MAURICE J. MOYER ACADEMIC INSTITUTE
RESPONSE TO MAJOR MODIFICATION CONCERNS

Mr. Blowman gave the reviewers the opportunity to restate any concerns about the application information and to clarify the additional information requested. The following concerns were noted:

Section A: Core Questions

1. Ms. Field Rogers requested revenue sheets that are consistent relative to enrollment and the percentage of special education student. Additionally, she requested that Moyer submit a contingency budget based on 80% enrollment (205) students.

   See Attachment A: Revenue Estimates FY2014-FY2018
   Revenue Estimates FY2014 (205 Students)
   Moyer Budget Worksheet Revised Budget (205 Students)

2. Ms. McCrae requested evidence that the curricula the department approved last year (Science, Social Studies, World Languages and Visual and Performing Arts) were implemented effectively this year. For Science, Ms. McCrae requested documentation that teachers have attended Science Coalition training in accordance with their Memorandum of Understanding. For other content areas, provide any other evidence of implementation (e.g. lessons plans, etc.)

   See Attachment B: Actual sample teacher lesson plans for Science-(Mr. Morgan), Social Studies-(Ms. Perkins), World Languages (online course), and Visual and Performing Arts-(Ms. Smith-Jackson) provided. Mr. Morgan and Mr. Tippens attended Science Coalition training, attendance sheets ad certificate(s) provided.

3. Ms. Mazza noted that the Exceptional Children Resources workgroup has ongoing concerns which will be addressed through a compliance agreement.

   Meeting will be held to address compliance agreement July 8th.

4. Ms. Bennett requested a more comprehensive professional development plan (beyond what SpringBoard has provided) that includes Moyer's RTI structure. She noted that teachers will not receive strategy instruction professional development from SpringBoard. Ms. Bennett further noted that an instructional leadership team is very different from an instructional support team. Without strong RTI structure in place it will be difficult to determine if Tier I is effective.

   See Attachment C: Maurice J. Moyer Academic Institute professional development schedule attached, detailing SpringBoard Curriculum Initial Teacher Training, new teacher orientation, and on-site professional development for first three weeks in August as well as professional development offerings throughout the remainder of the 2014-2015 school year. The 2014-2015

School Calendar is attached. The Instructional Support Team is in place and consists of a General Education Teacher, a Special Education Teacher, a Dean of Students, the Curriculum Director and a School Counselor. The team will meet bi-weekly. Maurice J. Moyer Academic Institute's Response to Intervention (RTI) Handbook is also attached.

Section C: Core Questions

5. Ms. Bennett also requested a plan for assessments that will be used for the RTI structure in lieu of the Smarter Balanced assessment bank that will not be available until November 2014 or later.

   See Attachment D: The Compass Learning program will be implemented in grades 6-12, for math and Reading/ELA. The program places students on a learning path based on their current learning level and CCSS and Delaware State Standards. The learning path is designed to be engaging and to facilitate the students' mastery of the material. The Compass Learning paths will assist students in building the foundational knowledge necessary to succeed both in class and on the state assessments. The Compass Learning program will be used to accurately identify student deficiencies through assessment data collected weekly and allowing the development of subsequent lesson plans to encourage development of skill and proficiency where deficiency is indicated. Site License to be purchased at a cost of approximately $3,300.00. Documentation attached.

6. Ms. Johnson requested an amended timeline and locations for SpringBoard professional development and coaching that includes a signed contract with College Board.

   See Attachment E: Maurice J. Moyer Academic Institute will provide access to SpringBoard Initial Teacher Training for (2) 6th Grade teachers, (2) Math Teachers, Middle School and High School, and (2) ELA Teachers, Middle School and High School. See attached registration and confirmation documentation.

7. Ms. Bennett noted the following feedback based on the Math Curriculum review:
   - Algebra I, Geometry, and Algebra II Scope and Sequence:
     i. All these courses need to show how they are aligning to CCSS. There is nothing in the scope and sequence document that shows this alignment (the structure of these documents are different from Grades 6, 7, and 8). Are there any gaps in alignment and if so what is the plan for filling those gaps?
     ii. Unit 1 is missing in Algebra II. Is there a reason?
     iii. In Algebra II, is there enough material for 180 days of study?
     iv. In Geometry, there is no pacing for Unit 1.
     v. Geometry Unit 6 has an incomplete pacing guide.
     vi. Pre-Calculus Unity 7 is the first Unit in the Scope and Sequence. Is there a reason for this rearrangement of units (or was this just a scanning issue?)

   See Attachment F: Complete SpringBoard Math Curriculum Scope and Sequence, Common Core Edition for High School (grades 9-12) attached, Algebra I, Geometry, Algebra II and Pre-Calculus.

New Charter School Estimated State and Local Fund Calculations

Disclaimer: The following estimates will vary from actuals and do not account for any extenuating circumstances.
--State earnings are detailed on the New Charter State Template Tab below.

	#students per unit
Regular/Special K-3	16.2
Regular Students 4-12	20
Special Students 4-12 Basic	8.4
Special Students 4-12 Intense	6
Special Students 4-12 Complex	2.6

Please enter the following information:

Specify grade configuration for the year of estimate: (Example k-8, 9-12)

Specify the county the school will be located: New Castle (Choices New Castle, Kent or Sussex)

Enter the number of students in the red cells below by school district and student type and the estimated funds will calculate below.
Enter the number of tenth graders in the box in cell location J:11

State Funding	Local Funding	Total Funding
$1,724,243	$1,148,542	$2,872,785

UNITS 18.45

Enter Estimated # of 10th Graders Here: 0

29 Appoquinimink	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$1,578.43	$0
Regular Students 4-12	0.00	$1,276.91	$0
Special Students 4-12 Basic	0.00	$3,040.26	$0
Special Students 4-12 Intense	0.00	$4,256.36	$0
Special Students 4-12 Complex	0.00	$9,822.37	$0
Totals	0.00		$0

31 Brandywine	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$4,137.77	$0
Regular Students 4-12	40.00	$3,351.59	$134,064
Special Students 4-12 Basic	5.00	$7,979.98	$39,900
Special Students 4-12 Intense	1.00	$11,171.98	$11,172
Special Students 4-12 Complex	1.00	$25,781.49	$25,781
	47.00		$210,917

30 Caesar Rodney	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$1,127.59	$0
Regular Students 4-12	0.00	$913.36	$0
Special Students 4-12 Basic	0.00	$2,174.64	$0
Special Students 4-12 Intense	0.00	$3,044.49	$0
Special Students 4-12 Complex	0.00	$7,025.75	$0
	0.00		$0

17 Cape Henlopen	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$2,825.21	$0
Regular Students 4-12	0.00	$2,369.42	$0
Special Students 4-12 Basic	0.00	$5,641.48	$0
Special Students 4-12 Intense	0.00	$7,898.07	$0
Special Students 4-12 Complex	0.00	$18,226.31	$0
Totals	0.00		$0

13 Capital	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$1,346.63	$0
Regular Students 4-12	0.00	$1,090.77	$0
Special Students 4-12 Basic	0.00	$2,597.08	$0
Special Students 4-12 Intense	0.00	$3,635.91	$0
Special Students 4-12 Complex	0.00	$8,390.55	$0
	0.00		$0

33 Christina	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$3,883.87	$0
Regular Students 4-12	102.00	$3,145.94	$320,886
Special Students 4-12 Basic	11.00	$7,490.33	$82,394
Special Students 4-12 Intense	4.00	$10,486.46	$41,946
Special Students 4-12 Complex	0.00	$24,199.52	$0
	117.00		$445,225

34 Colonial	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$2,765.74	$0
Regular Students 4-12	47.00	$2,240.25	$105,292
Special Students 4-12 Basic	5.00	$5,333.93	$26,670
Special Students 4-12 Intense	0.00	$7,467.51	$0
Special Students 4-12 Complex	0.00	$17,232.71	$0
Totals	52.00		$131,961

37 Delmar	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$805.15	$0
Regular Students 4-12	0.00	$652.17	$0
Special Students 4-12 Basic	0.00	$1,552.78	$0
Special Students 4-12 Intense	0.00	$2,173.89	$0
Special Students 4-12 Complex	0.00	$5,016.67	$0
	0.00		$0

36 Indian River	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$2,666.93	$0
Regular Students 4-12	0.00	$2,160.21	$0
Special Students 4-12 Basic	0.00	$5,143.36	$0
Special Students 4-12 Intense	0.00	$7,200.70	$0
Special Students 4-12 Complex	0.00	$16,617.00	$0
	0.00		$0

15 Lake Forest	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$1,076.87	$0
Regular Students 4-12	0.00	$872.27	$0
Special Students 4-12 Basic	0.00	$2,075.83	$0
Special Students 4-12 Intense	0.00	$2,907.56	$0
Special Students 4-12 Complex	0.00	$6,709.76	$0
Totals	0.00		$0

16 Laurel	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$737.88	$0
Regular Students 4-12	0.00	$597.68	$0
Special Students 4-12 Basic	0.00	$1,423.05	$0
Special Students 4-12 Intense	0.00	$1,992.27	$0
Special Students 4-12 Complex	0.00	$4,597.56	$0
	0.00		$0

18 Milford	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$1,346.14	$0
Regular Students 4-12	0.00	$1,091.99	$0
Special Students 4-12 Basic	0.00	$2,599.99	$0
Special Students 4-12 Intense	0.00	$3,639.98	$0
Special Students 4-12 Complex	0.00	$8,399.96	$0
	0.00		$0

32 Red Clay	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$4,211.22	$0
Regular Students 4-12	79.00	$3,411.09	$269,476
Special Students 4-12 Basic	7.00	$8,121.63	$56,851
Special Students 4-12 Intense	3.00	$11,370.28	$34,111
Special Students 4-12 Complex	0.00	$26,239.12	$0
Totals	89.00		$360,438

23 Seaford	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$1,146.72	$0
Regular Students 4-12	0.00	$928.85	$0
Special Students 4-12 Basic	0.00	$2,211.54	$0
Special Students 4-12 Intense	0.00	$3,095.16	$0
Special Students 4-12 Complex	0.00	$7,144.98	$0
	0.00		$0

24 Smyrna	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$1,285.94	$0
Regular Students 4-12	0.00	$1,041.61	$0
Special Students 4-12 Basic	0.00	$2,480.02	$0
Special Students 4-12 Intense	0.00	$3,472.03	$0
Special Students 4-12 Complex	0.00	$8,012.37	$0
	0.00		$0

35 Woodbridge	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$1,135.54	$0
Regular Students 4-12	0.00	$918.79	$0
Special Students 4-12 Basic	0.00	$2,189.97	$0
Special Students 4-12 Intense	0.00	$3,065.95	$0
Special Students 4-12 Complex	0.00	$7,075.28	$0
Totals	0.00		$0

Charter School Revenue Calculation - Estimate
State Funding

Student Total:	305				
Regular:	268				
Special:	37				
Location					
Districts:					
Appoquinimink	0	Christina	117	Laurel	0
Brandywine	47	Colonial	52	Milford	0
Caesar Rodney	0	Delmar	0	Red Clay	89
Cape Henlopen	0	Indian River	0	Seaford	0
Capital	0	Lake Forest	0	Smyrna	0
				Woodbridge	0

Transportation Eligible Students:	229		
Regular/Special K-3	0.00	Unit size Regular/Special K-3 students =	16.2
Regular Students 4-12	268.00	Unit size Regular Students 4-12 =	20
Special Students 4-12 Basic	28.00	Unit size Special Students 4-12 Basic =	8.4
Special Students 4-12 Intense	8.00	Unit size Special Students 4-12 Intense =	6
Special Students 4-12 Complex	1.00	Unit Size Special Students 4-12 Complex =	2.6

# of Div I Units Generated =	18.45	$30,894	$570,031
Administrative Assistant =	1.00	$50,290	$50,290
Percentage 11 Month Supervisor =	0.12	$59,411	$7,129
Percentage Transportation Supervisor =	0.03	$59,411	$1,782
Principal =	1.00	$60,849	$60,849
Assistant Principal =	0.00	$55,189	$0
Percentage Visiting Teacher =	0.07	$42,544	$2,978
Percentage Driver Education Teacher =	0.00	$37,468	$0
Nurse =	0.14	$40,315	$5,579
Academic Excellence Units =	1.22	$37,483	$45,729
Related Services Specialist K-3, 4-12 Reg, Basic 4-12	0.29	$42,890	$12,591
Related Services Specialist Intensive	0.24	$42,890	$10,398
Related Services Specialist Complex	0.13	$42,890	$5,499
Clerical Units =	1.00	$28,368	$28,368
Custodial Units =	1.00	$23,401	$23,401
Cafeteria Manager =	0.00	$26,491	$0
Cafeteria Worker =	0.00	$16,835	$0
Total Staffing =	24.69		
Total Staffing For Health Insurance =	24.69		
Total Salary Costs			$824,624
OEC Rate		28.53%	$235,265
Health Insurance Per FTE		$8,611	$212,639

Subtotal Personnel Revenue	**$1,272,528**

Other State Sources (based on Latest Available Values)

Professional & Curriculum Development =		$ -
Division II Units (No Vocational Courses) =	18.45	
Division II - All Other Costs - Current Unit Value =	$ 2,955	$ 54,524
Division II - Energy - Current Unit Value =	$ 2,435	$ 44,929
Division III - Equalization - Unit Value =	$ 6,465	$ 119,288
Academic Excellence Division III =		$ 7,887
MCI/Annual Maintenance =		$ 17,211
LEP =		$ -
Student Transportation Amount =		$ 207,877

Subtotal Other Sources	**$451,715**

Grand Total State Sources	**$1,724,243**

New Charter School Estimated State and Local Fund Calculations

Disclaimer: The following estimates will vary from actuals and do not account for any extenuating circumstances.
–State earnings are detailed on the New Charter State Template Tab below.

	#students per unit
Regular/Special K-3	16.2
Regular Students 4-12	20
Special Students 4-12 Basic	6.4
Special Students 4-12 Intense	6
Special Students 4-12 Complex	2.6

Please enter the following information:

Specify grade configuration for the year of estimate: (Example K-8, 9-12)

Specify the county the school will be located: New Castle (Choices New Castle, Kent or Sussex)

Enter the number of students in the red cells below by school district and student type and the estimated funds will calculate below.
Enter the number of tenth graders in the box in cell location J:11

State Funding	Local Funding	Total Funding
$1,581,580	$1,046,400	$2,627,980

UNITS 16.80

Enter Estimated # of 10th Graders Here: **0**

29 Appoquinimink	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$1,576.43	$0
Regular Students 4-12	0.00	$1,278.91	$0
Special Students 4-12 Basic	0.00	$3,040.26	$0
Special Students 4-12 Intense	0.00	$4,258.36	$0
Special Students 4-12 Complex	0.00	$9,822.37	$0
Totals	0.00		$0

31 Brandywine	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$4,137.77	$0
Regular Students 4-12	32.00	$3,351.59	$107,251
Special Students 4-12 Basic	7.00	$7,979.86	$55,860
Special Students 4-12 Intense	1.00	$11,171.96	$11,172
Special Students 4-12 Complex	1.00	$25,781.49	$25,781
	41.00		$200,064

10 Caesar Rodney	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$1,127.59	$0
Regular Students 4-12	0.00	$913.35	$0
Special Students 4-12 Basic	0.00	$2,174.64	$0
Special Students 4-12 Intense	0.00	$3,044.49	$0
Special Students 4-12 Complex	0.00	$7,025.75	$0
	0.00		$0

17 Cape Henlopen	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$2,925.21	$0
Regular Students 4-12	0.00	$2,369.42	$0
Special Students 4-12 Basic	0.00	$5,541.48	$0
Special Students 4-12 Intense	0.00	$7,898.07	$0
Special Students 4-12 Complex	0.00	$18,226.31	$0
Totals	0.00		$0

13 Capital	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$1,346.63	$0
Regular Students 4-12	0.00	$1,090.77	$0
Special Students 4-12 Basic	0.00	$2,597.08	$0
Special Students 4-12 Intense	0.00	$3,635.91	$0
Special Students 4-12 Complex	0.00	$8,390.55	$0
	0.00		$0

33 Christina	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$3,863.87	$0
Regular Students 4-12	87.00	$3,145.94	$273,697
Special Students 4-12 Basic	11.00	$7,490.33	$82,394
Special Students 4-12 Intense	4.00	$10,486.46	$41,946
Special Students 4-12 Complex	0.00	$24,199.52	$0
	102.00		$398,036

34 Colonial	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$2,755.74	$0
Regular Students 4-12	39.00	$2,240.25	$87,370
Special Students 4-12 Basic	6.00	$5,333.93	$32,004
Special Students 4-12 Intense	0.00	$7,467.51	$0
Special Students 4-12 Complex	0.00	$17,232.71	$0
Totals	45.00		$119,373

37 Delmar	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$805.15	$0
Regular Students 4-12	0.00	$652.17	$0
Special Students 4-12 Basic	0.00	$1,552.79	$0
Special Students 4-12 Intense	0.00	$2,173.89	$0
Special Students 4-12 Complex	0.00	$5,018.67	$0
	0.00		$0

36 Indian River	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$2,656.93	$0
Regular Students 4-12	0.00	$2,160.21	$0
Special Students 4-12 Basic	0.00	$5,143.36	$0
Special Students 4-12 Intense	0.00	$7,200.70	$0
Special Students 4-12 Complex	0.00	$16,617.00	$0
	0.00		$0

15 Lake Forest	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$1,078.87	$0
Regular Students 4-12	0.00	$872.27	$0
Special Students 4-12 Basic	0.00	$2,076.83	$0
Special Students 4-12 Intense	0.00	$2,907.56	$0
Special Students 4-12 Complex	0.00	$6,709.76	$0
Totals	0.00		$0

16 Laurel	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$737.68	$0
Regular Students 4-12	0.00	$597.66	$0
Special Students 4-12 Basic	0.00	$1,423.05	$0
Special Students 4-12 Intense	0.00	$1,992.27	$0
Special Students 4-12 Complex	0.00	$4,597.56	$0
	0.00		$0

18 Milford	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$1,348.14	$0
Regular Students 4-12	0.00	$1,091.99	$0
Special Students 4-12 Basic	0.00	$2,599.99	$0
Special Students 4-12 Intense	0.00	$3,639.98	$0
Special Students 4-12 Complex	0.00	$8,399.96	$0
	0.00		$0

32 Red Clay	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$4,211.22	$0
Regular Students 4-12	65.00	$3,411.09	$221,721
Special Students 4-12 Basic	9.00	$8,121.63	$73,095
Special Students 4-12 Intense	3.00	$11,370.28	$34,111
Special Students 4-12 Complex	0.00	$26,239.12	$0
Totals	77.00		$328,926

23 Seaford	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$1,146.72	$0
Regular Students 4-12	0.00	$928.65	$0
Special Students 4-12 Basic	0.00	$2,211.54	$0
Special Students 4-12 Intense	0.00	$3,096.16	$0
Special Students 4-12 Complex	0.00	$7,144.98	$0
	0.00		$0

24 Smyrna	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$1,285.94	$0
Regular Students 4-12	0.00	$1,041.61	$0
Special Students 4-12 Basic	0.00	$2,480.02	$0
Special Students 4-12 Intense	0.00	$3,472.03	$0
Special Students 4-12 Complex	0.00	$8,012.37	$0
	0.00		$0

35 Woodbridge	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$1,135.54	$0
Regular Students 4-12	0.00	$919.79	$0
Special Students 4-12 Basic	0.00	$2,189.97	$0
Special Students 4-12 Intense	0.00	$3,065.95	$0
Special Students 4-12 Complex	0.00	$7,075.28	$0
Totals	0.00		$0

Charter School Revenue Calculation - Estimate
State Funding

Student Total:	265				
Regular:	223				
Special:	42				
Location					
Districts:					
Appoquinimink	0	Christina	102	Laurel	0
Brandywine	41	Colonial	45	Milford	0
Caesar Rodney	0	Delmar	0	Red Clay	77
Cape Henlopen	0	Indian River	0	Seaford	0
Capital	0	Lake Forest	0	Smyrna	0
				Woodbridge	0

Transportation Eligible Students:	199		
Regular/Special K-3	0.00	Unit size Regular/Special K-3 students =	16.2
Regular Students 4-12	223.00	Unit size Regular Students 4-12 =	20
Special Students 4-12 Basic	33.00	Unit size Special Students 4-12 Basic =	8.4
Special Students 4-12 Intense	8.00	Unit size Special Students 4-12 Intense =	6
Special Students 4-12 Complex	1.00	Unit Size Special Students 4-12 Complex =	2.6

# of Div I Units Generated =	16.80	$30,894	$518,909
Administrative Assistant =	1.00	$50,290	$50,290
Percentage 11 Month Supervisor =	0.11	$59,411	$6,535
Percentage Transportation Supervisor =	0.03	$59,411	$1,782
Principal =	1.00	$60,849	$60,849
Assistant Principal =	0.00	$55,189	$0
Percentage Visiting Teacher =	0.07	$42,544	$2,978
Percentage Driver Education Teacher =	0.00	$37,468	$0
Nurse =	0.13	$40,315	$5,079
Academic Excellence Units =	1.06	$37,483	$39,732
Related Services Specialist K-3, 4-12 Reg, Basic 4-12	0.26	$42,890	$11,346
Related Services Specialist Intensive	0.24	$42,890	$10,398
Related Services Specialist Complex	0.13	$42,890	$5,499
Clerical Units =	1.00	$28,368	$28,368
Custodial Units =	1.00	$23,401	$23,401
Cafeteria Manager =	0.00	$26,491	$0
Cafeteria Worker =	0.00	$16,835	$0
Total Staffing =	22.83		
Total Staffing For Health Insurance =	22.83		
Total Salary Costs			$765,166
OEC Rate		28.53%	$218,302
Health Insurance Per FTE		$8,611	$196,569

Subtotal Personnel Revenue	**$1,180,037**

Other State Sources (based on Latest Available Values)

Professional & Curriculum Development =		$ -
Division II Units (No Vocational Courses) =	16.80	
Division II - All Other Costs - Current Unit Value =	$ 2,955	$ 49,634
Division II - Energy - Current Unit Value =	$ 2,435	$ 40,900
Division III - Equalization - Unit Value =	$ 6,465	$ 108,590
Academic Excellence Division III =		$ 6,853
MCI/Annual Maintenance =		$ 14,954
LEP =		$ -
Student Transportation Amount =		$ 180,614

Subtotal Other Sources	**$401,544**

Grand Total State Sources	**$1,581,580**

Delaware Dept. of Education

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Charter Bill (Charter View)

This report was last updated on: 11/27/2013

Select a Charter School: Moyer (Maurice J.) Academy

Select a School Year: 2014

Total Receivables from **all School Districts**

Charter School	Total Enrollment	Total Receivables	35% Pre-Load
Moyer (Maurice J.) Academy	227	$1,192,660.96	$417,431.34

Breakdown of Expected Receivables by School District

District Code	District Name	Students Enrolled from District	Receivable from District	35% Pre-Load
31	Brandywine School District	42	$246,683.56	$86,339.25
33	Christina School District	102	$545,689.71	$190,991.40
34	Colonial School District	30	$109,722.51	$38,402.88
32	Red Clay Consolidated School District	53	$290,565.19	$101,697.82

Funding Summary as of 03/07/2014

Charter/District Name: Moyer (Maurice J.) Academy

Fiscal Year: 2014

Grade Configuration: 6-12

Meals Configuration: Meals prepared by the school

Total Enrollment: 227

Brandywine School District	42	Colonial School District	30
Christina School District	102	Red Clay Consolidated School District	53

Transportation Eligible: 200

Personnel

Description	Units Funded	Units Allocated	Unit Cost	Total Cost
# of Div I Units Generated	19.26	18.00	$32,173	$619,652
Administrative Assistant	1.00	1.00	$47,801	$47,801
11 Month Supervisor	0.13	0.00	$60,530	$7,869
Transportation Supervisor	0.03	0.00	$60,530	$1,816
Principal	1.00	1.00	$66,860	$66,860
Assistant Principal	0.00	0.00	$57,617	$0
Visiting Teacher	0.08	0.00	$43,545	$3,484
Driver Education Teacher	0.20	0.00	$39,641	$7,928
Nurse	0.14	0.00	$42,031	$6,052
Academic Excellence Units	0.91	0.00	$39,448	$35,898
Clerical Units	1.00	1.00	$31,224	$31,224
Custodial Units	2.00	2.00	$27,211	$54,421
Cafeteria Manager	0.73	0.00	$26,992	$19,704
Cafeteria Worker	1.41	1.41	$24,257	$34,203
Related Service Specialist - Basic	0.25	0.00	$45,577	$11,394
Related Service Specialist - Intense	0.30	0.00	$45,577	$13,673
Related Service Specialist - Complex	1.15	0.00	$45,577	$52,414
Chief School Officer/Superintendent	0.00	0.00	$0	$0
Asst. Superintendent	0.00	0.00	$70,602	$0
Directors	0.00	0.00	$67,074	$0
Supervisor Building/Grounds	0.00	0.00	$0	$0
Subtotal Salary Costs				$1,014,393
FY OEC Components				
Pension			$0	$213,225
Workman's Compensation			$0	$16,230
Unemployment Insurance			$0	$1,724
FICA			$0	$62,892
Medicare			$0	$14,709
Health Insurance Costs				$264,658
Subtotal Personnel Revenue				$1,567,831

Other State Sources

Description	Units	Total Cost
Division II Units	19.26	
Division II - All Other Costs - Current Unit Value	$2,955.00	$56,913
Division II - Energy - Current Unit Value	$2,435.00	$46,896
Division III - Equalization - Unit Value	$6,465.00	$124,516
Division III Visiting Teacher		$517
Academic Excellence Division III		$5,883
Academic Excellence Division II		$2,689
Academic Excellence Allotment		$0
Professional & Curriculum Development		$2,968
MCI/Annual Maintenance		$22,680
LEP		$0
Technology Block Grants		$0
Tax Relief Funds		$0
Student Transportation Amount		$172,596
Driver Education Maintenance		$1,307
Subtotal Other Sources		$436,947
Total of Personnel Revenue and Other Sources		$2,024,778
Adjustment		$49,308
Adjusted Total		$2,074,086
Amount Already Forwarded		$1,991,500
Remainder to Forward		$82,586

Notes/Explanation for adjustment: $641 - Div III Psychologist; $3,467 – N. Alexander salary correction; $33,476 – N. Bulgheroni/K. Jackson-Harper pareeducator pair salary correction; $11,724 – C. McMillan, A. Morgan, M. Smith-Jackson salary corrections due to certification status.

New Charter School Estimated State and Local Fund Calculations

Disclaimer: The following estimates will vary from actuals and do not account for any extenuating circumstances.
--State earnings are detailed on the New Charter State Template Tab below.

	#students per unit
Regular/Special K-3	16.2
Regular Students 4-12	20
Special Students 4-12 Basic	8.4
Special Students 4-12 Intense	6
Special Students 4-12 Complex	2.6

Please enter the following information:

Specify grade configuration for the year of estimate: (Example k-8, 9-12)

Specify the county the school will be located: New Castle (Choices New Castle, Kent or Sussex)

Enter the number of students in the red cells below by school district and student type and the estimated funds will calculate below.

Enter the number of tenth graders in the box in cell location J:11

State Funding	Local Funding	Total Funding
$1,639,361	$1,080,154	$2,719,515

UNITS 17.49

Enter Estimated # of 10th Graders Here: 0

29 Appoquinimink	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$1,414.40	$0
Regular Students 4-12	0.00	$1,145.66	$0
Special Students 4-12 Basic	0.00	$2,727.77	$0
Special Students 4-12 Intense	0.00	$3,819.88	$0
Special Students 4-12 Complex	0.00	$9,812.80	$0
Totals	0.00		$0

31 Brandywine	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$4,232.41	$0
Regular Students 4-12	23.00	$3,428.25	$78,850
Special Students 4-12 Basic	12.00	$8,162.51	$97,950
Special Students 4-12 Intense	0.00	$11,427.51	$0
Special Students 4-12 Complex	0.00	$26,371.18	$0
	35.00		$176,800

10 Caesar Rodney	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$967.87	$0
Regular Students 4-12	0.00	$783.98	$0
Special Students 4-12 Basic	0.00	$1,668.61	$0
Special Students 4-12 Intense	0.00	$2,613.25	$0
Special Students 4-12 Complex	0.00	$6,030.58	$0
	0.00		$0

17 Cape Henlopen	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$2,568.03	$0
Regular Students 4-12	0.00	$2,080.10	$0
Special Students 4-12 Basic	0.00	$4,952.63	$0
Special Students 4-12 Intense	0.00	$6,933.68	$0
Special Students 4-12 Complex	0.00	$16,000.80	$0
Totals	0.00		$0

13 Capital	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$1,319.66	$0
Regular Students 4-12	0.00	$1,068.92	$0
Special Students 4-12 Basic	0.00	$2,545.05	$0
Special Students 4-12 Intense	0.00	$3,563.08	$0
Special Students 4-12 Complex	0.00	$8,222.48	$0
	0.00		$0

33 Christina	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$3,958.88	$0
Regular Students 4-12	64.00	$3,206.69	$205,228
Special Students 4-12 Basic	23.00	$7,634.98	$175,605
Special Students 4-12 Intense	7.00	$10,688.97	$74,823
Special Students 4-12 Complex	3.00	$24,666.86	$74,001
	97.00		$529,656

34 Colonial	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$2,706.23	$0
Regular Students 4-12	15.00	$2,191.24	$32,868
Special Students 4-12 Basic	8.00	$5,217.24	$41,738
Special Students 4-12 Intense	1.00	$7,304.13	$7,304
Special Students 4-12 Complex	1.00	$16,655.69	$16,656
Totals	25.00		$98,766

37 Delmar	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$1,137.30	$0
Regular Students 4-12	0.00	$921.22	$0
Special Students 4-12 Basic	0.00	$2,193.37	$0
Special Students 4-12 Intense	0.00	$3,070.72	$0
Special Students 4-12 Complex	0.00	$7,086.27	$0
	0.00		$0

36 Indian River	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$2,626.32	$0
Regular Students 4-12	0.00	$2,127.32	$0
Special Students 4-12 Basic	0.00	$5,065.05	$0
Special Students 4-12 Intense	0.00	$7,091.08	$0
Special Students 4-12 Complex	0.00	$16,364.02	$0
	0.00		$0

15 Lake Forest	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$948.29	$0
Regular Students 4-12	0.00	$768.12	$0
Special Students 4-12 Basic	0.00	$1,828.85	$0
Special Students 4-12 Intense	0.00	$2,560.39	$0
Special Students 4-12 Complex	0.00	$5,908.58	$0
Totals	0.00		$0

16 Laurel	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$832.03	$0
Regular Students 4-12	0.00	$673.95	$0
Special Students 4-12 Basic	0.00	$1,604.64	$0
Special Students 4-12 Intense	0.00	$2,246.49	$0
Special Students 4-12 Complex	0.00	$5,184.21	$0
	0.00		$0

18 Milford	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$1,375.43	$0
Regular Students 4-12	0.00	$1,114.10	$0
Special Students 4-12 Basic	0.00	$2,652.61	$0
Special Students 4-12 Intense	0.00	$3,713.66	$0
Special Students 4-12 Complex	0.00	$8,569.97	$0
	0.00		$0

32 Red Clay	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$3,859.97	$0
Regular Students 4-12	32.00	$3,126.57	$100,050
Special Students 4-12 Basic	11.00	$7,444.22	$81,886
Special Students 4-12 Intense	2.00	$10,421.91	$20,844
Special Students 4-12 Complex	3.00	$24,050.57	$72,152
Totals	48.00		$274,932

23 Seaford	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$1,354.76	$0
Regular Students 4-12	0.00	$1,097.35	$0
Special Students 4-12 Basic	0.00	$2,612.75	$0
Special Students 4-12 Intense	0.00	$3,657.85	$0
Special Students 4-12 Complex	0.00	$8,441.19	$0
	0.00		$0

24 Smyrna	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$1,057.87	$0
Regular Students 4-12	0.00	$856.88	$0
Special Students 4-12 Basic	0.00	$2,040.18	$0
Special Students 4-12 Intense	0.00	$2,856.26	$0
Special Students 4-12 Complex	0.00	$6,591.37	$0
	0.00		$0

35 Woodbridge	#	Local Pupil Rate	Amount
Regular/Special K-3	0.00	$1,193.02	$0
Regular Students 4-12	0.00	$966.34	$0
Special Students 4-12 Basic	0.00	$2,300.82	$0
Special Students 4-12 Intense	0.00	$3,221.15	$0
Special Students 4-12 Complex	0.00	$7,433.42	$0
Totals	0.00		$0

Charter School Application Budget Worksheet

	State Local & Loan Revenue	FY 2014		FY 2015		FY 2016		FY 2017		FY 2018	
1	State Appropriations	$2,024,778		$1,639,361		$2,204,951		$2,204,951		$2,204,951	
2	School District Local Fund Transfers	$1,192,660		$1,080,154		$1,470,936		$1,470,936		$1,470,936	
3	Prior Year Carryover Funds	$91,831		$72,325		$77,676		$84,102		$84,230	
	**Unbudgeted Carryover										
	**Summer Pay Set Aside	$ 307,000									
	STATE LOCAL & LOANS REVENUE	**$3,616,269**		**$2,791,840**		**$3,753,565**		**$3,759,989**		**$3,760,117**	
	State Local & Loans Expenses	**FY 2014**		**FY 2015**		**FY 2016**		**FY 2017**		**FY 2018**	
	Personnel Salaries / Other Employer Costs		FTE		FTE		FTE		FTE		FTE
4	Classroom Teachers	$610,988	12.00	$610,988	12.00	$881,988	14.00	$881,986	14.00	$881,988	14.00
5	Special Education Teachers	$246,000	6.00	$206,000	5.00	$360,000	8.00	$360,000	8.00	$360,000	8.00
6	Special Teachers (phys Ed, Art, Music)	$196,000	4.00	$196,000	4.00	$196,000	4.00	$196,000	4.00	$196,000	4.00
7	Counselors	$0	0.00	$0	0.00	$0	0.00	$0	0.00	$0	0.00
8	Principal/Administrative	$80,000	1.00	$65,000	1.00	$80,000	1.00	$80,000	1.00	$80,000	1.00
9	Nurse	$48,000	1.00	$48,000	1.00	$48,000	1.00	$48,000	1.00	$48,000	1.00
10	Clerical	$124,560	2.84	$43,560	1.00	$124,560	2.84	$124,560	2.84	$124,560	2.84
11	Custodial	$56,840	2.50	$18,420	1.00	$58,840	2.50	$58,840	2.50	$58,840	2.50
12	Para Professionals	$65,500	2.00	$65,500	2.00	$123,000	4.00	$123,000	4.00	$123,000	4.00
13	Food Service -Other	$11,104	1.50	$11,104	1.50	$11,104	2.00	$11,105	2.00	$11,105	2.00
14	Other Employer Costs (30.44 % of Salaries)	$436,638		$384,936		$512,455		$512,455		$512,455	
15	Health Insurance	$265,233		$247,862		$341,245		$341,245		$341,245	
16	Other Benefits	$0		$0		$0		$0		$0	
	SUBTOTAL SALARIES / OTHER EMPLOYER COSTS	**$2,164,863**	**32.84**	**$1,897,369**	**28.50**	**$2,537,192**	**39.34**	**$2,537,193**	**39.34**	**$2,537,193**	**39.34**
	Student Support										
17	Transportation	$152,761		$112,761		$207,159		$207,159		$207,159	
18	Extra Curricular Transportation	$0		$0		$0		$0		$0	
19	Cafeteria	$16,097		$16,097		$21,820		$21,820		$21,820	
20	Extra Curricular	$0		$0		$0		$0		$0	
21	Supplies and Materials	$20,037		$15,037		$27,162		$27,162		$27,162	
22	Textbooks	$6,000		$6,000		$6,000		$6,000		$6,000	
23	Curriculum	$60,000		$0		$0		$0		$0	
24	Professional Development	$7,000		$7,000		$7,000		$7,000		$7,000	
25	Assessments	$39,000		$29,000		$39,000		$39,000		$39,000	
26	Other Educational Program	$0		$0		$0		$0		$0	
27	Therapists (Occupational, Speech)	$3,600		$3,600		$4,900		$4,900		$4,900	
28	Classroom Technology	$40,000		$0		$0		$0		$0	
29	School Climate	$0		$0		$0		$0		$0	
30	Computers	$60,000		$15,000		$15,000		$15,000		$15,000	
31	Contracted Services	$113,174		$65,000		$105,174		$105,174		$105,174	
32	Other	$16,822		$16,822		$16,822		$16,822		$16,822	
	SUBTOTAL STUDENT SUPPORT	**$534,491**		**$286,317**		**$450,037**		**$450,037**		**$450,037**	
	Operations and Maintenance of Facilities										
33	Insurance (Property/Liability)	$15,000		$15,000		$15,000		$15,000		$15,000	
34	Rent	$0		$0		$0		$0		$0	
35	Mortgage	$198,000		$198,000		$198,000		$198,000		$198,000	
36	Utilities	$120,000		$120,000		$120,000		$120,000		$120,000	
37	Maintenance	$154,000		$75,000		$100,000		$100,000		$100,000	
38	Telephone/Communications	$10,300		$10,300		$10,300		$10,300		$10,300	
39	Construction	$0		$0		$0		$0		$0	
40	Renovation	$0		$0		$0		$0		$0	
41	Custodial Supplies	$5,300		$1,300		$5,300		$5,300		$5,300	
	SUBTOTAL OPERATIONS AND MAINTENANCE OF FACILITIES	**$502,600**		**$419,600**		**$449,600**		**$448,600**		**$448,600**	
	Administrative/Operations Support										
42	Equipment Lease/Maintenance	$50,200		$35,000		$50,200		$50,200		$50,200	
43	Equipment Purchase	$0		$0		$0		$0		$0	
44	Supplies and Materials	$15,000		$12,000		$20,000		$20,000		$20,000	
45	Printing and Copying	$44,500		$12,400		$60,300		$60,300		$60,300	
46	Postage and Shipping	$3,500		$2,200		$4,800		$4,800		$4,800	
47	Enrollment / Recruitment	$0		$0		$0		$0		$0	
48	Staffing (recruitment and assessment	$500		$500		$500		$500		$500	
50	Legal Services	$18,400		$6,400		$8,400		$8,400		$8,400	
50	Auditors	$17,000		$17,000		$17,000		$17,000		$17,000	
	SUBTOTAL ADMINISTRATIVE/OPERATIONS SUPPORT	**$149,100**		**$87,500**		**$161,200**		**$161,200**		**$161,200**	
	Management Company										
51	Fees	$27,890		$23,376		$72,434		$78,729		$78,855	
52	Salaries/Other Employee Costs	$0		$0		$0		$0			
53	Curriculum	$0		$0		$0		$0		$0	
54	Accounting and Payroll	$0		$0		$0		$0		$0	
55	Other	$165,000		$0		$0		$0		$0	
	SUBTOTAL MANAGEMENT COMPANY	**$192,890**		**$23,376**		**$72,434**		**$78,729**		**$78,855**	
	STATE LOCAL & LOANS EXPENDITURES	**$3,543,944**		**$2,714,162**		**$3,669,463**		**$3,675,759**		**$3,675,885**	
56	**# Students**	225		205		305		305		305	
	REVENUE LESS EXPENDITURES	**$72,325**		**$77,678**		**$84,102**		**$84,230**		**$84,232**	
	2 % CONTINGENCY CHECK	$72,325.38		$55,836.80		$75,071.30		$75,199.78		$75,202.34	

Lesson Plan

Teacher: Mr. Morgan **Dates: 02/25/14**

Grade Level: **9th grade** **Lesson/Activity Duration:** *47 minuets*

Subject Area(s): *Physical Science* **Curricular Unit/Theme:** *energy across the system*

Agenda: *Student will examine how waves transfer energy.*

1. Do Now assignment (5 min.)
2. Mini lesson defining the different wave types(20 min)
3. Students will look at simulations describing the different types of Waves and their properties (20 min)
4. Exit Ticket/Post Assessment (5 min)

Materials: *List any materials you or the students need to prepare to teach and execute the lesson.*

- ☐ Student guided notes

Common Core State Standard(s): *State standards the lesson supports or should cover.*

- ❖ Forces are mechanical and can transfer energy from one object to another. A force acting on an object and moving it through a distance does work on the object and changes it kinetic energy potential energy or both. Power indicates the rate at which forces transfer energy to an object or away from it. (3.2.2)
- ❖ Waves Carry energy that can have important consequences when transferred to objects or substances. (3.3.3)

Student Learning Objectives/Outcomes:

- ❖ **Student will become familiar with different wave types and energies.**

Do Now/Warm-up Activity: *Do Now questions:*

How is energy carried through a transverse wave?

Can waves transport matter? If so how?

Grouping Structures/Seating Arrangement: *students grouping will be 5 to a group, 3 groups*

Modifications and Accommodations: *Special education student will receive help with the reading comprehension and the definitions of key words applicable to this lesson. Students will also be given extra time to complete assignments. I will make sure to devote time to give individual groups instruction to those students who need it.*

Differentiation: *high achieving students will be given an internet assignment where they will research each wave type and look for an example of how that particular wav and energy is utilized on a daily basis. Students will also discuss safety hazards, if any, and major benefits.*

Pre Assessment: *List the assessment name and what you will do to pre-assess the students.*

Lesson/Activity Sequence:

Teacher Actions	Learner Actions
Teacher will conduct class lecture involving wave types. Teacher will introduce key vocabulary and important concepts	Students will discuss the results they obtained from their lab experiments with teacher and other students Students will read as group with teacher investigation/guided notes packet filling in the key vocabulary terms and outlining key concepts.

**Describes what both the teacher and students will do throughout the lesson.*

Post Assessment/Exit Ticket: *Student will answer post analysis questions after data is collected.*

Follow Up (Extension/Enrichment): *Quiz will be given on material at end of following week.*

Lesson Plan

Teacher: Mr. Morgan **Dates: 02/26/14**

Grade Level: **9th grade** **Lesson/Activity Duration:** *47 minuets*

Subject Area(s): *Physical Science* **Curricular Unit/Theme:** *energy across the system*

Agenda: *Student will examine how waves transfer energy.*

1. Do Now assignment (5 min.)
2. Investigation How waves transfer energy(30 min)
3. Students will answer discussion questions(10 min)
4. Exit Ticket/Post Assessment (5 min)

Materials: *List any materials you or the students need to prepare to teach and execute the lesson.*

- ☐ Laser pointers
- ☐ Two cups of red and blue jello
- ☐ PowerPoint

Common Core State Standard(s): *State standards the lesson supports or should cover.*

- ❖ Forces are mechanical and can transfer energy from one object to another. A force acting on an object and moving it through a distance does work on the object and changes it kinetic energy potential energy or both. Power indicates the rate at which forces transfer energy to an object or away from it. (3.2.2)
- ❖ Waves Carry energy that can have important consequences when transferred to objects or substances. (3.3.3)

Student Learning Objectives/Outcomes:

- ❖ **Student will examine how wave energies can be absorbed and distorted.**

Do Now/Warm-up Activity: *Do Now questions:*

What would cause a wave to lose energy?

Can waves be absorbed? How do we know this?

Grouping Structures/Seating Arrangement: *students grouping will be 5 to a group, 3 groups*

Modifications and Accommodations: *Special education student will receive help with the reading comprehension and the definitions of key words applicable to this lesson. Students will also be given extra time to complete assignments. I will make sure to devote time to give individual group instruction to those students who need it.*

Differentiation: *high achieving students will take then test to see if different liquids would create the same type of absorption the jello did. They will test regular water, oil, milk, dark colored liquids and light colored liquids*

Pre Assessment: *List the assessment name and what you will do to pre-assess the students.*

Lesson/Activity Sequence:

Teacher Actions	Learner Actions
Teacher will conduct investigation with laser pointer. Teacher will walk student through assessment questions	Students will write down observations and sketch a picture of what the laser beam s doing

**Describes what both the teacher and students will do throughout the lesson.*

Post Assessment/Exit Ticket: *Student will answer post analysis questions after data is collected.*

Follow Up (Extension/Enrichment): *Quiz will be given on material at end of following week.*

Lesson Plan

Teacher: Mr. Morgan **Dates: 02/27/14**

Grade Level: **9th grade** **Lesson/Activity Duration:** *47 minuets*

Subject Area(s): *Physical Science* **Curricular Unit/Theme:** *energy across the system*

Agenda: *Student will examine how waves deliver their energy.*

1. Do Now assignment (5 min.)
2. Introduction lecture into how waves deliver energy and introduction into vocabulary(30 min)
3. Demonstration on who light divides(10 min)
4. Exit Ticket/Post Assessment (5 min)

Materials: *List any materials you or the students need to prepare to teach and execute the lesson.*

- ☐ Laser pointers
- ☐ A clear container
- ☐ Power
- ☐ Water, milk, or some substance to cloud container of water

Common Core State Standard(s): *State standards the lesson supports or should cover.*

- ❖ Forces are mechanical and can transfer energy from one object to another. A force acting on an object and moving it through a distance does work on the object and changes it kinetic energy potential energy or both. Power indicates the rate at which forces transfer energy to an object or away from it. (3.2.2)
- ❖ Waves Carry energy that can have important consequences when transferred to objects or substances. (3.3.3)

Student Learning Objectives/Outcomes:

- ❖ **Student will examine how light divides and how lasers work.**

Do Now/Warm-up Activity: *Do Now questions:*

Why we can see visible light? Explain.

What happened to the laser beam when it was shinned into the red cup of jello and what happened when the laser was shinned into the blue cup of jello?

Grouping Structures/Seating Arrangement: *students grouping will be 5 to a group, 3 groups*

Modifications and Accommodations: *Special education student will receive help with the reading comprehension and the definitions of key words applicable to this lesson. Students will also be given extra time*

to complete assignments. I will make sure to devote time to give individual group instruction to those students who need it.

Differentiation: *high achieving students will take then test to see if different liquids would create the same type of absorption the jello did. They will test regular water, oil, milk, dark colored liquids and light colored liquids*

Pre Assessment: *List the assessment name and what you will do to pre-assess the students.*

Lesson/Activity Sequence:

Teacher Actions	**Learner Actions**
Teacher will conduct investigation with laser pointer. Teacher will walk student through assessment questions	Students will write down observations and sketch a picture of what the laser beam s doing

**Describes what both the teacher and students will do throughout the lesson.*

Post Assessment/Exit Ticket: *Student will answer post analysis questions after data is collected.*

Follow Up (Extension/Enrichment): *Quiz will be given on material at end of following week.*

Lesson Plan

Teacher: Mr. Morgan **Dates: 02/28/14**

Grade Level: **9th grade** **Lesson/Activity Duration:** *47 minuets*

Subject Area(s): *Physical Science* **Curricular Unit/Theme:** *energy across the system*

Agenda: *Student will examine how waves deliver their energy.*

1. Do Now assignment (5 min.)
2. Finish investigation of how waves deliver energy (10 min)
3. Student will complete investigation assessment questions and discussion(30 min)
4. Exit Ticket/Post Assessment (5 min)

Materials: *List any materials you or the students need to prepare to teach and execute the lesson.*

- ☐ Laser pointers
- ☐ A clear container
- ☐ Power
- ☐ Water, milk, or some substance to cloud container of water

Common Core State Standard(s): *State standards the lesson supports or should cover.*

- ❖ Forces are mechanical and can transfer energy from one object to another. A force acting on an object and moving it through a distance does work on the object and changes it kinetic energy potential energy or both. Power indicates the rate at which forces transfer energy to an object or away from it. (3.2.2)
- ❖ Waves Carry energy that can have important consequences when transferred to objects or substances. (3.3.3)

Student Learning Objectives/Outcomes:

- ❖ **Student will examine how light divides and how lasers work.**

Do Now/Warm-up Activity: *Do Now questions:*

Why we can see visible light? Explain.

What happened to the laser beam when it was shinned into the red cup of jello and what happened when the laser was shinned into the blue cup of jello?

Grouping Structures/Seating Arrangement: *students grouping will be 5 to a group, 3 groups*

Modifications and Accommodations: *Special education student will receive help with the reading comprehension and the definitions of key words applicable to this lesson. Students will also be given extra time*

to complete assignments. I will make sure to devote time to give individual group instruction to those students who need it.

Differentiation: *high achieving students will take then test to see if different liquids would create the same type of absorption the jello did. They will test regular water, oil, milk, dark colored liquids and light colored liquids*

Pre Assessment: *List the assessment name and what you will do to pre-assess the students.*

Lesson/Activity Sequence:

Teacher Actions	Learner Actions
Teacher will conduct investigation with laser pointer. Teacher will walk student through assessment questions	Students will write down observations and sketch a picture of what the laser beam s doing

**Describes what both the teacher and students will do throughout the lesson.*

Post Assessment/Exit Ticket: *Student will answer post analysis questions after data is collected.*

Follow Up (Extension/Enrichment): *Quiz will be given on material at end of following week.*

Lesson Plan

Teacher: Mr. Morgan **Dates: 02/28/14**

Grade Level: **9th grade** **Lesson/Activity Duration:** *47 minuets*

Subject Area(s): *Physical Science* **Curricular Unit/Theme:** *energy across the system*

Agenda: *Student will examine how waves deliver their energy.*

1. Do Now assignment (5 min.)
2. Finish investigation of how waves deliver energy (10 min)
3. Student will complete investigation assessment questions and discussion(30 min)
4. Exit Ticket/Post Assessment (5 min)

Materials: *List any materials you or the students need to prepare to teach and execute the lesson.*

- ☐ Laser pointers
- ☐ A clear container
- ☐ Power
- ☐ Water, milk, or some substance to cloud container of water

Common Core State Standard(s): *State standards the lesson supports or should cover.*

- ❖ Forces are mechanical and can transfer energy from one object to another. A force acting on an object and moving it through a distance does work on the object and changes it kinetic energy potential energy or both. Power indicates the rate at which forces transfer energy to an object or away from it. (3.2.2)
- ❖ Waves Carry energy that can have important consequences when transferred to objects or substances. (3.3.3)

Student Learning Objectives/Outcomes:

- ❖ **Student will examine how light divides and how lasers work.**

Do Now/Warm-up Activity: *Do Now questions:*

Why we can see visible light? Explain.

What happened to the laser beam when it was shinned into the red cup of jello and what happened when the laser was shinned into the blue cup of jello?

Grouping Structures/Seating Arrangement: *students grouping will be 5 to a group, 3 groups*

Modifications and Accommodations: *Special education student will receive help with the reading comprehension and the definitions of key words applicable to this lesson. Students will also be given extra time*

to complete assignments. I will make sure to devote time to give individual group instruction to those students who need it.

Differentiation: *high achieving students will take then test to see if different liquids would create the same type of absorption the jello did. They will test regular water, oil, milk, dark colored liquids and light colored liquids*

Pre Assessment: *List the assessment name and what you will do to pre-assess the students.*

Lesson/Activity Sequence:

Teacher Actions	**Learner Actions**
Teacher will conduct investigation with laser pointer. Teacher will walk student through assessment questions	Students will write down observations and sketch a picture of what the laser beam s doing

**Describes what both the teacher and students will do throughout the lesson.*

Post Assessment/Exit Ticket: *Student will answer post analysis questions after data is collected.*

Follow Up (Extension/Enrichment): *Quiz will be given on material at end of following week.*

Lesson Plan

Teacher: Mr. Morgan **Dates: 03/10/14**

Grade Level: **10th grade** **Lesson/Activity Duration:** *47 minuets*

Subject Area(s): *Biology* **Curricular Unit/Theme:** *Cell Biology*

Agenda: *Student will create a model membrane of a cell*

1. Do now assignment (5 min.)
2. Introduction into creating a model membrane assignment (10 min)
3. Class experiment (30min)
4. Exit Ticket/Post Assessment (5 min)

Materials: *List any materials you or the students need to prepare to teach and execute the lesson.*

- ☐ **Tray**
- ☐ **Bubble solution**
- ☐ **Straws**
- ☐ **Cotton string**
- ☐ **Plastic tubes**
- ☐ **Tooth picks**
- ☐ **Paper clips**
- ☐ **Scissors paper towel**

Common Core State Standard(s): *State standards the lesson supports or should cover.*

- ❖ Content Standard(s): 6.9-12.1B Cells take different forms in many plants, animals, and microorganisms. The structure of the cells is what will determine the function of the cells

Student Learning Objectives/Outcomes:

- ❖ **Students will understand the structures and characteristics help cell membranes perform its functions**

Do Now/Warm-up Activity:

What is the purpose of the cell membrane in cells?

What is the main difference between the cell membrane in an animal cell and a plant cell?

Grouping Structures/Seating Arrangement: *students grouping will be 5 to a group, 3 groups*

Modifications and Accommodations: *Accommodations for students in this class will be as follows, student will receive help with reading comprehension and vocabulary for this particular assignment. Student will be grouped into small groups and the experiment will be conducted under teacher supervision. Students will also be given extra time to complete the reading and note taking portion of this assignment.*

Differentiation:

Pre Assessment: *List the assessment name and what you will do to pre-assess the students.*

Lesson/Activity Sequence:

Teacher Actions	Learner Actions
Teacher will conduct experiment Teacher will monitor students as they complete observations	Students will be recording observations. Students will be utilizing prior knowledge to determine what is happening to cell memebrane . Students will complete analysis questions from end of chapter.

**Describes what both the teacher and students will do throughout the lesson.*

Post Assessment/Exit Ticket: *Student will answer independent practice worksheet.*

Follow Up (Extension/Enrichment):

Lesson Plan

Teacher: Mr. Morgan **Dates: 03/11/14**

Grade Level: **10th grade** **Lesson/Activity Duration:** *47 minuets*

Subject Area(s): *Biology* **Curricular Unit/Theme:** *Cell Biology*

Agenda: *Student will create a model membrane of a cell*

1. Do now assignment (5 min.)
2. Finish creating a model membrane assignment (20 min)
3. Students will answer experiment analysis questions(20min)
4. Exit Ticket/Post Assessment (5 min)

Materials: *List any materials you or the students need to prepare to teach and execute the lesson.*

- ☐ **Tray**
- ☐ **Bubble solution**
- ☐ **Straws**
- ☐ **Cotton string**
- ☐ **Plastic tubes**
- ☐ **Tooth picks**
- ☐ **Paper clips**
- ☐ **Scissors paper towe**

Common Core State Standard(s): *State standards the lesson supports or should cover.*

- ❖ Content Standard(s): 6.9-12.1B Cells take different forms in many plants, animals, and microorganisms. The structure of the cells is what will determine the function of the cells

Student Learning Objectives/Outcomes:

- ❖ **Students will understand the structures and characteristics help cell membranes perform its functions**

Do Now/Warm-up Activity:

What is the purpose of the cell membrane in cells?

What is the main difference between the cell membrane in an animal cell and a plant cell?

Grouping Structures/Seating Arrangement: *students grouping will be 5 to a group, 3 groups*

Modifications and Accommodations: *Accommodations for students in this class will be as follows, student will receive help with reading comprehension and vocabulary for this particular assignment. Student will be grouped into small groups and the experiment will be conducted under teacher supervision. Students will also be given extra time to complete the reading and note taking portion of this assignment.*

Differentiation:

Pre Assessment: *List the assessment name and what you will do to pre-assess the students.*

Lesson/Activity Sequence:

Teacher Actions	Learner Actions
Teacher will conduct experiment Teacher will monitor students as they complete observations	Students will be recording observations. Students will be utilizing prior knowledge to determine what is happening to cell memebrane . Students will complete analysis questions from end of chapter.

**Describes what both the teacher and students will do throughout the lesson.*

Post Assessment/Exit Ticket: *Student will answer independent practice worksheet.*

Follow Up (Extension/Enrichment):

Lesson Plan

Teacher: Mr. Morgan **Dates: 03/12/14**

Grade Level: **10th grade** **Lesson/Activity Duration:** *47 minuets*

Subject Area(s): *Biology* **Curricular Unit/Theme:** *Cell Biology*

Agenda: *Student will discuss diffusion of cell membranes*

1. Do now assignment (5 min.)
2. Introduction into diffusion (20 min)
3. Guided notes completion (20min)
4. Exit Ticket/Post Assessment (5 min)

Materials: *List any materials you or the students need to prepare to teach and execute the lesson.*

- ☐ **Guided notes**
- ☐ **Biology Text books**

Common Core State Standard(s): *State standards the lesson supports or should cover.*

- ❖ Content Standard(s): 6.9-12.1B Cells take different forms in many plants, animals, and microorganisms. The structure of the cells is what will determine the function of the cells

Student Learning Objectives/Outcomes:

- ❖ **Students will understand how cells use diffusion to get nutrients and other materials into the cells**

Do Now/Warm-up Activity:

What is the purpose of the cell membrane in cells?

What is the main difference between the cell membrane in an animal cell and a plant cell?

Grouping Structures/Seating Arrangement: *students grouping will be 5 to a group, 3 groups*

Modifications and Accommodations: *Accommodations for students in this class will be as follows, student will receive help with reading comprehension and vocabulary for this particular assignment. Student will be grouped into small groups and the experiment will be conducted under teacher supervision. Students will also be given extra time to complete the reading and note taking portion of this assignment.*

Differentiation:

Pre Assessment: *List the assessment name and what you will do to pre-assess the students.*

Lesson/Activity Sequence:

Teacher Actions	Learner Actions
Teacher will introduce topic Teacher will go through guided notes	. Students will complete guided notes Students will answer discussion questions

**Describes what both the teacher and students will do throughout the lesson.*

Post Assessment/Exit Ticket: *Student will answer independent practice worksheet.*

Follow Up (Extension/Enrichment):

Lesson Plan

Teacher: Mr. Morgan **Dates: 03/13/14**

Grade Level: **10th grade** **Lesson/Activity Duration:** *50 minuets*

Subject Area(s): *Biology* **Curricular Unit/Theme:** *Cell Biology*

Agenda: *Student will discuss diffusion of cell membranes*

1. Do now assignment (5 min.)
2. Diffusion Lab assignment (40min)
3. Exit Ticket/Post Assessment (5 min)

Materials: *List any materials you or the students need to prepare to teach and execute the lesson.*

- ☐ **Diffusion materials**
- ☐ **Lab Worksheets**
- ☐ **Biology text book**

Common Core State Standard(s): *State standards the lesson supports or should cover.*

- ❖ Content Standard(s): 6.9-12.1B Cells take different forms in many plants, animals, and microorganisms. The structure of the cells is what will determine the function of the cells

Student Learning Objectives/Outcomes:

- ❖ **Students will understand how cells use diffusion to get nutrients and other materials into the cells**

Do Now/Warm-up Activity:

What is the purpose of the cell membrane in cells?

What is the main difference between the cell membrane in an animal cell and a plant cell?

Grouping Structures/Seating Arrangement: *students grouping will be 5 to a group, 3 groups*

Modifications and Accommodations: *Accommodations for students in this class will be as follows, student will receive help with reading comprehension and vocabulary for this particular assignment. Student will be grouped into small groups and the experiment will be conducted under teacher supervision. Students will also be given extra time to complete the reading and note taking portion of this assignment.*

Differentiation:

Pre Assessment: *List the assessment name and what you will do to pre-assess the students.*

Lesson/Activity Sequence:

Teacher Actions	Learner Actions
Teacher will introduce lad assignment Teacher will go through lab results	. Students will complete lab assignment Students will answer discussion questions for each lab activity

**Describes what both the teacher and students will do throughout the lesson.*

Post Assessment/Exit Ticket: *Student will answer independent practice worksheet.*

Follow Up (Extension/Enrichment):

Lesson Plan

Teacher: Mr. Morgan **Dates: 03/14/14**

Grade Level: **10th grade** **Lesson/Activity Duration:** *50 minuets*

Subject Area(s): *Biology* **Curricular Unit/Theme:** *Cell Biology*

Agenda: *Student will discuss diffusion of cell membranes*

1. Do now assignment (5 min.)
2. Continue Diffusion Lab assignment (40min)
3. Exit Ticket/Post Assessment (5 min)

Materials: *List any materials you or the students need to prepare to teach and execute the lesson.*

- ☐ **Diffusion materials**
- ☐ **Lab Worksheets**
- ☐ **Biology text book**

Common Core State Standard(s): *State standards the lesson supports or should cover.*

- ❖ Content Standard(s): 6.9-12.1B Cells take different forms in many plants, animals, and microorganisms. The structure of the cells is what will determine the function of the cells

Student Learning Objectives/Outcomes:

- ❖ **Students will understand how cells use diffusion to get nutrients and other materials into the cells**

Do Now/Warm-up Activity:

What is the purpose of the cell membrane in cells?

What is the main difference between the cell membrane in an animal cell and a plant cell?

Grouping Structures/Seating Arrangement: *students grouping will be 5 to a group, 3 groups*

Modifications and Accommodations: *Accommodations for students in this class will be as follows, student will receive help with reading comprehension and vocabulary for this particular assignment. Student will be grouped into small groups and the experiment will be conducted under teacher supervision. Students will also be given extra time to complete the reading and note taking portion of this assignment.*

Differentiation:

Pre Assessment: *List the assessment name and what you will do to pre-assess the students.*

Lesson/Activity Sequence:

Teacher Actions	Learner Actions
Teacher will introduce lad assignment Teacher will go through lab results	. Students will complete lab assignment Students will answer discussion questions for each lab activity

**Describes what both the teacher and students will do throughout the lesson.*

Post Assessment/Exit Ticket: *Student will answer independent practice worksheet.*

Follow Up (Extension/Enrichment):

Lesson Plan

Teacher: Mr. Morgan **Dates: 04/07/14**

Grade Level: **11^{th}-12^{th} grade** **Lesson/Activity Duration:** *50 minuets*

Subject Area(s): *Chemistry* **Curricular Unit/Theme:** *Quantitative Chem*

Agenda: *Student will calculate percent yield of reactions*

1. Do now assignment (5 min.)
2. Introduction into Percent yield problems (10 min)
3. Guided practice (10 minuets)
4. Independent practice (20 minutes)
5. Exit Ticket/Post Assessment (5 min)

Materials: *List any materials you or the students need to prepare to teach and execute the lesson.*

- ☐ Chemistry Text book
- ☐ Percent yield handout

Common Core State Standard(s): *State standards the lesson supports or should cover.*

- ❖ Content Standard(s): 1.9-12.1F understand that knowledge and skills from all sources other than science are essential to scientific inquiry. These include mathematics, reading, writing and technology when conducting scientific inquiry.

Student Learning Objectives/Outcomes:

- ❖ **Students will be able to calculate the amount of product that is produced from a chemical reaction.**

Do Now/Warm-up Activity:

What do Mole ratios tell us?

Why do we need to convert grams to moles before we calculate stoichiometric values?

Grouping Structures/Seating Arrangement: *students grouping will be 5 to a group, 3 groups*

Modifications and Accommodations: *Accommodations for students in this class will be as follows, student will receive guided note worksheet with answers and definitions filled in. Student will be responsible for knowing definitions of key terms for mid-term assessment.*

Differentiation: Students will write out responses on worksheet as well as complete examples on board

Pre Assessment: *List the assessment name and what you will do to pre-assess the students.*

Lesson/Activity Sequence:

Teacher Actions	Learner Actions
Teacher will introduce percent yield calculations Teacher will monitor activity of students to help with comprehension	Students will take notes Student will complete guided practice problems with teacher Student will complete independent practice problems on their own

**Describes what both the teacher and students will do throughout the lesson.*

Post Assessment/Exit Ticket: *Student will answer independent practice worksheet.*

Follow Up (Extension/Enrichment):

Lesson Plan

Teacher: Mr. Morgan **Dates: 04/08/14**

Grade Level: **11^{th}-12^{th} grade** **Lesson/Activity Duration:** *50 minuets*

Subject Area(s): *Chemistry* **Curricular Unit/Theme:** *Quantitative Chem*

Agenda: *Student will calculate percent yield of reactions*

1. Student will complete exam

Materials: *List any materials you or the students need to prepare to teach and execute the lesson.*

- ☐ Chemistry exam

Common Core State Standard(s): *State standards the lesson supports or should cover.*

- ❖ Content Standard(s): 1.9-12.1F understand that knowledge and skills from all sources other than science are essential to scientific inquiry. These include mathematics, reading, writing and technology when conducting scientific inquiry.

Student Learning Objectives/Outcomes:

- ❖ **Students will be able to calculate the amount of product that is produced from a chemical reaction.**

Do Now/Warm-up Activity:

What do Mole ratios tell us?

Why do we need to convert grams to moles before we calculate stoichiometric values?

Grouping Structures/Seating Arrangement: *students grouping will be 5 to a group, 3 groups*

Modifications and Accommodations: *Accommodations for students in this class will be as follows, student will receive guided note worksheet with answers and definitions filled in. Student will be responsible for knowing definitions of key terms for mid-term assessment.*

Differentiation: Students will write out responses on worksheet as well as complete examples on board

Pre Assessment: *List the assessment name and what you will do to pre-assess the students.*

Lesson/Activity Sequence:

Teacher Actions	Learner Actions
Teacher will monitor class during exam time	Students will compete exam

**Describes what both the teacher and students will do throughout the lesson.*

Post Assessment/Exit Ticket: *Student will answer independent practice worksheet.*

Follow Up (Extension/Enrichment):

Lesson Plan

Teacher: Mr. Morgan **Dates: 04/09/14**

Grade Level: **11^{th}-12^{th} grade** **Lesson/Activity Duration:** *50 minuets*

Subject Area(s): *Chemistry* **Curricular Unit/Theme:** *Quantitative Chem*

Agenda: *Student will Derive empirical and molecular formula from experimental data*

1. Do Now (5 minutes)
2. Introduction into empirical formula (10 minutes)
3. Guided practice (10 minutes)
4. Independent Practice (20 Minutes)
5. Exit ticket (5 minutes)

Materials: *List any materials you or the students need to prepare to teach and execute the lesson.*

- ☐ Chemistry text book
- ☐ Empirical formula handout

Common Core State Standard(s): *State standards the lesson supports or should cover.*

- ❖ Content Standard(s): 1.9-12.1F understand that knowledge and skills from all sources other than science are essential to scientific inquiry. These include mathematics, reading, writing and technology when conducting scientific inquiry.

Student Learning Objectives/Outcomes:

- ❖ **Students will be able to write out an empirical formulas for a chemical reaction.**

Do Now/Warm-up Activity:

Define products and reactants?

Why do we need to balance equations?

Grouping Structures/Seating Arrangement: *students grouping will be 5 to a group, 3 groups*

Modifications and Accommodations: *Accommodations for students in this class will be as follows, student will receive guided note worksheet with answers and definitions filled in. Student will be responsible for knowing definitions of key terms for mid-term assessment.*

Differentiation: Students will write out responses on worksheet as well as complete examples on board

Pre Assessment: *List the assessment name and what you will do to pre-assess the students.*

Lesson/Activity Sequence:

Teacher Actions	Learner Actions
Teacher will introduce the concept of empirical formula Teacher will guide discussion for guided practice Teacher will monitor class while independent practice is going on	Students will follow introduction Student will complete guided practice with teacher Students will complete independent practice

**Describes what both the teacher and students will do throughout the lesson.*

Post Assessment/Exit Ticket: *Student will answer independent practice worksheet.*

Follow Up (Extension/Enrichment):

Lesson Plan

Teacher: Mr. Morgan **Dates: 04/10/14**

Grade Level: **11^{th}-12^{th} grade** **Lesson/Activity Duration:** *50 minuets*

Subject Area(s): *Chemistry* **Curricular Unit/Theme:** *Quantitative Chem*

Agenda: *Student will differentiate between endothermic and exothermic reactions*

1. Do Now (5 minutes)
2. Introduction into endothermic and exothermic reactions and how to draw energy diagrams outlining energy release or absorbance (20 minutes)
3. Guided practice (10 minutes)
4. Independent Practice (10 Minutes)
5. Exit ticket (5 minutes)

Materials: *List any materials you or the students need to prepare to teach and execute the lesson.*

- ☐ Chemistry text book
- ☐ Reactions handout

Common Core State Standard(s): *State standards the lesson supports or should cover.*

- ❖ Content Standard(s): 2.9-12.4.D. Energy is transformed in chemical reactions. Energy diagrams can illustrate this transformation. Exothermic reactions release energy. Endothermic reactions absorb energy

Student Learning Objectives/Outcomes:

- ❖ **Students will be able to identify exothermic and endothermic reactions**
- ❖ **Student will be able to create energy diagrams of both endothermic and exothermic reactions**

Do Now/Warm-up Activity:

Define products and reactants?

Why do we need to balance equations?

Grouping Structures/Seating Arrangement: *students grouping will be 5 to a group, 3 groups*

Modifications and Accommodations: *Accommodations for students in this class will be as follows, student will receive guided note worksheet with answers and definitions filled in. Student will be responsible for knowing definitions of key terms for mid-term assessment.*

Differentiation: Students will write out responses on worksheet as well as complete examples on board

Pre Assessment: *List the assessment name and what you will do to pre-assess the students.*

Lesson/Activity Sequence:

Teacher Actions	Learner Actions
Teacher will introduce the concept of endothermic and exothermic reactions Teacher will guide discussion for guided practice Teacher will monitor class while independent practice is going on	Students will follow introduction Student will complete guided practice with teacher Students will complete independent practice

**Describes what both the teacher and students will do throughout the lesson.*

Post Assessment/Exit Ticket: *Student will answer independent practice worksheet.*

Follow Up (Extension/Enrichment):

Lesson Plan

Teacher: Mr. Morgan **Dates: 04/11/14**

Grade Level: 11^{th}-12^{th} **grade** **Lesson/Activity Duration:** *50 minuets*

Subject Area(s): *Chemistry* **Curricular Unit/Theme:** *Quantitative Chem*

Agenda: *Student will differentiate between endothermic and exothermic reactions*

1. Do Now (5 minutes)
2. Introduction into endothermic and exothermic reactions and how to draw energy diagrams outlining energy release or absorbance (20 minutes)
3. Guided practice (10 minutes)
4. Independent Practice (10 Minutes)
5. Exit ticket (5 minutes)

Materials: *List any materials you or the students need to prepare to teach and execute the lesson.*

- ☐ Chemistry text book
- ☐ Reactions handout

Common Core State Standard(s): *State standards the lesson supports or should cover.*

- ❖ Content Standard(s): 2.9-12.4.D. Energy is transformed in chemical reactions. Energy diagrams can illustrate this transformation. Exothermic reactions release energy. Endothermic reactions absorb energy

Student Learning Objectives/Outcomes:

- ❖ **Students will be able to identify exothermic and endothermic reactions**
- ❖ **Student will be able to create energy diagrams of both endothermic and exothermic reactions**

Do Now/Warm-up Activity:

Define products and reactants?

Why do we need to balance equations?

Grouping Structures/Seating Arrangement: *students grouping will be 5 to a group, 3 groups*

Modifications and Accommodations: *Accommodations for students in this class will be as follows, student will receive guided note worksheet with answers and definitions filled in. Student will be responsible for knowing definitions of key terms for mid-term assessment.*

Differentiation: Students will write out responses on worksheet as well as complete examples on board

Pre Assessment: *List the assessment name and what you will do to pre-assess the students.*

Lesson/Activity Sequence:

Teacher Actions	Learner Actions
Teacher will introduce the concept of endothermic and exothermic reaction Teacher will guide discussion for guided practice Teacher will monitor class while independent practice is going on	Students will follow introduction Student will complete guided practice with teacher Students will complete independent practice

**Describes what both the teacher and students will do throughout the lesson.*

Post Assessment/Exit Ticket: *Student will answer independent practice worksheet.*

Follow Up (Extension/Enrichment):

Curriculum Scope & Sequence

School_____Moyer Academy_____ Grade or Course _HS Spanish II__Teacher _____

The High School Spanish II course follows a standard level 2 scope and sequence. Topics are presented in sequential order moving from basic to more advanced concepts. The information from each unit builds upon and directly incorporates ideas and concepts from previous units. Key concepts are introduced, practiced, and then assessed through various explanations, multimedia presentations, practices, activities, quizzes, and tests.

Each unit, approximately 5 hours of content, follows a similar structure and contains the following types of activities:

- Theme introduction (exploration, practice, synthesis, assessment)
- Grammar presentation (exploration, practice, synthesis, assessment)
- Interpretive Communication – print and audio (reading and listening excerpts, vocabulary and grammar synthesis, assessment)
- Interpersonal Communication – speaking and writing (conversations/emails and other interpersonal communication practices, assessments)
- Presentational Communication – speaking and writing (speaking and writing prompts, practices, assessments)
- Culture – culture tidbit notes and culture videos about important cultural products, practices, and/or perspectives, assessment
- Journal – journal prompts related to culture or theme

Other activity types throughout the course include the following:

Webquests – These special activities provide students the opportunity to link out to authentic sources of language on the Internet. Students are given practical tasks where they must use their language to accomplish the assignment.

Out of Seat Assignments – Several times during the year, students are given opportunities to use the language "outside" the course. These are specific assignments directing students to interact in a genuine way with the Spanish language or Spanish-speaking culture.

Explore Activities – These ACTFL-aligned activities allow students to explore other topics in the target language. They are typically asked to conduct research in the target language and to make connections to the topics they choose.

Lifelong Learner Assignment – Each semester students are required to create a plan for incorporating Spanish into their daily lives. They accomplish this by outlining the long-term benefits of learning Spanish, by making goals for what they want to accomplish with their mastery of the language, and by creating a plan for accomplishing their goals. A report is submitted at the end of the semester summarizing their experiences.

Discussion Board - These activities provide opportunities for students to interact with their teacher and other students, express their thoughts and opinions, and practice their new language.

Unit Order By unit title and/or time frame	**Learning Targets** Content Standards, Grade Level Expectations, Proficiency Level Expectations, or Grade Cluster Benchmarks	**Theme/Big Idea/Concept**	**Enduring Understandings and/or Essential Questions**
Semester 1	**Proficiency Level: Novice Mid**		
Unit 1 – Review of Present Tense	Use *–ar* verbs to talk about	Comparing and contrasting one's	By learning another language

(Five one-hour lessons)	actions and events in the present tense. Write and talk about what activities they do. Write and talk about what others like to do. Demonstrate understanding of how people greet each other in many Spanish-speaking countries. Learn about the region of Chile. Standards: 1.1, 1.2, 1.3, 2.1, 4.1, 4.2	own and other languages and cultures enables individuals to gain new insight about self and the world. • I can talk about habits and daily activities. • I can listen to and read conversations and audio/written passages and demonstrate understanding of main ideas and significant details. • I can participate in a conversation using the vocabulary and concepts from this unit and from Spanish 1.	individuals can better understand how both the native and other languages work. How do I talk about favorite activities?
Unit 2 – Review of Preterite Tense (Five one-hour lessons)	Review *–er* and *–ir* verbs to use in conversation. Say and write about what they did last summer. Talk about actions completed in the past using the preterite tense. Learn about Chile's history. Standards: 1.1, 1.2, 1.3, 2.1, 4.1, 4.2	Comparing and contrasting one's own and other languages and cultures enables individuals to gain new insight about self and the world. • I can talk about past events • I can listen to and read conversations and audio/written passages and demonstrate understanding of main ideas and significant details. • I can participate in a conversation using the vocabulary and concepts	By learning another language individuals can better understand how both the native and other languages work. How do I talk about my past?

		from this unit and previous units.	
Unit 3 – Numbers (Five one-hour lessons)	Review cardinal and ordinal numbers to use in conversation. Talk to a salesperson about how much money they want to spend on an item. Talk and write about how many people are in their immediate family and their age. Learn about Chile's national dance *La Cueca*. Standards: 1.1, 1.2, 1.3, 2.1, 3.1, 4.1, 4.2, 5.2	Comparing and contrasting one's own and other languages and cultures enables individuals to gain new insight about self and the world. • I can interact with others and negotiate prices. • I can listen to and read conversations and audio/written passages and demonstrate understanding of main ideas and significant details. • I can participate in a conversation using the vocabulary and concepts from this unit and previous units.	By learning another language individuals can better understand how both the native and other languages work. How do I interact with others appropriately?
Unit 4 – Food (Five one-hour lessons)	Use food vocabulary words to describe what they ate. Use irregular verbs in the preterite to say where they have been. Learn about Chilean food. Standards: 1.1, 1.2, 1.3, 2.1, 2.2, 3.2, 4.1, 4.2, 5.2	Culture and language are inseparable; they influence and reflect each other. • I can order food in Spanish at a restaurant in my community. • I can listen to and read conversations and audio/written passages and demonstrate understanding of main ideas and significant	What is the connection between a people's perspectives, practices, products and their language? How do my favorite foods differ from those in other countries?

		details. • I can participate in a conversation using the vocabulary and concepts from this unit and previous units.	
Unit 5 – Health (Five one-hour lessons)	Use vocabulary words to discuss what sicknesses they've had. Make necessary spelling changes in preterite tense verbs. Write about a health challenge they or someone else has experienced. Recognize unique Chilean idioms. Standards: 1.1, 1.2, 1.3, 2.1, 3.1, 3.2, 4.1, 4.2, 5.2	The study of World Languages helps students enhance learning and provide access to other • I can write about my health problems. • I can listen to and read conversations and audio/written passages and demonstrate understanding of main ideas and significant details. • I can participate in a conversation using the vocabulary and concepts from this unit and previous units. areas, strategies, and resources.	In what ways does the study of a World Language open doors for individuals? How do I talk about my health?
Unit 6 – Family (Five one-hour lessons)	Use the present progressive to express what they are doing. Write about their family and extended family. Learn about a famous writer from Chile. Standards: 1.1, 1.2, 1.3, 2.1, 3.1, 4.1, 4.2, 5.2	Culture and language are inseparable; they influence and reflect each other. • I can talk about my famly. • I can listen to and read conversations and audio/written passages and demonstrate understanding of main ideas and significant	What is the connection between a people's perspectives, practices, products and their language? How does the family structure differ in other countries?

		details. • I can participate in a conversation using the vocabulary and concepts from this unit and previous units.	
Unit 7 – Professions (Five one-hour lessons)	Differentiate between the present and preterite tense. Use profession vocabulary words to talk about their parents' profession. Use profession vocabulary words to talk about what they want to become professionally. Learn about some Chilean festivals. Standards: 1.1, 1.2, 1.3, 2.1, 4.1, 4.2, 5.2	Culture and language are inseparable; they influence and reflect each other. • I can explore professions where Spanish might be useful. • I can listen to and read conversations and audio/written passages and demonstrate understanding of main ideas and significant details. • I can participate in a conversation using the vocabulary and concepts from this unit and previous units.	How do language and culture influence and reflect each other? How might Spanish help me in my future profession?
Unit 8 – Descriptions (Five one-hour lessons)	Learn fundamental differences between ser and *estar*. Conjugate and use the verb *ser* in conversation. Conjugate and use the verb *estar* in conversation. Use adjectives to say how they are doing and describe the way they are. Discover popular places to visit in Chile.	Comparing and contrasting one's own and other languages and cultures enables individuals to gain new insight about self and the world. • I can talk about others in conversations. • I can listen to and read conversations and	Why do they say or write it that way? Why can't they say or write it our way? How would I describe myself? How would others describe me?

	Standards: 1.1, 1.2, 1.3, 2.1, 4.1, 4.2, 5.2	audio/written passages and demonstrate understanding of main ideas and significant details. • I can participate in a conversation using the vocabulary and concepts from this unit and previous units.	
Unit 9 – Midterm Review and Test	During this week, students will have the chance to review the concepts presented to them during the first eight units of semester 1 in preparation for the summative midterm assessments. The midterm exam consists of the following: 1) a multiple choice test which covers vocabulary, grammar, reading comprehension, and listening comprehension, 2) open-ended teacher-graded speaking prompts, and 3) open-ended teacher-graded writing prompts.		
Unit 10 – Hobbies and Pastimes (Five one-hour lessons)	Conjugate verbs in the imperfect tense to describe an action in the past. Talk about what hobbies and pastimes they've had. Learn about Peru. Standards: 1.1, 1.2, 1.3, 2.1, 4.1, 4.2, 5.2	Language is at the heart of all human interaction. • I can get to know others by discussing hobbies and pastimes. • I can listen to and read conversations and audio/written passages and demonstrate understanding of main ideas and significant details.	What do you need to be able to do to communicate in another language? What are my favorite hobbies?

		• I can participate in a conversation using the vocabulary and concepts from this unit and previous units.	
Unit 11 – Body (Five one-hour lessons)	Identify parts of the body. Correctly use adverbs and adjectives in Spanish. Describe injuries to a doctor. Correctly pronounce the vowel U. Learn about Incan history. Standards: 1.1, 1.2, 1.3, 2.1, 3.1, 4.1, 4.2, 5.2	Language is at the heart of all human interaction. • I can communicate with a doctor in Spanish. • I can listen to and read conversations and audio/written passages and demonstrate understanding of main ideas and significant details. • I can participate in a conversation using the vocabulary and concepts from this unit and previous units.	What do you need to be able to do to communicate in another language? How do I talk about my health?
Unit 12 – Holidays and Special Celebrations (Five one-hour lessons)	Distinguish the imperfect from the preterite to describe past occurrences. Talk about what holidays they have celebrated in the past. Learn about holidays in the Spanish speaking world. Standards: 1.1, 1.2, 1.3, 2.1, 4.1, 4.2, 5.2	Language is at the heart of all human interaction. • I can compare holidays in my culture with those of the Spanish-speaking world. • I can listen to and read conversations and audio/written passages	What do you need to be able to do to communicate in another language? How do holidays and celebrations differ across the world?

		and demonstrate understanding of main ideas and significant details. • I can participate in a conversation using the vocabulary and concepts from this unit and previous units.	
Unit 13 – At Home (Five one-hour lessons)	Describe different rooms in their house or dream house. Correctly use the verbs that change meaning between preterite and imperfect. Correctly pronounce the vowel combinations *ia* and *io*. Learn about Peruvian food. Standards: 1.1, 1.2, 1.3, 2.1, 4.1, 4.2, 5.1, 5.2	Comparing and contrasting one's own and other languages and cultures enables individuals to gain new insight about self and the world. • I can interact with others and discuss topics related to our homes. • I can listen to and read conversations and audio/written passages and demonstrate understanding of main ideas and significant details. • I can participate in a conversation using the vocabulary and concepts from this unit and previous units.	Why do they say or write it that way? Why can't they say or write it our way? How is my home different from others' homes?
Unit 14 – At School (Five one-hour lessons)	Write about what classes they are taking. Use the verb *haber* to describe what school items are found in their classroom. Write about what events have	Language is at the heart of all human interaction. • I can participate in a conversation and talk	Speaking, listening, reading and writing skills are developed by using the interpersonal, interpretative and presentational modes of communication.

	taken place in the past. Correctly pronounce the letter H. Learn about an important author from Peru. Standards: 1.1, 1.2, 1.3, 2.1, 3.1, 4.1, 4.2, 5.2	about my school life. • I can listen to and read conversations and audio/written passages and demonstrate understanding of main ideas and significant details. • I can participate in a conversation using the vocabulary and concepts from this unit and previous units.	How would I compare my educational experience to those found in other countries?
Unit 15 – Automobiles (Five one-hour lessons)	Describe a car in detail. Use *hacer* to express how long they have been doing certain activities. Correctly pronounce the letter combinations *ie / iu*. Learn about dance and music in the Spanish-speaking world. Standards: 1.1, 1.2, 1.3, 2.1, 3.1, 3.2, 4.1, 4.2, 5.2	Comparing and contrasting one's own and other languages and cultures enables individuals to gain new insight about self and the world. • I can talk about my activities. • I can listen to and read conversations and audio/written passages and demonstrate understanding of main ideas and significant details. • I can participate in a conversation using the vocabulary and concepts from this unit and previous units.	By studying another culture, individuals can better understand and appreciate their native and other cultures. How do dance and music styles differ in other cultures?
Unit 16 – In the City (Five one-hour lessons)	Talk about what places they will visit during the week.	Comparing and contrasting one's own and other languages and	By learning another language individuals can better understand

	Use the reflexive to explain their daily routine. Learn about Peru. Standards: 1.1, 1.2, 1.3, 2.1, 4.1, 4.2, 5.2	cultures enables individuals to gain new insight about self and the world. • I can talk about my city and learn about others' cities by conversing with other students. • I can listen to and read conversations and audio/written passages and demonstrate understanding of main ideas and significant details. • I can participate in a conversation using the vocabulary and concepts from this unit and previous units.	how both the native and other languages work. What is my daily routine?
Unit 17 – Spanish Expressions (Five one-hour lessons)	Use Spanish proverbs in a variety of situations. User verbs like *gustar*. Correctly pronounce the letter combinations *ua* / *uo*. Learn about idiomatic expressions in Peru. Standards: 1.1, 1.2, 1.3, 2.1, 4.1, 4.2	Language is at the heart of all human interaction. • I can get to know others by talking about our common interests. • I can listen to and read conversations and audio/written passages and demonstrate understanding of main ideas and significant details. • I can participate in a conversation using the vocabulary and concepts from this unit and	Speaking, listening, reading and writing skills are developed by using the interpersonal, interpretative and presentational modes of communication. How does standard Spanish differ from slang?

		previous units.	
Unit 18 – Final Review and Test	During this week, students will have the chance to review the concepts presented to them during the semester in preparation for the summative final assessments. The final exam consists of the following: 1) a multiple choice test which covers vocabulary, grammar, reading comprehension, and listening comprehension, 2) open-ended teacher-graded speaking prompts, and 3) open-ended teacher-graded writing prompts.		
Semester 2	**Proficiency Level: Novice Mid**		
Unit 19 – Verb Review (Five one-hour lessons)	Conjugate verbs in the future tense. Review verbs to use in conversation. Use the future tense to talk and write about what they will be doing next year. Learn about Columbia. Standards: 1.1, 1.2, 1.3, 2.1, 4.1, 4.2,	Comparing and contrasting one's own and other languages and cultures enables individuals to gain new insight about self and the world. • I can use multiple tenses to participate in conversations and to get to know others better. • I can listen to and read conversations and audio/written passages and demonstrate understanding of main ideas and significant details. • I can participate in a conversation using the vocabulary and concepts from this unit and	By learning another language individuals can better understand how both the native and other languages work. How do I talk about my future?

		previous units.	
Unit 20 – False Cognates (Five one-hour lessons)	Understand the real meaning of false cognates. Determine whether a word in a sentence is used correctly or not. Use the conditional to talk about what they would do. Learn about Columbian festivals and traditions. Standards: 1.1, 1.2, 1.3, 2.1, 4.1, 4.2,	Comparing and contrasting one's own and other languages and cultures enables individuals to gain new insight about self and the world. • I can hypothesize about my future. • I can listen to and read conversations and audio/written passages and demonstrate understanding of main ideas and significant details. • I can participate in a conversation using the vocabulary and concepts from this unit and previous units.	Why do they say or write it that way? Why can't they say or write it our way? How does language sometimes cause confusion or embarrassment?
Unit 21 – Nature (Five one-hour lessons)	Use words related to nature in a variety of situations. Use the past participle with the verb *estar* to express conditions and states. Correctly pronounce the letter T. Learn about a forefather in South America. Standards: 1.1, 1.2, 1.3, 2.1, 3.1, 4.1, 4.2, 5.1, 5.2	The study of World Languages helps students enhance learning and provide access to other content areas, strategies, and resources. • I can discuss beliefs and feelings with others. • I can listen to and read conversations and audio/written passages and demonstrate understanding of main ideas and significant	What does it take to become a global citizen? Hoes does history affect culture?

		details. • I can participate in a conversation using the vocabulary and concepts from this unit and previous units.	
Unit 22 – Vacation (Five one-hour lessons)	Use travel vocabulary to say where they like to go on vacation and what they like to do there. Change sentences into the passive voice. Learn about what they can do in Columbia. Standards: 1.1, 1.2, 1.3, 2.1, 3.1, 3.2, 4.1, 4.2, 5.2	The study of WL enables individuals to participate in multiple communities and enriches their experiences. • I can email others about my vacation plans. • I can interact with others to discuss travel desires and plans. • I can listen to and read conversations and audio/written passages and demonstrate understanding of main ideas and significant details. • I can participate in a conversation using the vocabulary and concepts from this unit and previous units.	The study of a World Language expands individuals' opportunities. How can Spanish help me explore the world?
Unit 23 – Music (Five one-hour lessons)	Compare and contrast two musical groups using the vocabulary and comparatives and superlatives. Correctly pronounce the letter D. Learn about music in Columbia.	The study of World Languages helps students enhance learning and provide access to other content areas, strategies, and resources. • I can talk to others and	What difference does the study of a World Language make in an individual's life? How does my taste I music compare with music found in other countries?

	Standards: 1.1, 1.2, 1.3, 2.1, 3.1, 4.1, 4.2, 5.2	share music preferences. • I can listen to and read conversations and audio/written passages and demonstrate understanding of main ideas and significant details. • I can participate in a conversation using the vocabulary and concepts from this unit and previous units.	
Unit 24 – Technology (Five one-hour lessons)	Use words related to technology in a variety of situations. Use adjectives and possessive pronouns in conversation. Be able to use Colombian expressions. Standards: 1.1, 1.2, 1.3, 2.1, 3.1, 4.1, 4.2, 5.2	The study of World Languages helps students enhance learning and provide access to other content areas, strategies, and resources. • I can talk with others about my personal technology use and habits. • I can listen to and read conversations and audio/written passages and demonstrate understanding of main ideas and significant details. • I can participate in a conversation using the vocabulary and concepts from this unit and previous units.	In what ways does the study of a World Language open doors for individuals? What is the relationship between culture and technology?

Unit 25 – Measurements (Five one-hour lessons)	Use the vocabulary related to measurements in a variety of situations. Use demonstrative adjectives and pronouns correctly. Correctly pronounce the letters B and V. Learn about Colombian food. Standards: 1.1, 1.2, 1.3, 2.1, 4.1, 4.2, 5.2	Comparing and contrasting one's own and other languages and cultures enables individuals to gain new insight about self and the world. • I can use measurement vocabulary to understand and talk about recipes. • I can listen to and read conversations and audio/written passages and demonstrate understanding of main ideas and significant details. • I can participate in a conversation using the vocabulary and concepts from this unit and previous units.	Why do they say or write it that way? Why can't they say or write it our way? How are similar concepts talked about in different languages?
Unit 26 – Clothing (Five one-hour lessons)	Use words related to clothing in a variety of situations. Learn about and use phrasal verbs. Know who Gabriel García Márquez is. Standards: 1.1, 1.2, 1.3, 2.1, 3.1, 4.1, 4.2, 5.2	The study of World Languages helps students enhance learning and provide access to other content areas, strategies, and resources. • I can interact with others to talk about our clothing preferences. • I can listen to and read conversations and audio/written passages and demonstrate understanding of main ideas and significant details.	In what ways does the study of a World Language open doors for individuals? How can I become familiar with literature from other cultures?

		• I can participate in a conversation using the vocabulary and concepts from this unit and previous units.	
Unit 27 – Midterm Review and Test	During this week, students will have the chance to review the concepts presented to them during the first eight units of semester 2 in preparation for the summative midterm assessments. The midterm exam consists of the following: 1) a multiple choice test which covers vocabulary, grammar, reading comprehension, and listening comprehension, 2) open-ended teacher-graded speaking prompts, and 3) open-ended teacher-graded writing prompts.		
Unit 28 – At Work (Five one-hour lessons)	Use words related to business and work in a variety of situations. Give *tú* commands. Learn about Nicaragua. Standards: 1.1, 1.2, 1.3, 2.1, 4.1, 4.2, 5.2	The study of World Languages helps students enhance learning and provide access to other content areas, strategies, and resources. • I can give advice about finding jobs. • I can listen to and read conversations and audio/written passages and demonstrate understanding of main ideas and significant details. • I can participate in a conversation using the vocabulary and concepts	In what ways does the study of a World Language open doors for individuals? How might Spanish help me in a business situation?

		from this unit and previous units.	
Unit 29 – Shopping and Money (Five one-hour lessons)	Give someone financial advice using *usted* commands and unit vocabulary. Correctly use *usted* commands in the affirmative and negative forms. Correctly pronounce the letters R and RR. Learn about a famous Nicaraguan dish called *gallopinto*. Standards: 1.1, 1.2, 1.3, 2.1, 4.1, 4.2, 5.2	The study of WL enables individuals to participate in multiple communities and enriches their experiences. • I can discuss shopping preferences. • I can listen to and read conversations and audio/written passages and demonstrate understanding of main ideas and significant details. • I can participate in a conversation using the vocabulary and concepts from this unit and previous units.	In what ways does the study of a World Language open doors for individuals? What advice can I give others in Spanish?
Unit 30 – *Por* and *Para* Expressions (Five one-hour lessons)	Use expressions with *por* and *para* in a variety of situations. Differentiate between *por* and *para*. Know who Rubén Darío is. Standards: 1.1, 1.2, 1.3, 2.1, 3.1, 4.1, 4.2, 5.2	Comparing and contrasting one's own and other languages and cultures enables individuals to gain new insight about self and the world. • I can talk about plans for the future. • I can listen to and read conversations and audio/written passages and demonstrate understanding of main ideas and significant	Why do they say or write it that way? Why can't they say or write it our way? How does Hispanic literature differ from what I am used to?

		details. • I can participate in a conversation using the vocabulary and concepts from this unit and previous units.	
Unit 31 – Love and Dating 1 (Five one-hour lessons)	Use vocabulary related to love and friendship in a variety of situations. Use the present perfect in conversation. Correctly pronounce the letters J and G. Learn about *piropos* and festivals in Nicaragua. Standards: 1.1, 1.2, 1.3, 2.1, 4.1, 4.2, 5.2	Culture and language are inseparable; they influence and reflect each other. • I can discuss my experiences with love and dating. • I can listen to and read conversations and audio/written passages and demonstrate understanding of main ideas and significant details. • I can participate in a conversation using the vocabulary and concepts from this unit and previous units.	How do language and culture influence and reflect each other? How will knowing Spanish help me to get to know more people?
Unit 32 – Love and Dating 2 (Five one-hour lessons)	Use words related to love and friendship in a variety of situations. Use the present perfect with irregular participles in conversation. Learn about courtship and things to do in Nicaragua. Standards: 1.1, 1.2, 1.3, 2.1, 4.1, 4.2, 5.2	Culture and language are inseparable; they influence and reflect each other. • I can discuss what I like to do for fun with others. • I can listen to and read conversations and audio/written passages and demonstrate	How do language and culture influence and reflect each other? What are similarities and differences between how people date in other cultures?

		understanding of main ideas and significant details. • I can participate in a conversation using the vocabulary and concepts from this unit and previous units.	
Unit 33 – Societal Issues 1 (Five one-hour lessons)	Use the vocabulary to discuss social problems. Distinguish between the indicative and subjunctive moods. Correctly pronounce the letter Y. Learn about poverty and other problems in Latin American society. Standards: 1.1, 1.2, 1.3, 2.1, 3.1, 3.2, 4.1, 4.2, 5.2	The study of World Languages helps students enhance learning and provide access to other content areas, strategies, and resources. • I can discuss my opinions about crime in society. • I can listen to and read conversations and audio/written passages and demonstrate understanding of main ideas and significant details. • I can participate in a conversation using the vocabulary and concepts from this unit and previous units.	What does it take to become a global citizen? What opportunities do I now have because I know Spanish?
Unit 34 – Societal Issues 2 (Five one-hour lessons)	Use words related to societal issues in a variety of situations. Use the present subjunctive in conversation. Learn about the political history of Nicaragua. Standards: 1.1, 1.2, 1.3, 2.1, 3.1,	The study of World Languages helps students enhance learning and provide access to other content areas, strategies, and resources. • I can discuss the most	What does it take to become a global citizen? How will knowing Spanish help me to make this a better world?

	4.1, 4.2, 5.2	common societal problems in my community. • I can listen to and read conversations and audio/written passages and demonstrate understanding of main ideas and significant details. • I can participate in a conversation using the vocabulary and concepts from this unit and previous units.	
Unit 35 – Slang (Five one-hour lessons)	Recognize and use idiomatic expressions from different countries. Review all tenses and how to use them in conversation. Correctly pronounce the double L. Learn some idiomatic expressions and words used in Nicaragua. Standards: 1.1, 1.2, 1.3, 2.1, 4.1, 4.2	Language is at the heart of all human interaction. • I can incorporate common slang into my informal conversations. • I can listen to and read conversations and audio/written passages and demonstrate understanding of main ideas and significant details. • I can participate in a conversation using the vocabulary and concepts from this unit and previous units.	What do you need to be able to do to communicate in another language? What is the relationship between slang and standard Spanish?
Unit 36 – Final Review and Test	During this week, students will have the chance to review the		

	concepts presented to them during the semester in preparation for the summative final assessments. The final exam consists of the following: 1) a multiple choice test which covers vocabulary, grammar, reading comprehension, and listening comprehension, 2) open-ended teacher-graded speaking prompts, and 3) open-ended teacher-graded writing prompts.		

Course	Unit	Date	Teacher
Art	**5: Homelessness Through the Eyes of Art**	**01/06/14**	**Mrs. Jackson**

Stage 1 – Desired Results

Content Standard(s): 2:1
Standard 2: Using knowledge of structures and functions
•Evaluate works of art in terms of structure and function

Understanding (s)/goals
In this unit, students will explore the issue of homelessness through art. Students will create several projects that will lead up to their culminating task. Students will be introduced to the life and work of world famous Jean-Michel Basquiat, an artist popular in the nineteen eighties, who at various points in his own life, was homeless. Through this unit, students will gain insight, empathy, and knowledge about an issue that affects Americans on a broad level.

Essential Question(s):
•To what extent is a work of art dependent upon the point of view of the artist?

•To what extent is a work of art dependent upon the point of view of the viewer?

•How and why is art used as a vehicle for communication?

Student objectives (outcomes):
Scholars will be able to:

Stage 2 – Assessment Evidence

Performance Task(s):
Assessments
Scholars will:
-Interpret the quote in small teams
-Discuss how to use collective ideas to make an original art piece
-Create an original art piece based on the inspirational quote

Other Evidence:

-
- Interpretive Artwork

Stage 3 – Learning Plan

Learning Activities:

Do Now (5 minutes): Students will be asked to draw a picture or sketch of what home means to them. Does not have to be a picture of a house, could be a picture of a dog, a fridge, a sunset, anything that may represent home to them in some way. Under this image, they should write a few sentences about their choice, and what it means to them. Inform students that they will need to share this information with others in class.

Transition....

15 mins

• Students will place their opened sketchbook on their desk

• Teacher should ask students if anyone would be willing to share their image and read their statement aloud

• Following this, have students clear everything on their desk except their opened sketchbooks

• Have students walk around the class and observe the interpretations others have come up with

20 mins

• Have students form groups of 3-4

• Hand each group a piece of chart paper and several markers

• Tell students that they have 15 minutes to brainstorm everything they know about homelessness

• Have them create a mind map on chart paper with all their thoughts

• Tell students that they may write, draw, chart, they may brainstorm in any form they choose to

• Walk around classroom in order to give any assistance necessary

• If students are having a hard time, they may be prompted with questions such as: Who is homeless? Where do people who are homeless sleep at night? How do they survive? Do they have jobs? What do they look like? Who may be homeless? Where might we see people who are homeless? Why are some people homeless?

• Students must now choose one student representative to present their findings

• One at a time, groups should present their ideas to the rest of the class

• Have a discussion around groups' ideas at the end of presentations

• When finished, have students tape their chart papers on the wall

• Save chart papers in order to revisit them at the end of the unit- It will be a nice

opportunity to see what has been learned and what stereotypes have been cleared up by the end of the unit

30 minutes

- Inform students that they must now choose two words from any of the chart papers (does not necessarily have to be their groups paper)
- In their sketchbooks they will write these two words in a creative manner
- They must represent them using different types of lines (straight, curvy, dotted, horizontal, vertical, thick, thin, contour, and so on)
- Give them the word "Scared" as an example and show how this word might be drawn with a curvy line to represent a shaky feeling, and drawn in contour to represent the feeling of emptiness that someone who is homeless might feel
- Tell students to try and choose the lines that would best express their words
- If students finish early, they may begin their journal entry

10 mins

- Clean up

Accommodations:

Prompt questions, for brainstorm, may be posted on the wall for those who need a structure

Journal Prompt may be point form rather than paragraph style

For those students who are more advanced, have them also research who "Jean-Michel Basquiat" is, and report back to class next day

Required Materials:

- sketch book
- chart paper
- markers
- tape

- pencils
- charcoal
- erasers

Homework:

Journal/Sketch prompts- Who are some famous artists? List a few. Where do you think most artists fit on the social class scale? Do they have a lot of money? What type of dwellings do you think they live in? What makes someone a successful artist? Describe.

Course	Unit	Date	Teacher
Art	**5: The Look and Feel of Homelessness Through Collage**	**01/07/14-01/08/13**	**Mrs. Jackson**

Stage 1 – Desired Results

Content Standard(s):

Standard 4: Understanding the visual arts in relation to history and cultures

- **Identify subject matter, symbols and ideas in works of art**
- **Describe and differentiate the origins of specific subject matter, symbols and ideas in works of art**

Understanding (s)/goals	**Essential Question(s):**
students will be guided in the discussion of abstraction, symbolism and interpretation. This will help them create collages with meaning behind them rather than representing only the literal. Students will then create two collages. In one collage, they will explore what homelessness looks like. The second collage will be more abstract, and it will depict what homelessness feels like.	•To what extent is a work of art dependent upon the point of view of the artist? •To what extent is a work of art dependent upon the point of view of the viewer? •How and why is art used as a vehicle for communication?

Student objectives (outcomes):

Scholars will be able to discuss and analyze abstraction, symbolism and interpretation

Stage 2 – Assessment Evidence

Performance Task(s):	**Other Evidence:**
Assessments Scholars will: -Discuss the definition of symbolism	• 2 Collages • rubric

Stage 3 – Learning Plan

Learning Activities:

Do Now (2 minutes): Students will derive as many words as they can from the word collage (Ex. Cage, all, age, ego, gel, etc.)

Transition....Discuss how collages are made up of a variety of objects

Day 1

40 mins

• Copy images so that each group has same 6 images

• Put students into groups of 3

• Distribute handouts and read together as a class

• Discuss realistic versus abstract art

• Discuss the meaning of the word symbolism

• Students must now look at the 6 images they were given and choose the word they think best suits each image, they will place word under image

• When students are finished, have a person from each group present their choices and give reason behind each choice example: image of door = "isolation" because opportunities are always being closed on the person who is homeless

Day 2- Collage

35 mins

• Have all materials in a central location, and have students come get their supplies (magazines, glue, scissors and so on)

• Write on board the two following statements

Home looks like... And Homelessness feels like...

• Tell students that they must create two collages representing the two statements

• Remind students they need to focus on symbolism rather than the literal, they should not try and find a picture of a house, but rather elements that make home what it is

• An example may be a zoom in of someone laughing, to represent joy

• Give students at least two periods to complete collages

• Tell students they must title their two pieces

Cleanup- 10 mins

Accommodations:

It would be important to create an exemplar of collages so that students would have it as a reference point, and to describe why you made the choices you did in selecting different

images. Required Materials: Scissors, glue, magazines, photocopied images from books, computer printed images, paper, teacher exemplars Homework: Have students bring in any additional images they can find to use in their piece

Course	Unit	Date	Teacher
Art	**5: A virtual tour through the mind and art of Jean-Michel Basquiat**	**01/09/14-01/10/14**	**Mrs. Jackson**

Stage 1 – Desired Results

Content Standard(s):

Standard 4: Understanding the visual arts in relation to history and cultures

- **Identify subject matter, symbols and ideas in works of art**
- **Describe and differentiate the origins of specific subject matter, symbols and ideas in works of art**

Understanding (s)/goals	**Essential Question(s):**
Students will explore the life and work of Jean-Michel Basquiat. This will familiarize students with an important figure who lived through periods of homelessness, as well as critiquing the society which created that same issue. This lesson is also an opportunity to connect technology to the classroom.	•To what extent is a work of art dependent upon the point of view of the artist? •To what extent is a work of art dependent upon the point of view of the viewer? •How and why is art used as a vehicle for communication?

Student objectives (outcomes):

Scholars will be able to discuss the life and work of Jean-Michel Basquiat

Stage 2 – Assessment Evidence

Performance Task(s):	**Other Evidence:**
Assessments Scholars will: -Research the life and work of Jean-Michel Basquiat	• Worksheet

Stage 3 – Learning Plan

Learning Activities:

Distribute handouts to students
- Read through handout as a class
- Students may need 2 periods in order to complete this task
- It is important to tell students that all the work they do throughout the unit will be collected in order to see their entire process
- Students will begin by answering questions on the life of Basquiat
- They will then look at some of his work and the meanings behind his paintings

Questions & Answers to worksheet:

At what age did Jean-Michel become famous?
23
Where and in what year was Jean-Michel born?
1960 Brooklyn New York
How many years did his career last and how did he die?
8 years, drug overdose
In what year did Basquiat create his famous character SAMO and what was its purpose
1977- to make a commentary on politics, religion and philosophy
What were the first items he began selling?
hand painted postcards and t-shirts
What was another artistic form Basquiat took part in?
he had a music band
From what two sources did Basquiat draw his inspiration in his artwork?
African diaspora and his own symbology
In what year did Basquiat have his first show and who was involved?
1980-1981 with other young artists
Name several items Basquiat used as a "canvas".
canvas, paper, and found objects like refrigerators, books, and other things
In 1983 Basquiat became friends with which world famous artist?
Andy Warhol
What event affects Basquiat deeply?
Warhol's death
When and where does Basquiat die?
NY in July 1988
What do we learn about Basquiat through this page? What kind of person do you think he was?
Open to interpretation

Course	Unit	Date	Teacher
Art	5: Graffiti Art	01/016/14-01/17/14	Mrs. Jackson

Stage 1 – Desired Results

Content Standard(s):

Standard 4: Understanding the visual arts in relation to history and cultures

- **Identify subject matter, symbols and ideas in works of art**
- **Describe and differentiate the origins of specific subject matter,**

symbols and ideas in works of art

Understanding (s)/goals	**Essential Question(s):**
In this lesson, students will create Basquiat-inspired Graffiti Art. This piece will be a form of expression, while making a statement about homelessness.	•To what extent is a work of art dependent upon the point of view of the artist? •To what extent is a work of art dependent upon the point of view of the viewer? •How and why is art used as a vehicle for communication?

Student objectives (outcomes):

Scholars will be able to graffiti art in the likeness of Jean-Michel Basquiat

Stage 2 – Assessment Evidence

Performance Task(s):	**Other Evidence:**
Assessments Scholars will: -Discuss the life and work of Jean-Michel Basquiat	

Stage 3 – Learning Plan

Learning Activities:

Do Now 10 mins

• Distribute handouts to students

• Read over handout

• Explain to students that they are to create a piece of Graffiti Art using at least three different mediums

• The piece must make a statement about homelessness in some way

• Have students refer back to Basquiat website in order to see examples of Graffiti Art and the meanings behind different pieces

• Students now need to go to the Homeless Hub website (www.homelesshub.ca) in order to find an idea to represent in the piece

• They must first create three different ideas using the thumbnails provided on handout

• When finished, have them share their ideas with one peer in class

• Their peer must write at least one comment on the bottom of their sheet (an idea they liked or some form of feedback on ideas presented)

• Tell students that they are to then conference with you in order to choose the strongest idea for the final product

25 mins

• Place all materials in a central location

• Once an idea has been chosen, have students begin their Graffiti Art

• Students will need at least two to three periods to complete this piece

• Inform students that they will also need to write a short paragraph describing piece and significance behind it

Lesson Plan- Social Studies

Teacher: Ms. Perkins

Dates: 3/11/14

Grade Level: 6th Grade

Lesson/Activity Duration: *50 Mins.*

Subject Area(s): Social Studies

Curricular Unit/Theme: Rome

Agenda:

1. Materials (5 min.)
2. Images of Rome/ Rome Web (5-10 min)
3. Paired Reading p.340-346 (15-20 min)
4. Check your Reading (15-20 min)
5. Review (5 min)

Materials:

- ☐ Classwork folder
- ☐ Check your Reading packet
- ☐ Image of Rome
- ☐ History textbook

Common Core State Standard(s):

- ❖ History Standard One 6-8a: Students will examine historical materials relating to a particular region, society, or theme; analyze change over time, and make logical inferences concerning cause and effect.

Student Learning Objectives/Outcomes:

- ❖ Identify Romulus and Remus and summarize the legend about the foundation of Rome.

Do Now/Warm-up Activity: Students are greeted warmly at the door and given the materials for the day's lesson/

Grouping Structures/Seating Arrangement: students are in assigned seating arrangements for classroom management purposes.

Modifications and Accommodations: Clearly stated agendas, written directions, one-on-one assistance, push in (sp-ed students), self-contained (sp-ed students)

Differentiation: Students who have completed the given assignment will be assigned another task in the classroom.

Pre Assessment: Students will use prior knowledge to brainstorm ideas on the topic of Rome. Students will view images of Rome to spark interest on the topic.
Lesson/Activity Sequence:

Teacher Actions	Learner Actions
Materials (5 mins)- Teacher will greet student warmly at the door and dispense materials for day's lesson. Images of Rome/ Rome Web (10 mins) Teacher will display web graphic organizer to brainstorm ideas on the topic of Rome. Students will view images of Rome to spark interest on the topic. Paired reading p. 340-346 (20 mins) Teacher will direct students to pair up and read the above mentioned pages. Check your reading (15 mins) Teacher will direct students to stay in their partner groups and complete the check your reading assignment Review (5 mins) Teacher will display answers on smartboard and have students check their groups answers.	Materials (5 mins)- Students will be greeted warmly at the door and given the materials for the day's lesson. Images of Rome/ Rome Web (10 mins)- Students will use prior knowledge to brainstorm ideas on the topic of Rome. Students will view images of Rome to spark interest on the topic. Paired Reading p. 340- 346(20 mins) - Students will pair up to read the text on pages 340-346. Check your reading (15 mins)- Students will continue to work in their pair groups to complete the check your reading. Review (5 mins)- Students will review answers for check your reading

Post Assessment/Exit Ticket: Review (5 mins)- Students will review answers for check your reading

Follow Up (Extension/Enrichment):

Lesson Plan Social Studies

Teacher: Ms. Perkins

Dates: 3/12/14

Grade Level: 6th Grade

Lesson/Activity Duration: *45 Mins.*

Subject Area(s): Social Studies

Curricular Unit/Theme: Rome

Agenda:

1. **Materials (5 min.)**
2. **Order the Myth (5-10 min)**
3. **Paired reading p. 346-351 (15-20 min)**
4. **Reading Guide(15-20 min)**
5. **Reveiw (5 min)**

Materials:

- ☐ **Computer**
- ☐ **SmartBoard**
- ☐ **Classwork Folder**
- ☐ **History textbook p. 346-351**

Common Core State Standard(s):

- ❖ **History Standard One 6-8a: Students will examine historical materials relating to a particular region, society, or theme; analyze change over time, and make logical inferences concerning cause and effect.**

Student Learning Objectives/Outcomes:

- ❖ **Define paterfamilias, rex, patrician, and republic.**

Do Now/Warm-up Activity: Students are greeted warmly at the door and given the materials for the day's lesson/

Grouping Structures/Seating Arrangement: students are in assigned seating arrangements for classroom management purposes.

Modifications and Accommodations: Clearly stated agendas, written directions, one-on-one assistance, push in (sp-ed students), self-contained (sp-ed students)

Differentiation: Students who have completed the given assignment will be assigned another task in the classroom.

Pre Assessment: Students will put the events of the myth from yesterday in order of their occurrence.

Lesson/Activity Sequence:

Teacher Actions	Learner Actions
Materials (5 mins)- Teacher will greet student warmly at the door and dispense materials for day's lesson.	Materials (5 mins)- Students will be greeted warmly at the door and given the materials for the day's lesson.
Order the Myth (10 Mins) Teacher will direct the students to complete the assignment and review answers	Order the Myth (10 mins)- students will put the events of the myth from yesterday in order of their occurrence
Paired Reading p. 346- 351 (15 mins) Teacher will direct students to pair up and read the above mentioned text.	Paired Reading p. 346-351 (15 mins)- Students will pair up and read pages 346-351
Reading Guide (20 mins) Teacher will direct students to remain in partner groups and complete reading guide.	Reading Guide (20 Mins) Students will be directed to complete the reading guide for the text.
Review (5 mins) Teacher will display answers on smartboard and review with class.	Review (5 mins) Students will review answers for the reading guide.

Post Assessment/Exit Ticket: Review (5 mins) Students will review answers for the reading guide.

Follow Up (Extension/Enrichment): n/a

Lesson Plan Social Studies

Teacher: Ms. Perkins

Dates: 3/13/14

Grade Level: 6th Grade

Lesson/Activity Duration: *50 Mins.*

Subject Area(s): Social Studies

Curricular Unit/Theme: Rome

Agenda:

1. **Materials (5 min.)**
2. **Term assessment (10 min)**
3. **Paired Reading pgs. 352-354 (20 min)**
4. **Reading Guide(15 min)**
5. **Review (5 min)**

Materials:

- ☐ **Computer**
- ☐ **Timer**
- ☐ **Smartboard**
- ☐ **History textbook pg. 352-354**
- ☐ **Reading Guide**

Common Core State Standard(s):

- ❖ **History Standard One 6-8a: Students will examine historical materials relating to a particular region, society, or theme; analyze change over time, and make logical inferences concerning cause and effect.**

Student Learning Objectives/Outcomes:

- ❖ **Describe the problems Rome's common people faced and how they responded to them**
- ❖ **Describe the roles of plebeians, the twelve Tables, consuls, and senators in Roman society**
- ❖ **Summarize the most important achievements of the Roman Republic**
- ❖ **Analyze "The story of the Cincinnatus" to find information about the Roman ideals of citizenship**

Do Now/Warm-up Activity: Students are greeted warmly at the door and given the materials for the day's lesson/

Grouping Structures/Seating Arrangement: students are in assigned seating arrangements for classroom management purposes.

Modifications and Accommodations: Clearly stated agendas, written directions, one-on-one assistance, push in (sp-ed students), self-contained (sp-ed students)

Differentiation: Students who have completed the given assignment will be assigned another task in the classroom.

Pre Assessment: Term Assessment (10 mins)- Students will complete a short assessment on the terms learned in the previous lesson.

Lesson/Activity Sequence:

Teacher Actions	Learner Actions
Materials (5 mins)- Teacher will greet student warmly at the door and dispense materials for day's lesson.	Materials (5 mins)- Students will be greeted warmly at the door and given the materials for the day's lesson.
Term Assessment (10 Mins)- Teacher will dispense a short assessment about the terms that were learned in the previous lesson	Term Assessment (10 mins) Students will complete a short assessment that covers the terms that were covered in the previous lesson.
Paired reading Pg. 352-354 (20 mins)- Teacher will direct students to pair up and read the above mentioned pages.	Paired Reading pgs. 352-354 (20 mins)- Students will pair up and read pages 352-354
Reading Guide (15 mins) Teacher will direct students to complete the reading guide for the text.	Reading Guide (15 mins)- Students will complete the reading guide for the text.
Review (5 mins) Teacher will review the answers to the reading guide.	Review (5 mins) Students will review the answers to the reading guide.

Post Assessment/Exit Ticket: Review (5 mins) Students will review the answers to the reading guide

Follow Up (Extension/Enrichment):

Lesson Plan Social Studies

Teacher: Ms. Perkins

Dates: 3/14/14

Grade Level: 6th Grade

Lesson/Activity Duration: *50 Mins.*

Subject Area(s): Social Studies

Curricular Unit/Theme: Rome

Agenda:

1. **Materials (5 min.)**
2. **Term assessment (10 min)**
3. **Paired Reading pgs. 352-354 (20 min)**
4. **Reading Guide(15 min)**
5. **Review (5 min)**

Materials:

- ☐ **Computer**
- ☐ **Timer**
- ☐ **Smartboard**
- ☐ **History textbook pg. 355-357**
- ☐ **Reading Guide**

Common Core State Standard(s):

- ❖ **History Standard One 6-8a: Students will examine historical materials relating to a particular region, society, or theme; analyze change over time, and make logical inferences concerning cause and effect.**

Student Learning Objectives/Outcomes:

- ❖ **Describe the problems Rome's common people faced and how they responded to them**
- ❖ **Describe the roles of plebeians, the twelve Tables, consuls, and senators in Roman society**
- ❖ **Summarize the most important achievements of the Roman Republic**
- ❖ **Analyze "The story of the Cincinnatus" to find information about the Roman ideals of citizenship**

Do Now/Warm-up Activity: Students are greeted warmly at the door and given the materials for the day's lesson/

Grouping Structures/Seating Arrangement: students are in assigned seating arrangements for classroom management purposes.

Modifications and Accommodations: Clearly stated agendas, written directions, one-on-one assistance, push in (sp-ed students), self-contained (sp-ed students)

Differentiation: Students who have completed the given assignment will be assigned another task in the classroom.

Pre Assessment: Term Assessment (10 mins)- Students will complete a short assessment on the terms learned in the previous lesson.

Lesson/Activity Sequence:

Teacher Actions	Learner Actions
Materials (5 mins)- Teacher will greet student warmly at the door and dispense materials for day's lesson.	Materials (5 mins)- Students will be greeted warmly at the door and given the materials for the day's lesson.
Term Assessment (10 Mins)- Teacher will dispense a short assessment about the terms that were learned in the previous lesson	Term Assessment (10 mins) Students will complete a short assessment that covers the terms that were covered in the previous lesson.
Paired reading Pg. 355-357 (20 mins)- Teacher will direct students to pair up and read the above mentioned pages.	Paired Reading pgs. 355-357 (20 mins)- Students will pair up and read pages 355-357
Reading Guide (15 mins) Teacher will direct students to complete the reading guide for the text.	Reading Guide (15 mins)- Students will complete the reading guide for the text.
Review (5 mins) Teacher will review the answers to the reading guide.	Review (5 mins) Students will review the answers to the reading guide.

Post Assessment/Exit Ticket: Review (5 mins) Students will review the answers to the reading guide

Follow Up (Extension/Enrichment):

Lesson Plan Social Studies

Teacher: Ms. Perkins

Dates: 3/17/14

Grade Level: 6th Grade

Lesson/Activity Duration*: 50 Mins.*

Subject Area(s): Social Studies

Curricular Unit/Theme: Incomplete Assignment

Agenda:

1. **Materials (5 min.)**
2. **Debrief and Relaxation (5-10 min)**
3. **Incomplete Assignment (15-20 min)**
4. **Clean up (5 min)**

Materials:

- ☐ **Computer**
- ☐ **Classwork folder**
- ☐ **Textbooks**

Common Core State Standard(s):

- ❖ **Students will revisit standards from previous lessons.**

Student Learning Objectives/Outcomes:

- ❖ **Students will work on assignments that were not completed or assignment that need to be redone correctly.**

Do Now/Warm-up Activity: Students are greeted warmly at the door and given the materials for the day's lesson

Grouping Structures/Seating Arrangement: students are in assigned seating arrangements for classroom management purposes.

Modifications and Accommodations: Clearly stated agendas, written directions, one-on-one assistance, push in (sp-ed students), self-contained (sp-ed students)

Differentiation: Students who have completed the given assignment will be assigned another task in the classroom.

Pre Assessment: Students will listen to calming music, stretch, and calming discuss how they feel they did on their DCAS test.

Lesson/Activity Sequence:

Teacher Actions	Learner Actions
Materials (5 mins)- Teacher will greet student warmly at the door and dispense materials for day's lesson.	Materials (5 mins)- Students will be greeted warmly at the door and given the materials for the day's lesson.
Debrief and Relaxation (10 mins) Teacher will lead a calming discussion about the testing period, play calming music, and lead stretching exercise to relax students.	Debrief and Relaxation (10 mins) Students will listen to calming music, stretch, and calming discuss how they feel they did on their DCAS test.
Incomplete assignments (30 mins) Teacher will provide materials for students to complete missing and incomplete assignments	Incomplete Assignments (30 mins)- Students will be directed to work on incomplete assignments
Clean up (5 mins) Teacher will direct students to clean up their area. Teacher will direct students pack up any materials that they are taking home to complete.	Clean-up (5 mins) Students will be directed to organize their materials for dismissal.

Post Assessment/Exit Ticket: Teacher will direct students to clean up their area. Teacher will direct students pack up any materials that they are taking home to complete.

Follow Up (Extension/Enrichment):

Lesson Plan Social Studies

Teacher: Ms. Perkins

Dates: 3/18/14

Grade Level: 6th Grade

Lesson/Activity Duration: *50 Mins.*

Subject Area(s): Social Studies

Curricular Unit/Theme: Rome

Agenda:

1. **Materials (5 min.)**
2. **Venn Diagram (10 min)**
3. **Formation of Roman Republic (15 min)**
4. **All about the Roman Republic p. 352-354 (15-20 min)**
5. **Review (5 min)**

Materials:

- ☐ **Computer**
- ☐ **Smartboard**
- ☐ **History Textbook p.352-354**
- ☐ **All about the Roman Republic Worksheet**

Common Core State Standard(s):

- ❖ **History Standard One 6-8a: Students will examine historical materials relating to a particular region, society, or theme; analyze change over time, and make logical inferences concerning cause and effect.**

Student Learning Objectives/Outcomes:

- ❖ **Describe the roles of plebeians, the Twelve Tables, consuls, and senators in Roman society.**
- ❖ **Summarize the most important achievements of the Roman Republic.**

Do Now/Warm-up Activity: Students are greeted warmly at the door and given the materials for the day's lesson/

Grouping Structures/Seating Arrangement: students are in assigned seating arrangements for classroom management purposes.

Modifications and Accommodations: Clearly stated agendas, written directions, one-on-one assistance, push in (sp-ed students), self-contained (sp-ed students)

Differentiation: Students who have completed the given assignment will be assigned another task in the classroom.

Pre Assessment: Students will complete a whole class discussion comparing the United States and the republic of Rome.

Lesson/Activity Sequence:

Teacher Actions	Learner Actions
Materials (5 mins)- Teacher will greet student warmly at the door and dispense materials for day's lesson.	Materials (5 mins)- Students will be greeted warmly at the door and given the materials for the day's lesson.
Venn Diagram (10 mins) Teacher will lead discussion comparing the governments of Untied States and the Roman Republic using Venn Diagram	Venn Diagram (10 mins)- Students will complete a whole class discussion comparing the United States and the republic of Rome.
Formation of Roman Republic (15 mins) Teacher will show video and direct students to complete worksheet as they go through the video.	Formation of Roman Republic (15 mins)- Students will watch video and complete a guided notes worksheet.
All about the Roman Republic (20 mins)- Teacher will direct the students to complete the worksheet using the information from pages 352-354 and the video.	All about the Roman Republic (20 mins)- Students will complete All about the Roman Empire worksheet using the information in pages 352-354 and the video
Review (5 mins) Teacher will review the assignments for the day.	Review (5 mins) Students will review the assignments for the day.

Post Assessment/Exit Ticket: Review (5 mins) Students will review the assignments for the day.

Follow Up (Extension/Enrichment): Roman Collage- Students will create a collage of images of Rome. Topics: Government, Art, Architecture etc.

Lesson Plan Social Studies

Teacher: Ms. Perkins

Dates: 3/19/14

Grade Level: 6th Grade

Lesson/Activity Duration: *50 Mins.*

Subject Area(s): Social Studies

Curricular Unit/Theme: Rome

Agenda:

1. **Materials (5 min.)**
2. **Image Inference (10 min)**
3. **Powerpoint and Read Along pg. 358-369 (20 min)**
4. **Before and After (15 min)**
5. **Share (5 min)**

Materials:

- ☐ **Powerpoint**
- ☐ **Computer**
- ☐ **History textbook**
- ☐ **Worksheets**

Common Core State Standard(s):

- ❖ **History Standard One 6-8a: Students will examine historical materials relating to a particular region, society, or theme; analyze change over time, and make logical inferences concerning cause and effect.**

Student Learning Objectives/Outcomes:

- ❖ **Students will be able to identify the effects of the Punic wars**

Do Now/Warm-up Activity: Students are greeted warmly at the door and given the materials for the day's lesson/

Grouping Structures/Seating Arrangement: students are in assigned seating arrangements for classroom management purposes.

Modifications and Accommodations: Clearly stated agendas, written directions, one-on-one assistance, push in (sp-ed students), self-contained (sp-ed students)

Differentiation: Students who have completed the given assignment will be assigned another task in the classroom.

Pre Assessment: Students will view image from the beginning of the chapter and make an inference on what the chapter will be about. This will happen in a discussion with the entire class.

Lesson/Activity Sequence:

Teacher Actions	Learner Actions
Materials (5 mins)- Teacher will greet student warmly at the door and dispense materials for day's lesson.	**Materials (5 mins)- Students will be greeted warmly at the door and given the materials for the day's lesson.**
Image Inference (10 mins) Teacher will display the image from the beginning of the chapter and lead student in a discussion that creates prediction on what the chapter will be about.	**Image Inference (10 mins)- Students will view image from the beginning of the chapter and make an inference on what the chapter will be about. This will happen in a discussion with the entire class.**
Powerpoint and read along (20 mins) Teacher will go through a powerpoint presentation that covers the chapter pages 358-369	**Powerpoint and read along (20mins) Students will go through a powerpoint and follow along in the textbook on pages 358-369**
Before and after (15 mins) Teacher will direct students to complete an assessment that pulls of the characteristics before and after the Punic war.	**Before and After (15 mins) Students will complete the before and after assessment**
Share (5 mins) Teacher will direct students to share their answers from the before and after assignment.	**Share (5 mins) Students will share answers from the before and After activity**

Post Assessment/Exit Ticket: Share (5 mins) Students will share answers from the before and After activity

Follow Up (Extension/Enrichment): Roman Collage- Students will create a collage of images of Rome. Topics: Government, Art, Architecture etc.

Lesson Plan Social Studies

Teacher: Ms. Perkins

Dates: 3/20/14

Grade Level: 6th Grade

Lesson/Activity Duration: *50 Mins.*

Subject Area(s): Social Studies

Curricular Unit/Theme: Rome

Agenda:

1. Materials (5 min.)
2. Name that effect(5-10 min)
3. Paired Reading pgs. 369-371(15 min)
4. Reading Guide (20 min)
5. Review (5 min)

Materials:

- ☐ History textbook pg. 369-371
- ☐ Reading guide

Common Core State Standard(s):

- ❖ History Standard One 6-8a: Students will examine historical materials relating to a particular region, society, or theme; analyze change over time, and make logical inferences concerning cause and effect.

Student Learning Objectives/Outcomes:

- ❖ Students will summarize the achievements of Julius Caesar.

Do Now/Warm-up Activity: Students are greeted warmly at the door and given the materials for the day's lesson/

Grouping Structures/Seating Arrangement: students are in assigned seating arrangements for classroom management purposes.

Modifications and Accommodations: Clearly stated agendas, written directions, one-on-one assistance, push in (sp-ed students), self-contained (sp-ed students)

Differentiation: Students who have completed the given assignment will be assigned another task in the classroom.

Pre Assessment: Students will review the effects of the Punic War with a short multiple choice assessment.

Lesson/Activity Sequence:

Teacher Actions	Learner Actions
Materials (5 mins)- Teacher will greet student warmly at the door and dispense materials for day's lesson.	Materials (5 mins)- Students will be greeted warmly at the door and given the materials for the day's lesson.
Name that effect (10 mins) Teacher will direct the students to complete a short assessment on the effects of the Punic Wars.	Name that effect (10 mins) Students will review the effects of the Punic War with a short multiple choice assessment.
Paired Reading (15 mins) Teacher will direct students to partner up and read pages 369-371	Paired Reading pgs. 369-371 (15 mins) Students will read the above mentioned pages with a partner.
Reading Guide (20 mins) Teacher will direct students to complete the reading guide for the passage.	Reading Guide (20 mins) With the same partner, students will complete tehe reading guide for the passage.
Review (5 mins) Teacher will review answers of reading guide	Review (5 mins) Students will review the answers to the reading guide.

Post Assessment/Exit Ticket: Review (5 mins) Students will review the answers to the reading guide.

Follow Up (Extension/Enrichment): Roman Collage- Students will create a collage of images of Rome. Topics: Government, Art, Architecture etc.

Lesson Plan Social Studies

Teacher: Ms. Perkins

Dates: 3/21/14

Grade Level: 6th Grade

Lesson/Activity Duration: *50 Mins.*

Subject Area(s): Social Studies

Curricular Unit/Theme: Rome

Agenda:

1. **Materials (5 min.)**
2. **Rome Collage Presentation (15 min)**
3. **Roman Review (30 mins)**

Materials:

- ☐ **Review game**
- ☐ **Computer**
- ☐ **Smart board**

Common Core State Standard(s):

- **History Standard One 6-8a: Students will examine historical materials relating to a particular region, society, or theme; analyze change over time, and make logical inferences concerning cause and effect.**

Student Learning Objectives/Outcomes:

Students will review the previously cover objectives

- **Students will summarize the achievements of Julius Caesar.**
- **Students will be able to identify the effects of the Punic wars**
- **Describe the roles of plebeians, the Twelve Tables, consuls, and senators in Roman society.**
- **Summarize the most important achievements of the Roman Republic.**

Do Now/Warm-up Activity: Students are greeted warmly at the door and given the materials for the day's lesson/

Grouping Structures/Seating Arrangement: students are in assigned seating arrangements for classroom management purposes.

Modifications and Accommodations: Clearly stated agendas, written directions, one-on-one assistance, push in (sp-ed students), self-contained (sp-ed students)

Differentiation: Students who have completed the given assignment will be assigned another task in the classroom.

Pre Assessment: Students will share their collages with another classmate and turn them in to the teacher.

Lesson/Activity Sequence:

Teacher Actions	Learner Actions
Materials (5 mins)- Teacher will greet student warmly at the door and dispense materials for day's lesson.	Materials (5 mins)- Students will be greeted warmly at the door and given the materials for the day's lesson.
Rome Collage presentation (15 mins) Teacher will direct students to share their collage with another student	Rome Collage presentation (15 mins) Students will share their collages with another classmate and turn them in to the teacher.
Roman review Teacher will lead a review game.	Roman Review- Students will engae in a review game to revisit the objectives previously covered.

Post Assessment/Exit Ticket: Roman Review- Students will engae in a review game to revisit the objectives previously covered.

Follow Up (Extension/Enrichment):

Class Summary

Session: Winter 2013-2014

Class: Living By Chemistry--Alchemy

Date: 12/16/2013 Location: JCERC

Teacher	School	District	Hours	Status
Connie Bean	Woodbridge High School	Woodbridge	0 of 18	Not Trained
Kristen Bennett	Penn (William) High School	Colonial	18 of 18	Trained
Brittany Bimbi	Sussex Central High School	Indian River	18 of 18	Trained
James Bosma	Concord High School	Brandywine	18 of 18	Trained
~~Judith Campo-Sobota~~	~~POLYTECH High School~~	~~Polytech~~	~~24 of 18~~	~~Dropped~~
Derrick Coleman	Dover High School	Capital	12 of 18	Not Trained
Amanda Hall	Appoquinimink High School	Appoquinimink	18 of 18	Trained
Lisa Hollis	Mount Pleasant High School	Brandywine	18 of 18	Trained
Esther Kernosh	Cape Henlopen High School	Cape Henlopen	18 of 18	Trained
~~Kristin Lupo~~	~~Dover High School~~	~~Capital~~	~~24 of 18~~	~~Dropped~~
Ryan Millman	Woodbridge High School	Woodbridge	18 of 18	Trained
Eric Morgan	Moyer (Maurice J.) Academy	Moyer Academy	18 of 18	Trained
Boniface Neba	Mount Pleasant High School	Brandywine	18 of 18	Trained
Michele Porter	Concord High School	Brandywine	18 of 18	Trained
Timothy Proseus	Cape Henlopen High School	Cape Henlopen	18 of 18	Trained
Wayne Ravenell	Concord High School	Brandywine	18 of 18	Trained
Michael Reilly	Lake Forest High School	Lake Forest	18 of 18	Trained
Charles Sapp	Dover High School	Capital	0 of 18	Not Trained
Angela Savage	Selbyville Middle School	Indian River	18 of 18	Trained
Christopher M Schleich	Appoquinimink High School	Appoquinimink	12 of 18	Not Trained
Tami Soltow	duPont (Alexis I.) High School	Red Clay	18 of 18	Trained

Amanda Speechley	Brandywine High School	Brandywine	18 of 18	Not Trained
Dave Watson	Milford Senior High School	Milford	0 of 18	Not Trained
Nikita Williams	Family Foundations Academy	Family Foundations	0 of 18	Not Trained
Eric Wilt	Appoquinimink High School	Appoquinimink	18 of 18	Trained

morgan

Class Summary

Session: Fall 2013-2014

Class: Energy Across the Systems

Date: 9/9/2013 **Location: Collette-science classroom**

Teacher	School	District	Hours	Status
Marianne Alls	McKean (Thomas) High School	Red Clay	0 of 24	Not Trained
Connie Bean	Woodbridge High School	Woodbridge	0 of 24	Not Trained
Kristen Bennett	Penn (William) High School	Colonial	24 of 24	Trained
Brittany Bimbi	Sussex Central High School	Indian River	24 of 24	Trained
James Bosma	Concord High School	Brandywine	24 of 24	Trained
Sharnette Carter	Lake Forest High School	Lake Forest	24 of 24	Trained
Derrick Coleman	Dover High School	Capital	24 of 24	Trained
Theresa Craig	DSCYF	DSCYF	24 of 24	Trained
Michelle Dadisman (Greene)	DSCYF	DSCYF	24 of 24	Trained
Jessica Davis	Positive Outcomes Charter School	Positive Outcomes	24 of 24	Trained
Mike Denney	Dover High School	Capital	0 of 24	Not Trained
Dainelle Hampton	Smyrna High School	Smyrna	24 of 24	Trained
Carolyn Heckenstaller	Brandywine High School	Brandywine	0 of 24	Not Trained
Kristin Hite	Dover High School	Capital	24 of 24	Trained
Lisa Hollis	Mount Pleasant High School	Brandywine	24 of 24	Trained
Kristen King	DSCYF	DSCYF	12 of 24	Not Trained
~~Kim Kleinstuber~~	~~Clayton (John M.) Elementary School~~	~~Indian River~~	~~0 of 24~~	~~Cancelled~~
Kory Knaster	Penn (William) High School	Colonial	24 of 24	Trained
Jeffrey LaBarrett	Northeast Treatment Center	DSCYF	24 of 24	Trained
Erick Lawler	Silver Lake Treatment Center	DSCYF	24 of 24	Trained

Robert Lawrence	Cape Henlopen High School	Cape Henlopen	24 of 24	Trained
Kristin Lupo	Dover High School	Capital	0 of 24	Not Trained
~~Yolanda McKinney~~	~~Concord High School~~	~~Brandywine~~	~~0 of 24~~	~~Dropped~~
Eric Morgan	Moyer (Maurice J.) Academy	Moyer Academy	24 of 24	Trained
~~Boniface Nebe~~	~~Mount Pleasant High School~~	~~Brandywine~~	~~0 of 24~~	~~Cancelled~~
Michele Porter	Concord High School	Brandywine	24 of 24	Trained
Wayne Ravenell	Concord High School	Brandywine	24 of 24	Trained
Michael Reilly	Lake Forest High School	Lake Forest	24 of 24	Trained
Helena Rudd	Dover High School	Capital	0 of 24	Not Trained
Charles Sapp	Dover High School	Capital	24 of 24	Trained
~~Angela Savage~~	~~Selbyville Middle School~~	~~Indian River~~	~~0 of 24~~	~~Cancelled~~
Morgan Scuse	Smyrna High School	Smyrna	24 of 24	Trained
Timothy Sneeringer	Smyrna High School	Smyrna	24 of 24	Trained
Tami Soltow	duPont (Alexis I.) High School	Red Clay	24 of 24	Trained
Amanda Speechley	Concord High School	Brandywine	24 of 24	Trained
Mike Strobach	Brandywine High School	Brandywine	18 of 24	Trained
Bonnie Wilson	Brandywine High School	Brandywine	18 of 24	Trained
Cary Wolfgang	DSCYF	DSCYF	24 of 24	Trained

Tippens

Class Summary

Session: Fall 2013-2014

Class: Transformation of Energy

Date: 9/11/2013 **Location: Collette-science classroom**

Teacher	School	District	Hours	Status
Rose Barbour	Beacon Middle School	Cape Henlopen	24 of 24	Trained
~~Kristen Black~~	~~Providence Creek Academy Charter School~~	~~Providence Creek~~	~~0 of 24~~	~~Cancelled~~
Jessica Davis	Positive Outcomes Charter School	Positive Outcomes	24 of 24	Trained
Dayra Diamond	Kent County Alternative Programs	Capital	24 of 24	Trained
Nancy Duffy	Gauger-Cobbs Middle School	Christina	24 of 24	Trained
Walter Durant	Edison (Thomas A.) Charter School	Thomas Edison	24 of 24	Trained
David Evans	Chipman (W.T.) Middle School	Lake Forest	24 of 24	Trained
Jon Frey	Laurel Middle School	Laurel	24 of 24	Trained
Christopher Grady	East Side Charter School	East Side	24 of 24	Trained
James Harrison	Postlethwait (F. Niel) Middle School	Caesar Rodney	24 of 24	Trained
Corinne Hood	Smyrna Middle School	Smyrna	24 of 24	Trained
Christine Hubbard	Redding (Louis L.) Middle School	Appoquinimink	24 of 24	Trained
Kristen Johnson	Fifer (Fred) Middle School	Caesar Rodney	18 of 24	Trained
Kim Kleinstuber	Clayton (John M.) Elementary School	Indian River	18 of 24	Trained
Robert Kogut	Delaware School for the Deaf	Christina	24 of 24	Trained
Heather Lambden	Phillis Wheatley Middle School	Woodbridge	24 of 24	Trained
Alex March	Fifer (Fred) Middle School	Caesar Rodney	24 of 24	Trained
Jennifer McHenry	Fifer (Fred) Middle School	Caesar Rodney	24 of 24	Trained
Miya McMillion	Central Middle School	Capital	24 of 24	Trained
~~Bill Mills~~	~~Delmar Middle School~~	~~Delmar~~	~~0 of 24~~	~~Cancelled~~
Kathy Paulison	Fifer (Fred) Middle School	Caesar Rodney	24 of 24	Trained

Laurie Poore	Providence Creek Academy Charter School	Providence Creek	24 of 24	Trained
Renee Robinson	Selbyville Middle School	Indian River	24 of 24	Trained
Sheryl Saborio	Postlethwait (F. Niel) Middle School	Caesar Rodney	24 of 24	Trained
~~Angela Savage~~	~~Selbyville Middle School~~	~~Indian River~~	~~0 of 24~~	~~Cancelled~~
Sara Schiavone	Reach Academy for Girls	Reach Academy	24 of 24	Trained
Elizabeth Snyder	Smyrna Middle School	Smyrna	24 of 24	Trained
Kai Sparkman	Bayard Middle School	Christina	18 of 24	Trained
Kelly Spencer	duPont (H.B.) Middle School	Red Clay	24 of 24	Trained
Michele Stolle	Sussex Consortium	Cape Henlopen	24 of 24	Trained
Jamie Thompson	Fifer (Fred) Middle School	Caesar Rodney	24 of 24	Trained
Terron Tippons	Moyer (Maurice J.) Academy	Moyer Academy	24 of 24	Trained
Kenneth Winter	Central School (The)	Red Clay	24 of 24	Trained

Tippens

Class Summary

Session: Fall 2013-2014

Class: Diversity of Life

Date: 9/12/2013 **Location: Collette-science classroom**

Teacher	School	District	Hours	Status
~~Melissa Amzibel (Beauchamp)~~	~~Central Middle School~~	~~Capital~~	~~0 of 18~~	~~Cancelled~~
~~Samantha Anderson~~	~~Edison (Thomas A.) Charter School~~	~~Thomas Edison~~	~~0 of 18~~	~~Cancelled~~
jeff Armstrong	Talley Middle School	Brandywine	0 of 18	Not Trained
Shannon Barnes	Read (George) Middle School	Colonial	6 of 18	Trained
Carol Breeding	Milford Central Academy	Milford	12 of 18	Trained
Kim Cochran	Waters (Alfred G.) Middle School	Appoquinimink	6 of 18	Trained
Daniel Custer	Delmar Middle School	Delmar	12 of 18	Trained
Jessica Davis	Positive Outcomes Charter School	Positive Outcomes	6 of 18	Trained
~~Nancy Duff~~	~~Wallace Wallin Building~~	~~Colonial~~	~~0 of 18~~	~~Cancelled~~
Walter Durant	Edison (Thomas A.) Charter School	Thomas Edison	12 of 18	Trained
David Evans	Chipman (W.T.) Middle School	Lake Forest	6 of 18	Trained
Moira Fasick	Read (George) Middle School	Colonial	6 of 18	Trained
Cindy Griswold	Mariner Middle School	Cape Henlopen	12 of 18	Trained
Jenny Haight	Talley Middle School	Brandywine	6 of 18	Trained
Jennifer Handler	Talley Middle School	Brandywine	6 of 18	Trained
Christine Hastings	Mariner Middle School	Cape Henlopen	12 of 18	Trained
Chelsea Hilberg	Selbyville Middle School	Indian River	6 of 18	Trained
Kristen Johnson	Fifer (Fred) Middle School	Caesar Rodney	6 of 18	Trained
Kim Kleinstuber	Clayton (John M.) Elementary School	Indian River	6 of 18	Trained
Lauren Lucca	Smyrna Middle School	Smyrna	12 of 18	Trained

Clifton Morlan	duPont (H.B.) Middle School	Red Clay	12 of 18	Trained
Jennifer Mounts	Central Middle School	Capital	6 of 18	Trained
Laurie Poore	Providence Creek Academy Charter School	Providence Creek	6 of 18	Trained
Justice Roberts	Seaford Middle School	Seaford	12 of 18	Trained
Angela Savage	Selbyville Middle School	Indian River	6 of 18	Trained
Sara Schiavone	Reach Academy for Girls	Reach Academy	6 of 18	Trained
Dave Schofield	Shue-Medill Middle School	Christina	12 of 18	Trained
Katherine Schwartz	Central Middle School	Capital	12 of 18	Trained
~~Lauren Skoutelas~~	~~Read (George) Middle School~~	~~Colonial~~	~~0 of 18~~	~~Cancelled~~
Kai Sparkman	Bayard Middle School	Christina	12 of 18	Trained
Teagan Thomas	Las Americas ASPIRA Academy	Aspira Academy	12 of 18	Trained
Terron Tippons	Moyer (Maurice J.) Academy	Moyer Academy	12 of 18	Trained
Sarah Tunstill	Postlethwait (F. Niel) Middle School	Caesar Rodney	12 of 18	Trained
Nikita Williams	Family Foundations Academy	Family Foundations	12 of 18	Trained
Dana Wisnoski	duPont (H.B.) Middle School	Red Clay	12 of 18	Trained

Tappan

Class Summary

Session: Spring 2013-2014

Class: Delaware Watershed

Date: 3/18/2014 **Location: St. Jones Preserve**

Teacher	School	District	Hours	Status
Jeffrey Armstrong	Bayard Middle School	Christina	18 of 18	Trained
Shannon Barnes	Read (George) Middle School	Colonial	18 of 18	Trained
Brice Baylis	Kent County Alternative Programs	Capital	18 of 18	Trained
Carol Breeding	Milford Central Academy	Milford	18 of 18	Trained
~~Ophelia Craig~~	~~Fifer (Fred) Middle School~~	~~Caesar Rodney~~	~~0 of 18~~	~~Cancelled~~
Jordan Crockett	Seaford Middle School	Seaford	0 of 18	Not Trained
Walter Durant	Edison (Thomas A.) Charter School	Thomas Edison	18 of 18	Trained
David Evans	Chipman (W.T.) Middle School	Lake Forest	18 of 18	Trained
Moira Fasick	Read (George) Middle School	Colonial	18 of 18	Trained
Cindy Griswold	Mariner Middle School	Cape Henlopen	0 of 18	Not Trained
Christine Hastings	Mariner Middle School	Cape Henlopen	18 of 18	Trained
Chelsea Hilberg	Selbyville Middle School	Indian River	18 of 18	Trained
Kim Kleinstuber	Clayton (John M.) Elementary School	Indian River	6 of 18	Not Trained
Jeffrey Long	Wallace Wallin Building	Colonial	18 of 18	Trained
Lauren Lucca	Smyrna Middle School	Smyrna	18 of 18	Trained
Heather McCullagh	Shue-Medill Middle School	Christina	18 of 18	Trained
Jennifer Mounts	Central Middle School	Capital	0 of 18	Not Trained
Kathy Paulison	Fifer (Fred) Middle School	Caesar Rodney	18 of 18	Trained
Laurie Poore	Providence Creek Academy Charter School	Providence Creek	18 of 18	Trained
Sheryl Saborio	Postlethwait (F. Niel) Middle School	Caesar Rodney	18 of 18	Trained
Angela Savage	Selbyville Middle School	Indian River	18 of 18	Trained

Dave Schofield	Shue-Medill Middle School	Christina	18 of 18	Trained
Katherine Schwartz	Central Middle School	Capital	18 of 18	Trained
Tiffany Smith	Central Middle School	Capital	12 of 18	Not Trained
Megan Szabo	Postlethwait (F. Niel) Middle School	Caesar Rodney	18 of 18	Trained
Teagan Thomas	Las Americas ASPIRA Academy	Aspira Academy	18 of 18	Trained
Terron Tippons	Moyer (Maurice J.) Academy	Moyer Academy	18 of 18	Trained
Sarah Tunstill	Postlethwait (F. Niel) Middle School	Caesar Rodney	0 of 18	Not Trained
~~Deanna Vinciguerra~~	~~Shue-Medill Middle School~~	~~Christina~~	~~0 of 18~~	~~Cancelled~~
Amy Whittington	Shue-Medill Middle School	Christina	0 of 18	Not Trained
Nikita Williams	Family Foundations Academy	Family Foundations	~~18 of 18~~	~~Trained~~

Delaware

Department of Education

DE Science Coalition
Science Training
2012-2013
Certificate of Participation

NAME: Eric Morgan **District:** Moyer Academy

24 ***hours of participation regarding:***

Energy Across Systems
Science Kit

Option: PC DPTS: CK

On _____

Signature/Applicant 10/21/13 Date

_____ _____

Signature/Immediate Supervisor Date

Tonya Mead

_____

Signature/Supervisor of Activity

MJM Academic Institute

2014-2015 Professional Development Schedule

Date	Topic	Presenter
8/4/2014- 8/6/2014 All Day	**3 Day SpringBoard Initial Teacher Institute** ELA Grades 6-12 Math Grades 6-12 Hilton Wilmington/Christiana Newark, DE	**College Board**
8/7/2014 – 8/8/2014 All Day	**2 Day New Teacher Orientation**	**TBD**
8/12/2014- 8/13/2014 All Day	**2 Day Common Core Training:** Kick Start Common Core In Your Classroom Relevant hands-On Instruction Collaboration on classroom materials for immediate implementation Nationally recognized PD from CORE	**Providence Creek Academy**
8/14/2014- AM	**Diversity:** Understanding and effectively teaching students of diversity includes racial, social, developmental, economic and physical. In this session, we will discuss insights, benefits, factors and processes needed to understand and embrace diversity. Factors such as gender, race, ethnicity, culture, disability, age, education and economic diversity are reviewed. Insight into developing a culture of mutual respect and trust are explored through shared experiences and understanding of the self and of others	**Whitney Williams- Christina School District**
8/14/2014- PM	**Crisis Intervention Strategies:** De-Escalation and other strategies to help staff inside and outside of the classroom: 1. Crisis Development Model 2. Integrated Experience 3. Verbal Escalation and De-escalation 4. Para-Verbal and Nonverbal 5. Personal Space 6. Defusing Strategies 7. Tool Box items.	**Mr. Doug DiRaddo-Brandywine School District**
8/15/2014- AM	**Classroom Management:** Focusing on different instructional strategies so as to minimize interruptions and student behavioral issues. In this session, we will discuss evidence based strategies and implications for daily practice in creating an	**TBA**

	effective environment where disruptions are minimized and educators learn a repertoire of instructional and management practices.	
8/18/2014-AM	**The Art of Teaching:** Creating out of the box solutions from instruction to enhance student learning.	**TBA**
8/18/2012-PM	**Differentiated Instruction:** providing students with different avenues to acquiring content; to processing, constructing, or making sense of ideas; and to developing teaching materials so that all students within a classroom can learn effectively, regardless of differences in ability.	**TBA**
8/19/2014-AM	**RTI: Response to Intervention Training-** Exploring a framework that educators use to help students achieve their full potential	**TBA**
8/19/2014-PM	**Using Data to Create Effective Lesson Plans in Order to Enhance Student Engagement & Learning** **Using Data to Create Assessments to Enhance Student Understanding of Learning Materials**	**TBA**
8/20/2014-AM	**Successful Teaching in an Inclusive Classroom**	**TBA**
8/20/2014-PM	**New Teacher:** E-School Data Input Training (Gradebook & Attendance) **Returning Teachers:** Compass Learning Data Training	**TBA**
September	**New Teachers:** Compass Learning Data Training **Working with the DOE supplied Data Coach from TLEU, we will Pull Data from Gradebooks and Compass Learning to Discuss Student Academic Progress and Appropriate RTI. Also work in PLC's to create following weeks plans for instruction and interventions.**	TBA Team
October	**First Aid & CPR** **Working with the DOE supplied Data Coach from TLEU, we will Pull Data from Gradebooks and Compass Learning to Discuss Student Academic Progress and Appropriate RTI. Also work in PLC's to create following weeks plans for instruction and interventions.**	Nurse Team
November	**Pending Topic: Based on Identified Need**	TBA

	Working with the DOE supplied Data Coach from TLEU, we will Pull Data from Gradebooks and Compass Learning to Discuss Student Academic Progress and Appropriate RTI. Also work in PLC's to create following weeks plans for instruction and interventions.	Team
December	**Pending Topic: Based on Identified Need** **Working with the DOE supplied Data Coach from TLEU, we will Pull Data from Gradebooks and Compass Learning to Discuss Student Academic Progress and Appropriate RTI. Also work in PLC's to create following weeks plans for instruction and interventions.**	TBA Team
January	**Pending Topic: Based on Identified Need** **Working with the DOE supplied Data Coach from TLEU, we will Pull Data from Gradebooks and Compass Learning to Discuss Student Academic Progress and Appropriate RTI. Also work in PLC's to create following weeks plans for instruction and interventions.**	TBA Team
February	**Pending Topic: Based on Identified Need** **Working with the DOE supplied Data Coach from TLEU, we will Pull Data from Gradebooks and Compass Learning to Discuss Student Academic Progress and Appropriate RTI. Also work in PLC's to create following weeks plans for instruction and interventions.**	TBA Team
March	**Pending Topic: Based on Identified Need** **Working with the DOE supplied Data Coach from TLEU, we will Pull Data from Gradebooks and Compass Learning to Discuss Student Academic Progress and Appropriate RTI. Also work in PLC's to create following weeks plans for instruction and interventions.**	TBA Team
April	**Pending Topic: Based on Identified Need** **Working with the DOE supplied Data Coach from TLEU, we will Pull Data from Gradebooks and Compass Learning to Discuss Student Academic Progress and Appropriate RTI. Also work in PLC's to create following weeks plans for instruction and interventions.**	TBA Team
May	**Pending Topic: Based on Identified Need**	TBA

	Working with the DOE supplied Data Coach from TLEU, we will Pull Data from Gradebooks and Compass Learning to Discuss Student Academic Progress and Appropriate RTI. Also work in PLC's to create following weeks plans for instruction and interventions.	Team
June	**Share, Review, and Critique PD Training and Practice**	**Keenan Dorsey**

Maurice J. Moyer Academic Institute: 2014-2015 School Year

Summer Professional Development

Week 1

Monday August 4 SpringBoard Curriculum Professional Development 8:30 – 3:30	Tuesday August 5 SpringBoard Curriculum Professional Development 8:30 – 3:30	Wednesday August 6 SpringBoard Curriculum Professional Development 8:30 – 3:30	Thursday August 7	Friday August 8
MATH • Opening Session – 1 hour • Examining Springboard and Common Core Connections – 2 hours, 30 mins. • Connecting Expectations, Standards, and SpringBoard Strategies – 1 hour • SpringBoard Print and Digital Book Walk – 45 mins. • Closing Session – 15 mins. **ELA** • Opening Session – 30 mins. • Diving into the 2014 Common Core Edition – 30 mins. • Modeling SpringBoard Unit and Examining CCSS Connections, Part 1- 3 hours • Creating a Plan for Unit One - 1 hour • Closing Session -30 mins.	**MATH** • Opening Session – 10 mins. • Using SpringBoard Strategies in Context – 1 hour, 40 mins. • Examining the Instructional Framework of SpringBoard – 3 hours, 30 mins. • Closing Session – 10 mins **ELA** • Opening Session – 10 mins. • Modeling a SpringBoard Unit and Examining CCSS Connections, Part 2 – 1 hour, 40 mins. • Modeling a SpringBoard Unity and Examining CCSS Connections, Part 3 – 1 hour, 30 mins. • Closing Session – 25 mins.	**MATH** • Opening Session – 10 mins. • Planning That Leads to Rigorous Instruction – 1 hour, 10 mins. • Spotlight on Collaboration – 2 hours, 5 mins. • Spotlight on Formative Assessment – 1 hour, 40 mins. • Closing Session – 25 mins. **ELA** • Opening Session – 5 mins. • Modeling Springboard Close Reading Workshops – 1 hours, 30 mins. • Modeling a SpringBoard Performance Unit – 3 hours • Planning to Differentiate – 45 minutes • Closing Session – 10 mins.	***New Teacher Orientation***	***New Teacher Orientation***

Maurice J. Moyer Academic Institute: 2014-2015 School Year

Summer Professional Development

Week 2

Monday August 11	Tuesday August 12	Wednesday August 13	Thursday August 14	Friday August 15
Overview **8:30-9:00-** Ice Breaker/Team Building **9:00-9:30-** Review of 2013-2014 Student Academic/Behavior/Attendance Data **9:30-10:30-** 2014-2015 Strategic Plan for Improvement **10:30-11:00-** Break **11:00-12:00-** Review of 2014-2015 Standard Operating Procedures **12:00-1:00** Lunch **1:00-2:00-** Review of Student Code of Conduct & Policies and Procedures	***Common Core*** **All Day:** Common Core Training: Providence Creek Academy	***Common Core*** **All Day:** Common Core Training: Providence Creek Academy	***School Culture*** **8:30-9:00-** Ice Breaker/Team Building **9:00- 11:00- Training:** Diversity Training **11:00-11:20-** Break **11:20- 12:00-** Q & A /Feedback for Presenter **12:00-1:00-**Lunch **1:00-2:30- Training:** Crisis Intervention Strategies **2:30-3:00-** Q&A /Feedback for Presenter	***Classroom Management*** **8:30-9:00-** Ice Breaker/Team Building **9:00-11:00-** Training: Effective Classroom Management **11:00-11:20-** Break **11:20-12:00-** Q&A /Feedback for Presenter **12:00-1:00-** Lunch **1:00-3:00-** Teachers Working In and Preparing Classrooms

Maurice J. Moyer Academic Institute: 2014-2015 School Year

Summer Professional Development

Week 3

Monday August 18	Tuesday August 19	Wednesday August 20	Thursday August 21	Friday August 22
Pedagogy **8:30-9:00-** Ice Breaker/Team Building **9:00-11:00-Training:** The Art of Teaching **11:00-11:20-** Break **11:20-12:00-** Q&A /Feedback for the Presenter **12:00-1:00-** Lunch **1:00-2:30- Training:** Differentiated Instruction **2:30-3:00-** Q&A / Feedback for Presenter	***Data Driven Instruction & Assessments*** **8:30-9:00-** Ice Breaker/Team Building **9:00-11:00- Training:** RTI (Response to Intervention) **11:00-11:20-** Break **11:20-12:00-** Q&A /Feedback for the Presenter **12:00-1:00-** Lunch **1:00-3:00- Training:** Using Data to Create Assessments to Enhance Student Understanding of Learning Materials	***Equity for All*** **8:30-9:00-** Ice Breaker/Team Building **9:00-11:00-** Training: Inclusion: Successful Techniques to Teach in an Inclusive Classroom **11:00-11:20-** Break **11:20-12:00-** Q&A /Feedback for Presenter **12:00-1:00-** Lunch **1:00-3:00-** New Teacher: E-School Data Input Training (Gradebook & Attendance) Returning Teachers: Compass Learning Data Training	Summer Bridge	Summer Bridge

Maurice J. Moyer Academic Institute School Calendar 2014-2015

July				
M	T	W	TH	F
	1	2	3	4
7	8	9	10	11
14	15	16	17	18
21	22	23	24	25
28	29	30	31	
			Days	0

August				
M	T	W	TH	F
				1
4	5	6	7	8
11	12	13	14	15
18	19	20	21	22
25+	26	27	28	29
			Days	4

September				
M	T	W	TH	F
1	2	3	4	5
8	9	10	11	12
15	16	17	18	19
22	23	24	25	26
29	30			
			Days	21

October				
		1^	2	3
6	7	8	9	10
13	14	15	16	17
20	21	22	23	24
27	28	29	30	31
			Days	22

November				
M	T	W	TH	F
3	4	5	6	7
10	11	12	13	14*
17+	18	19	20	21
24	25	26	27	28
			Days	17

December				
M	T	W	TH	F
1	2	3	4	5
8	9	10	11	12
15	16	17	18	19
22	23	24	25	26
29	30	31		
			Days	15

January				
M	T	W	TH	F
			1	2
5	6	7	8	9
12	13	14^	15	16
19	20	21	22	23
26	27	28	28	30
			Days	18

February				
M	T	W	TH	F
2	3	4	5	6
9	10	11	12	13
16	17	18	19	20*
23+	24	25	26	27
			Days	19

March				
M	T	W	TH	F
2	3	4	5	6
9	10	11	12	13
16	17	18	19	20
23	24	25	26	27
30	31			
			Days	22

April				
M	T	W	TH	F
		1	2	3
6	7	8	9	10
13	14	15	16	17
20	21	22	23	24
27	28	29	30	
			Days	16

May				
M	T	W	TH	F
				1
4	5	6	7	8
11	12	13	14	15
18	19	20	21	22
25	26	27	28	29*
			Days	20

June				
M	T	W	TH	F
1	2	3	4	5
8	9	10	11	12
15	16	17	18	19
22	23	24	25	26
29	30			
			Days	5

Total Number of Student Days: 179

KEY

	School Day – 3:00pm Dismissal
	School Day – 12:30pm Dismissal (Staff PD)
	No School for Students (Staff PD)
	Vacation – School Closed
+	First Day of Marking Period
^	Progress Reports Completed
*	Last Day of Marking Period
5	Report Card Conferences – 12:30pm Dismissal
	SpringBoard Curriculum Training

Response to Intervention Handbook

2014-2015

Maurice J. Moyer Academic Institute

Contents

*This RTI FLEX Model Handbook is to serve as a model for your school and is based on the National RTI guidelines. Specific state requirements may have to be added to meet individual school needs.

Response to Instruction – Key Definitions

Response to Instruction/Intervention (RtI): is a systemic process of meeting the educational needs of all students through professional accountability to ensure:

- Delivery of scientific, research based core curriculum and instruction
- Ongoing monitoring of student data to assess the effectiveness of instruction
- Determination and delivery of targeted and intensive individualized student supports
- Shared responsibility – all staff (general education teachers, special education teachers, Title I, administration and Instructional strategist)

Multi-Tiered Instruction: An approach to organizing instruction used to efficiently differentiate instruction for all students. It incorporates increasing intensities of instruction and support using specific, research-based interventions matched to student need.

Fidelity: Refers to the extent to which a process and/or instruction are implemented as intended to maximize effectiveness. When checking for fidelity we ask if each identified component of the process and/or instruction is:

- Evident in the process or instruction.
- Implemented in the manner specified.
- Implemented to the degree specified.

Intervention: Intentionally becoming involved in a situation in order to improve it or prevent it from getting worse. The intervention process begins with identifying a problem and then using data in a team approach to develop a plan. The plan is then implemented and evaluated. Interventions become more intensive when students are significantly behind in skill development or knowledge critical to academic/behavioral growth.

Intensity: Interventions can become more intense by changing: (a) group size, (b) amount of time, and (c) curriculum/instruction used.

a. Group size: Students who are significantly behind benefit from instruction in smaller groups. Smaller groups allow instruction to be tailored to the specific

needs of the students, as well as more opportunities for practice and teacher feedback.

b. Amount of time: When students are behind, they need more time engaged in instruction in order to catch up. The additional time may include re-teaching or specialized curriculum/instruction matched to the needs of the student.

c. Type of curriculum/instruction: Students who are not making progress may need curriculum/instruction designed to teach specific skills and strategies. The instruction provides opportunities for modeling, practice, and feedback, with an emphasis on mastery.

Ways to Intensify/Change an Intervention

- Ensure that instruction targets skill deficit
- Increased time engaged in instruction
- Extended length of tasks
- More examples and wider range of examples
- Breaking down tasks into smaller steps
- Multiple opportunities to participate and respond (written, verbal)
- Repeated opportunities for practice and review
- Drill, repetition, practice, and review made engaging
- Immediate correction and feedback
- Eliciting group and individual verbal responses from all students
- Use, then fade prompts

Distinctions in *Response to Instruction*

RtI Is …	*RtI* Is Not …
A systemic process that aligns all school improvement goals	A special education initiative
Intent on ensuring all students meet or exceed proficiency standards	Intent on decreasing or increasing special education numbers
An instructional model designed to benefit all students through greater continuity of services	A product or kit to add on to the daily routine
Focused on effective instruction to enhance the academic learning of all students	Focused on documentation of evidence to remove a student from general education

RtI greatly increases the likelihood of improved student achievement by identifying struggling students at the earliest grade levels and providing them with additional instructional time and intensity during the school day. It also provides more advanced curriculum and additional instructional time and intensity to those who are proficient and need extended learning. With *RtI*, students are monitored often to ensure they are progressing, and when they are not, they receive additional learning opportunities.

Distinctions in RtI and Traditional Approaches

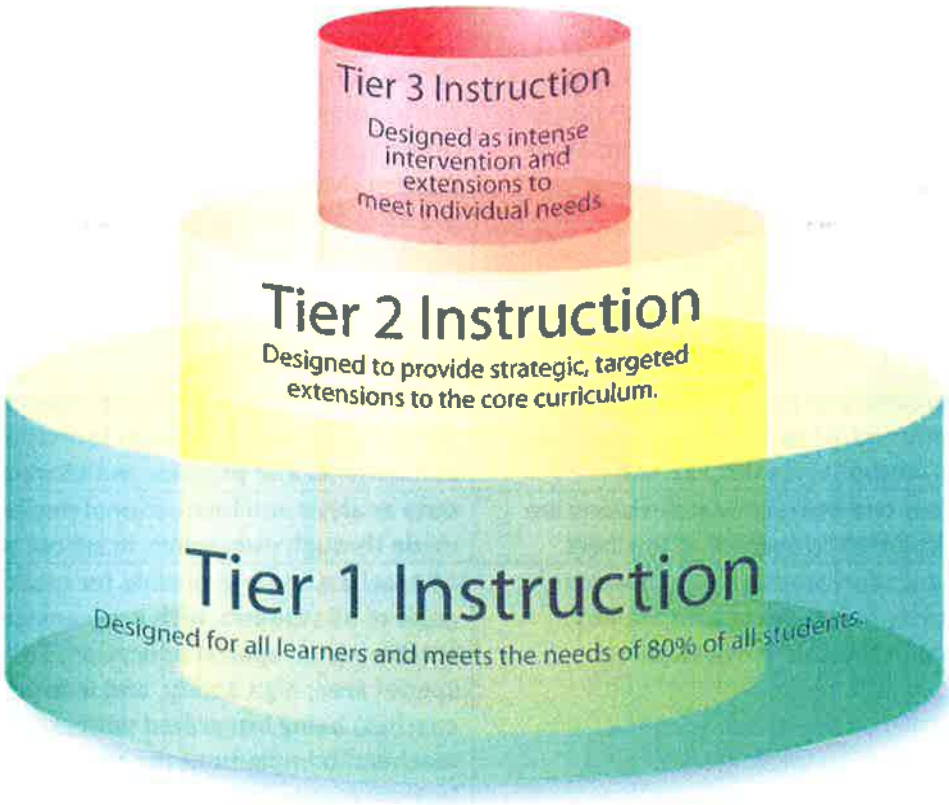
Traditional Approach	Response to Instruction

Students who are unsuccessful with the core curriculum are referred to and often placed in special programs that include instruction in pull-out classrooms.	When students are unsuccessful in the core curriculum or have demonstrated proficiency, their teachers review the student data and adjust instructional practices including intensity and duration to meet the students' goals.
Teachers primarily use the same instructional methods for all students.	Teachers modify, support, and extend instructional practices based on individual student goals/needs.
Student growth and needs are determined sporadically and/or over extended periods of time (e.g., end-of-semester exams).	Student growth and goals are measured weekly or biweekly through formative assessments and progress monitoring.
Data review and instructional decisions are made in isolation by individual teachers.	Data analysis and instructional decisions are made through discussions in school teams.
Special education teachers hold the main responsibility for students who are not succeeding in the core curriculum.	All teachers are responsible for meeting the goals of all students with program specific teachers (e.g., special education, Title I, ELL, special area, high ability, and instructional coaches) being integrated with classroom teachers to implement the tiers of instructional support.

Maximizing Student Instruction

A. Three- Tier Instructional Model*

The *RtI* framework consists of three levels or tiers that are fluid and overlapping. The tiers provide various levels of support to students in terms of duration and intensiveness. The more instructional support needed the higher up on the model the student moves. Teachers using *RtI* utilize research-based instructional practices, targeted interventions, and curricular enhancements to support students in accomplishing their individual learning goals and include innovative scheduling and resource allocations. Fluidity and flexibility within and between the instructional tiers are critical to students' receiving the supports they need. Every student is given an opportunity to meet or exceed proficiency standards by teachers utilizing data in an effective and collaborative decision-making process, which results in differentiating instructional practices for all learners.



RTI Process – How it Works

The *RtI* Process has three purposes:

1. To review grade-level behavior and academic data in order to evaluate the effectiveness of core programs.
2. To screen and identify students needing additional academic and/or behavior support.
3. To plan, implement and modify interventions for these students. Depending on each student's "response to intervention," a formal referral for special education evaluation may result.

Tier 1: Core Classroom Instruction
Tier 1 Instruction refers to research-based core classroom curriculum and instruction for all learners that focus on the essential elements of a subject. Designed to meet the needs of least 80 percent of all students, Tier 1 provides the foundation for instruction upon which all interventions are formulated. Pre-assessment data drive differentiated instructional decisions based on evidence of proficiency or evidence of difficulty. Identified students with high abilities in a particular subject or content are grouped together in one class (cluster group, multi-age, self-contained) to receive a more advanced core curriculum with accelerated and more in-depth instruction. Pre-assessment data are used to find additional students who need advanced instruction.

Tier 2: Targeted Instruction
Students who are struggling with content instruction in Tier 1 are considered in need of additional support in Tier 2. Tier 2 Instruction provides strategic, targeted extensions in addition to the core curriculum and instruction present at Tier 1. Data from consistent progress monitoring are used to guide the intensity, duration, and frequency of instruction and vary based on individual learning goals. For students performing below grade level, Tier 2 is intended to remediate deficiencies and provide the support needed to be successful in Tier 1. For students exceeding the higher level expectations of the advanced core, Tier 2 is designed to provide further challenges that are differentiated for pace, content, and complexity in the core subject.

Tier 3: Intensive Instruction
Tier 3 Instruction provides intense intervention to target specific, individual student needs. It goes beyond the instructional and differentiated practices typical of those within Tier 1 or Tier 2. For students with the most significant needs, this requires explicit, intensive, and specifically designed lessons in addition to Tier I and in place of Tier 2 Instruction. This intensive level of instruction utilizes a combination of research and evidence-based practices, a rigorous curriculum, a positive learning environment, and frequent assessments to ensure the needs of all students are met.

***If a student has not made adequate progress after an appropriate period of time and has been provided with appropriate instruction, a request for an educational evaluation may be initiated.**

****For students with high abilities, Tier 3 might require intensive instruction and/or highly individualized challenges. The intensive instruction is designed to accelerate students' learning in the specific area(s) of need.**

Descriptions of Tier 1 Elements

Feature	Definition
Materials	• Research-based core curricula and differentiated instructional materials (including English language development, ELD, curricula for English language learning students) • Above-grade-level materials used within advanced core
Instructional Organization	• Whole group instruction of strategies, processes, skills, and content • Differentiated, flexible groups determined by benchmark and progress monitoring data for application of skills, re-teaching, additional practice, compacting and/or challenge activities, and/or English language development instruction. • For ELL students, ELD instruction is provided within the 90 minute reading block for elementary and is a stand-alone course for secondary
Instructional Responsibility	• Highly qualified classroom teacher with the training and background required to implement research-based practices for all learners, including

	students with needs above or below grade-level curriculum and those with limited English proficiency **• An ELL teacher with specialized training to provide ELD instruction and who coordinates with classroom teachers to implement the tiers of instructional support** **• High-ability licensed teacher for identified high-ability students grouped together in one class (cluster group, multi-age, self-contained); could be in partnership with content expert**
Assessment	**• Pre and post assessment is needed in order to plan instruction** **• Benchmark data, progress monitoring data, diagnostic assessment data, including assessments of above or below grade-level standards inform instruction** **• Summative assessment is needed to determine student mastery and is one of the components for determining student grades** **• Students with an Individualized Education Program (IEP) or Individual Learning Plan (ILP) receive accommodations according to their plans**
Parent Communication	**• Consistent communication with parents regarding student progress and academic needs**
Scheduling	**• Tier 1 Instruction occurs daily in the general education classroom**

Tier 2: Targeted Instruction

Tier 2 instruction is scaffolded to provide additional research-based instruction beyond the core curriculum. The duration, intensity, and frequency of instruction are increased during this tier based on progress monitoring data. For students with learning difficulties or other special instructional needs such as English Language Learners (ELLs), Tier 2 is intended to remediate deficiencies and provide the support needed to be successful in Tier 1. For students with high abilities and others exceeding advanced expectations, Tier is designed to provide further challenges that are differentiated for pace, content, and complexity.

Descriptions of Tier 2 Elements

Feature	Definition
Materials	• Research-based instructional materials aligned to Tier 1 core curriculum (e.g., for ELL students, ELD instructional materials designed to remediate language and content deficiencies). • Selected to match student need based on progress monitoring and other data • Above grade level materials used within advanced core
Instructional Organization	• Small, homogeneous groups incorporating multisensory approaches as appropriate • Differentiated instruction increases in depth and intensity and is determined using benchmark and progress monitoring data

	• Frequent opportunities for students to apply their learning • Scaffold critical and creative thinking • For ELL students, the focus of ELD instruction is a continuation and intensification of Tier 1 to remediate language and content deficiencies
Instructional Responsibility	• Highly qualified teacher, in partnership with content and program area specialist, or other appropriate certified personnel • High ability licensed teacher for identified high ability students grouped together in one class (cluster group, multi-age, self-contained); could be in partnership with content expert • Additional opportunities for support provided by trained personnel and supervised by licensed staff
Assessment	• Diagnostic assessment and on-going progress monitoring to determine growth and make targeted instructional decisions (frequency is at least monthly)
Parent Communication	• Required written notification to parent (communicated in the native language when necessary) when a student experiences academic difficulty and requires an intervention that is not provided to all students in the general education classroom.
Scheduling	Students who need reinforcement of skills or additional extension instruction, in addition to Tier 1 receive up to 30 minutes daily (or duration according to research-based program implementation) • In secondary, students may receive additional time through a lab class, basic skills class, guided study, or an extended school day • For students with high ability, vertical or more in-depth extensions to the curriculum add further challenge to concepts during additional extension

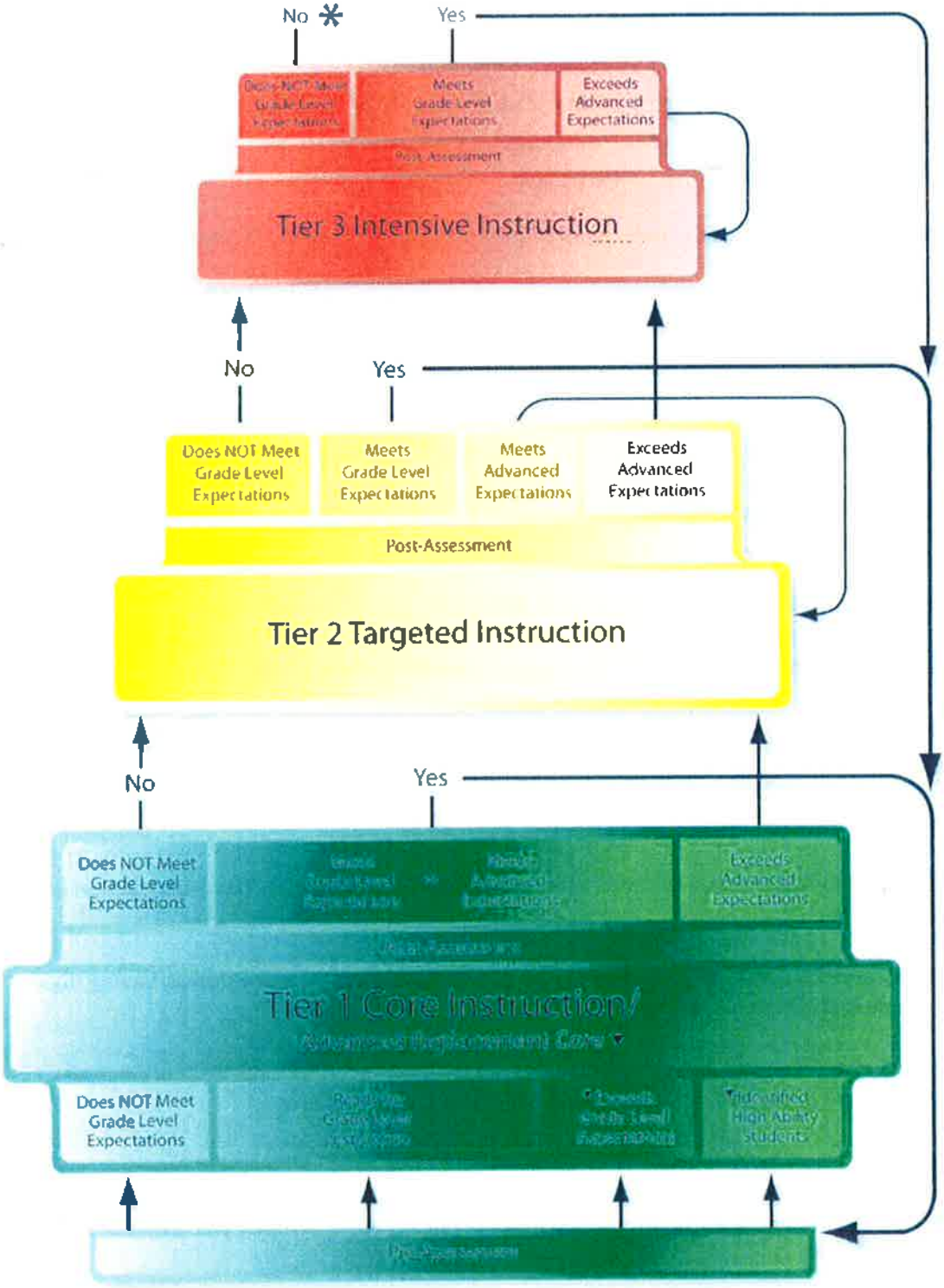
Tier 3: Intensive Instruction

Tier 3 Instruction involves research-based, intensive, targeted interventions for students with needs that are not adequately addressed in Tiers 1 and 2. For students with the greatest learning challenges, this could require explicit, intensive and specifically designed lessons. For high ability students, this could require intensive instruction and/or highly individualized challenges. Frequent progress monitoring provides data that drives customized strategies to assure that the needs of these students are met.

Description of Tier 3 Elements

Feature	Definition
Materials	• Research-based instructional materials selected to meet individualized needs or needs of students with significantly low or high ability as defined by contrasting age-appropriate expectations to student level of performance • Students significantly below grade level may need an intensive intervention program aligned to Tier I curriculum
Instructional Organization	• Individual or small, homogeneous groups • Explicit, intense, and scaffolded instruction • For secondary students, a specific course may be included during which intensive intervention is provided

	• Incorporation of multisensory approaches as appropriate • Classes specifically designed for students identified as having high intellectual abilities in a general or specific academic domain, or whole grade advancement for individuals • Critical and creative thinking appropriate in depth and intensity
Instructional Responsibility	• Highly qualified and specially trained teacher • High-ability licensed teacher for identified high-ability students grouped together in one class (cluster group, multi-age, self-contained); could be in partnership with content expert
Assessment	• Diagnostic, ongoing progress monitoring that provides data to address intense need (Bi monthly)
Parent Communication	• When a student experiences academic difficulty and requires an intervention that is not provided to all students in the general education classroom, written notification to inform the parent(s)/guardian is required • If a student has not made adequate progress after an appropriate period of time and has been provided with appropriate instruction as described in IDEA: Parent Notification Pertaining to Intervention/Extension Instruction, a request for an educational evaluation may be initiated
Scheduling	• In addition to Tier1Instruction, students receive 30–90 minutes daily (or time according to research-based program implementation).



* Please discuss an educational evaluation referral with your multidisciplinary team if the student is not currently receiving special education services.

Tier 1 Core Instruction: Decision Making

Pre-Assessment: Pre-assessments occur before instruction takes place to determine student mastery of outlined goals, skill levels, mastery of intended content, and/or need for additional practice on foundational concepts. Examples may include, but are not limited to, end-of-unit tests, assessments on specific skills, and end-of-course assessments.

If a student *does not meet* grade-level expectations on pre-assessment, the next steps are as follows:

1. Differentiated instruction of strategies, content, processes, and skills occurs.

2. A post assessment is given to measure student learning.

3. A) If data indicate a student still does not meet grade-level expectations, Tier 2 Instruction is required.

B) If data indicate a student does meet grade-level expectations, Tier 1 Instruction is appropriate.

If a student is *ready for* grade-level instruction based on pre-assessment, the next steps are as follows:

1. Differentiated instruction of strategies, content, processes, and skills occurs.

2. A post assessment is given to measure student learning.

3. A) If data indicate a student does not meet grade-level expectation, Tier 2 Instruction is required.

B) If data indicate a student does meet grade-level expectations, Tier 1 Instruction is appropriate.

If a student *exceeds* grade-level expectations on pre-assessment and identified as having high abilities, the next steps are as follows:

1. A student receives an advanced core, which is more complex and delivered at an accelerated pace; this may include above-grade-level standards.

2. A post assessment is given to measure student learning.

3. A) If data indicate a student exceeds the advanced expectations, Tier 2 Instruction is required.

B) If data indicate a student meets the advanced expectations, Tier1 Instruction is appropriate. Future pre-assessments may indicate the need for advanced core instruction again.

Post Assessment: Post assessments document students' level of achievement following instruction. These assessments help to guide flexible regrouping of students advancing to the next instructional

topic/unit of instruction. Depending on the instructional goals, post-assessments might include curriculum-based measures, chapter tests, end-of-unit tests, or end-of-course assessments.

Tier 2 Targeted Instruction: Decision Making

1. Tier 2 Instruction is scaffolded to provide additional research-based instruction beyond the core curriculum. The duration, intensity, and frequency of instruction are increased based on progress monitoring data.

2. A post assessment is given to measure student learning.

3. A) If data indicates a student still does not meet grade-level expectations, Tier 3 Instruction is required.

B) If data indicates a student does meet grade-level expectations, Tier1 Instruction is appropriate.

Tier 2 Targeted Instruction: Advanced Core

1. For students with high abilities and others exceeding advanced expectations, Tier 2 is designed to provide further challenges that are differentiated for pace, content, and complexity.

2. A post assessment is given to measure student learning.

3. A) If data indicates a student exceeds the advanced expectations, Tier 3 Instruction is required.

B) If data indicates a student meets the advanced expectations, Tier 2 Instruction is appropriate.

C) If data indicate a student requires an appropriate reduction of challenge, Tier 1 Instruction is appropriate.

Tier 3 Intensive Instruction: Decision Making

1. Tier 3 Instruction involves research-based, intensive, targeted interventions for students with needs that are not adequately addressed in Tiers 1 and 2.

2. A post assessment is given to measure student learning.

3. A) If data indicate a student still does not meet grade-level expectations, Tier 3 Instruction continues, which could include an advanced core aligned to grade-level standards. If a related disability is suspected, a referral for educational evaluation will be appropriate.

B) If data indicate a student does meet grade-level expectations, the student can be served in Tier 1 and progress monitored regularly to ensure Tier 2 or 3 services are not needed for the student to remain at grade level.

Tier 3 Intensive Instruction: Advanced Core

1. **For students with high abilities and others exceeding advanced expectations, Tier 3 is designed to provide intensive instruction and/or highly individualized challenges.**

2. **A post assessment is given to measure student learning.**

3. **A) If data indicate a student meets and/or exceeds the advanced expectations, Tier 3 Instruction continues.**

4. **B) If data indicate a student requires an appropriate reduction of challenge, returning to Tier 1 is appropriate.**

Tier 2 and 3 Instructional Strategies –

Explicit and Systematic Lessons: Many students in Tier 2 and 3 of *RtI* will benefit from lessons that are explicitly and systematically taught. Academic failure can often be attributed to the erroneous assumption that all students know how to complete a task without explicit lessons. More than any other factor, explicit instruction is essential to student achievement. Research supports that skills, processes, strategies, and content must be explicitly and systematically taught. They must be modeled and practiced in multiple settings with a variety of materials. A gradual withdrawal of teacher support must follow until the student achieves the desired level of automaticity and is independent. Effective teachers understand the following sequential components of explicit instruction:

• Direct Explanation
Teacher names and defines the skill, process, content, or strategy to be learned. This definition includes explaining why the skill or strategy is important and when it is used.

• Teacher Modeling
Teacher overtly demonstrates a skill, process, content, or strategy that a student will learn. Through modeling, instruction becomes less vague and more concrete for students. Explicit instruction provides a greater likelihood that students will demonstrate mastery.

• Guided Practice
Teacher provides students with support and guidance as they practice the skill or strategy independently or in small groups. Prompts, specific corrective feedback and praise related to the new skill, process, content, or strategy are provided. Teacher support gradually fades as the student takes responsibility for using the skill, process, or strategy independently.

• Independent Practice
Students are provided with multiple opportunities to apply the newly acquired skill, process, content, or strategy on their own. Through independent practice, students' continue to review and practice the skills, processes, strategies, and content learned.

• Progress Monitoring
Teacher monitors and evaluates student mastery of the new skill, process, content, or strategy. Future instruction is designed to target skills, process, content, and strategies that require additional review

and practice.

Family and Community

One of the most important ways to maximize student instruction is the role of family and community. The hallmarks of effective home/school collaboration include open communication and involvement of the family in all stages of the learning process. This includes involving the family early on when a student is struggling; providing assistance for how parents can help their children at home; and meaningfully involving families at school. For parents who do not speak English, all meetings need to be interpreted and all written communications be translated.

Within an *RtI* model, when a student experiences academic difficulty and requires an intervention that is not provided to all students in the general education classroom, written notification to inform the parent(s)/guardian is required before a student begins Tier 2 and/or Tier 3 interventions.

RtI Team

Team Responsibilities:

- **Focus on classroom/core and targeted skills/intervention groups**
- **Assist classroom teachers to**
    1. **Review grade level data and core program**
    2. **Identify students needing strategic support**
    3. **Identify students needing intensive support**
- **Schedule diagnostic assessments for strategic and intensive students in collaboration with grade level teams**
- **Recommend allocation of intervention resources (e.g., time in addition to the core) for the lowest 20% of students in the building**
- **Use diagnostic information to place students in existing academic interventions**
- **Provide suggestions for adjusting instruction in core academics and behavior**
- **Suggest adjustments for the behavior or academic interventions if the student is not making adequate progress.**
- **Continue to monitor students who have moved to Tier 2 and Tier 3 supports**
- **If parent requests an evaluation, the *RtI* Team must present this information to the Special Education Coordinator immediately.**

Team	Possible Members
RtI	Administrator General Education Teacher Special Education Teacher Speech Pathologist Title 1/ Reading Specialist ELL Intervention Specialist

- **Four members (minimum) should be present at all decision making meetings**

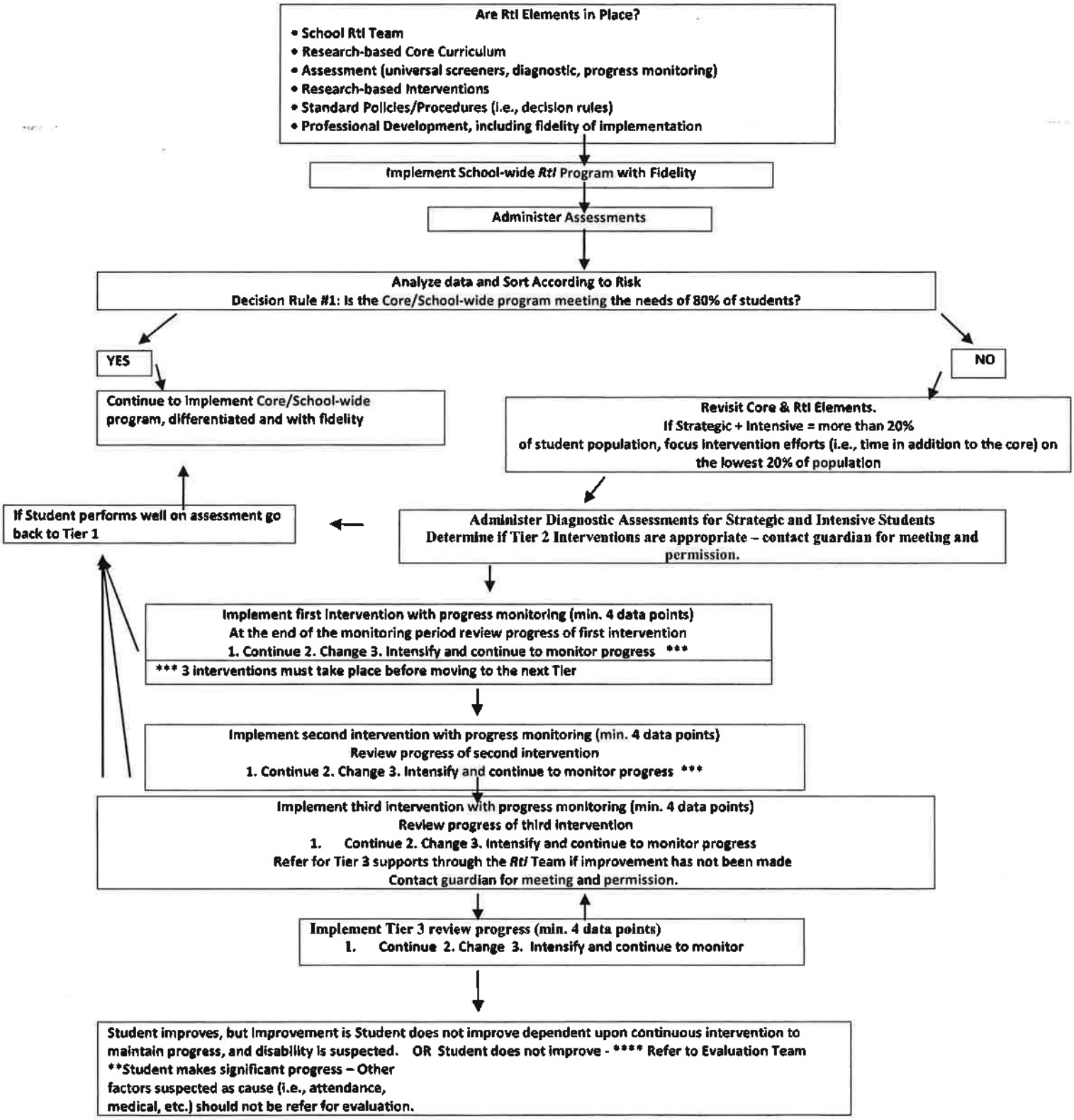
Team Function:

- **Review grade level and core program data**
- **Use a planned agenda format to:**
    - **Review progress-monitoring data and recommend interventions for students.**
    - **Determine referrals to *RtI* support. One of six different decisions may be made for each student being reviewed:**
        1. **The group intervention has been successful and the student has reached benchmark so the resources should begin to be faded.**
        2. **The group intervention has been successful but the student has not yet reached benchmark, so a new goal should be set.**
        3. **The intervention appears to be working for the student and should be continued as is.**
        4. **The group intervention is not working for the student and should be revised or refined.**
        5. **The group intervention is not working for the student, and the plan has been modified three times; therefore a more individualized plan is needed.**

6. **For students on an individualized plan, follow the "Individualizing, Intensifying Intervention" procedures.**

- **Team may meet without the RTI team an additional time during each month to:**
  - **Discuss curriculum planning**
  - **Plan for cross-classroom groupings, etc.**

RtI Flowchart



RtI Meeting Guideline

Maurice J. Moyer Academic Institute

General Meeting Guidelines
Team Member Attendance: *RtI* Members and Teachers as appropriate **Meeting Tips:** **• Meet only with essential team members present** **• Designate roles (timekeeper, facilitator, note taker)** **• Review the purpose** **• Stick to the agenda** **• Organize the data before the**
When: During Monthly meetings or as needed
Purpose: To sort students into profiles, select appropriate interventions, schedule intervention groups, and schedule progress monitoring.
Materials to Bring: diagnostic assessment data summary forms, Reading Assessment Process flow, Reading Protocols, Group or Individual Intervention Planning Form, Student Intervention Profile forms, reading 1. Sort Students into Profiles: Target 20% that need additional support 2. Determine Students in Need of Intervention: Focusing on the lowest 20% of the population and high Achieving students, determine which students are in need of intervention and enhancement. 3. Determine Intervention Groups and Plan Instruction: • Determine the instructional needs of each group (i.e., amount of instructional time, grouping size, materials, etc.). • Do any staff members need to be trained in a particular program selected? 4. Determine Progress Monitoring: • What measure will be used for progress monitoring? How often will it be administered? Who will be responsible for data collection and graphing? (Team may choose to alternate who is responsible.) • When will the team reconvene to review student progress? 5. Fidelity of Instruction: Determine who will check fidelity of instruction and how often? 6. Inform Parents: Determine who will inform parents about team decisions. <u>Tier 2 and 3 –</u> Individual Plan Intervention Review: (conducted at least monthly – at RtI Team meetings) 1. Review progress monitoring data and other student data 2. Use the following guidelines to evaluate the student's response to the individualized intervention: a. If student continues to struggle, but the difficulties appear to be due to other factors (behavior, attendance, or Limited English Proficiency), then interventions to help the student with these difficulties will be initiated. b. If student has improved substantially and no longer needs to have an individual intervention plan, then continue to monitor student progress and begin to fade resources. c. If student improvement is dependent upon continuous individualized intervention to maintain progress, and a disability is suspected, then refer to the Evaluation Planning Team. d. If the student does not improve, then refer to Evaluation Planning Team.

RtI Monthly Meeting Form

Members Present:
Date:
Determine - Students Needing Tier 2 support / Parent Meeting Date
Review Current Tier 2 plans and effectiveness (Intervention 1, 2 or 3 in Tier 2)
Determine – Students Needing Tier 3 support / Parent Meeting Date
Determine Current Tier 3 plans and effectiveness
Determine Tier 3 students that need to be referred for evaluation

Tier 2 Intervention Recording Form

Grade: _____

Teacher:_____

Student	Instructor	Group Size	Time/Date	Target	Program	Frequency	Person Responsible for implementation	Fidelity Check

Academic Concerns

To be completed by referring teacher

Student: _____ **Date:** _____ **Referred by:** _____

READING

Assessments Administered: *(circle)*	**Dates Administered/Scores:**
Course/Teacher	
Current LA Grade / %	

Attach 2 work samples and comparative work samples

WRITTEN LANGUAGE

Assessment Administered:	
Course/Teacher	
Current LA Grade / %	

Attach 2 writing samples with a comparison sample from an average student

MATH

Assessment	**Dates Administered/Scores:**
Course/Teacher	
Current Test Scores in Class	

Attach 2 work samples and comparative work sample

Check all that apply

- ☐Visual-spatial problems
- ☐Low frustration tolerance
- ☐Attention and concentration problems
- ☐Organizational problems
- ☐Difficulty processing information
- ☐Memory and thinking problems
- ☐Directional (left-right) confusion
- ☐Difficulty with sequencing (e.g. saying the days of week, alphabet, numbers)
- ☐Difficulty grasping concepts or with language
- ☐Difficulty copying from board

Other observations:

_____

Individual Student Supports Worksheet
Members present: (List RtI Team Members and titles)

Student: _____Today's Date: _____

Teacher/Grade: _____ Birth Date/Age: _____

Number of Grade Level Interventions _____RtI Tier Level _____

1. **History/Background – previous schools, attendance, medical issues, progress, etc.**

2. **Define the Problem (See Academic Concerns Worksheet for Data)**

Current Level of Performance

- **Reading**

- **Math**

- **Written Language**

- **Behavior**

3. **Prior Interventions and Assessments**

4. **Brainstorming – *what could be done?***

5. **Solutions/Choices – *what will be tried?***

6. **Evaluation – *how to know if the plan is working.***

7. **Strategy & Support**

Task/Strategy	Person Responsible	By When	Review Date	Evaluation Decision
1.				
2.				
3.				
4.				
5.				

Follow-Up Meeting:

Who: _____ **Date:** _____ **Time:** _____

Notes:

Options for Change in Intervention

- Use this guide to choose ways to intensify/change an intervention that is not working for a group or a particular student.

Options for an Individual student

- Increase Motivation
  - Add incentives
  - Change incentives
  - Increase success level (more positive reinforcement)
- Increase active engagement
  - Elicit more responses per session
  - Teach, review, and post standards of behavior
- Check/reassess student's group placement (does skill level match instruction)
- Increase pace of instruction (if advanced)
- Elicit unison group responses (use signals)
- Employ correction procedures (immediate with feedback)
- Pre-teach concepts/skills outside the group
- Build/activate prior knowledge
- Provide increased scaffolding
  - Modeling/more examples
  - Guided practice/review
  - Prompts
  - Breakdown tasks into smaller steps
- Reduce size of instructional group
- Add additional instructional time
  - Double dosing
  - Different materials
- Change seating within group
- Provide instruction in small units throughout the day
- Change physical environment
- Visual prompts

- Additional resource go to The National Center on Response to Intervention

  http://www.rti4success.org

Maurice J. Moyer Academic Institute RTI Model (TIER 2)

Date:

Re:

Dear Parent,

Your child's performance that has fallen below expectation in one or more targeted areas indicated by grade-level benchmark screenings administered to all students. The school would like to implement interventions selected for your child to increase the rate of learning in individually targeted academic areas (Tier 2 Intervention). The progress of each student participating in a Tier 2 Intervention will be closely monitored to determine individual rate of improvement.

Therefore, the school's building-based problem solving team has met to develop a more intensive and individualized intervention plan (Tier 2 intervention) that is intended to further increase your child's rate of learning as compared to grade level expectation. This plan may include increased intervention time, a different protocol of evidence-based intervention, and or participation in a smaller instructional group. Your child's progress will continue to be monitored closely during this time.

The Tier 2 Intervention Plan for your child is attached and includes the following information:

- **The general education services that will be provided**
- **The evidence – based strategies and/or programs that will be used**
- **The amount and nature of student progress monitoring data that will be collected**
- **The target date for review of the progress monitoring data; and**
- **The goal for what is considered an acceptable rate of progress**

If your child does not make adequate progress after participating in Tier 2 intervention for the designated period of time, the problem solving team, with your agreement, may elect to amend the plan and set a new target date for review. However, if adequate progress is not made a Tier 3 Intervention Plan may be implemented with your permission.

Please feel free to contact me if you desire additional information or have questions or concerns.

Sincerely,

_____(Guardian Signature) _____(Date)

Maurice J. Moyer Academic Institute RtI MODEL (TIER 3)

Date:

Re:

Dear Parent,

As you know, your child has participated in an evidence based intervention plan (Tier 2 Intervention) that provides supplemental, targeted instruction in areas of performance that have fallen below expectation as indicated by grade-level benchmark screenings administered to all students. The interventions selected for your child were provided in small group settings and were selected to increase the rate of learning in individually targeted academic areas. The progress of each student participating in a Tier 2 Intervention plan has been closely monitored to determine individual rate of improvement, and the results for your child are attached.

Current progress monitoring data for your child indicate that he/she is not making progress at a rate sufficient to meet grade level expectation in the targeted areas. Therefore, the school's building-based problem solving team has met to develop a more intensive and individualized intervention plan (Tier 3 intervention) that is intended to further increase your child's rate of learning as compared to grade level expectation. This plan may include increased intervention time, a different protocol of evidence-based intervention, and or participation in a smaller instructional group. Your child's progress will continue to be monitored closely during this time.

The Tier 3 Intervention Plan for your child is attached and includes the following information:

- **The general education services that will be provided**
- **The evidence – based strategies and/or programs that will be used**
- **The amount and nature of student progress monitoring data that will be collected**
- **The target date for review of the progress monitoring data; and**
- **The goal for what is considered an acceptable rate of progress**

If your child does not make adequate progress after participating in Tier 3 intervention for the designated period of time, the problem solving team, with your agreement, may elect to amend the plan and set a new target date for review. However, if adequate progress is not made after completion of the intervention plan and the plan is not amended, the school is required, pursuant to 511 IAC 7-40-2 (f), to initiate a request for an educational evaluation to determine your child's eligibility for special education and related services. In this instance, you would receive a written Notice of Evaluation describing the nature of the evaluation, which must be completed within 20 school days. This evaluation cannot occur without your informed consent.

Please note that at any time during the intervention process, you have the right to request an educational evaluation for your child. If he or she is participating in a Tier 3 Intervention plan and you request an evaluation prior to completion of the plan, the school is allowed 50 days to complete the evaluation and convene the case conference committee meeting to consider eligibility for special education services.

Please feel free to contact me if you desire additional information or have questions or concerns.

Sincerely,

_____(Guardian Signature) **_____(Date)**

Maurice J. Moyer Academic Institute

Notice of Initial Evaluation Following Interventions

Student: STN:
DOB:
Age:
Grade:
Gender:
The public agency is proposing to conduct an initial educational evaluation. The decision to conduct this evaluation was based on:

_____

Area(s) of eligibility under consideration:

_____

The proposed evaluation procedures include reviewing existing data and collecting new information in the areas of:

_____

I understand the proposed evaluation procedures. I understand that I have protection under the procedural safeguards and that this document includes a list of resources to contact for assistance in understanding the provisions of Indiana special education rules. If I have not previously received a copy of the procedural safeguards, I will be provided with one. I can expect the evaluation to be completed and the case conference committee, comprised of parent(s) and public agency staff, to be convened within 20 school days once the consent is received by the public agency. After the evaluation is conducted, the case conference committee will meet to discuss the evaluation results to determine if the student is eligible for special education and related services.

If I consent to this evaluation, I will receive a copy of the Educational Evaluation Report at the case conference committee meeting. In addition, I am requesting:

- **A meeting with someone to discuss the educational evaluation report prior to the date of the case conference committee meeting.**
- **A copy of the educational evaluation report prior to the case conference committee meeting.**

_____ _____

Guardian Signature **Date**

CompassLearning

CompassLearning Inc. Price Quote
MOYER (MAURICE J.) ACADEMY (AC-1219825)
SO-210617-058778

Date: 02/03/2014
Quote #: SO-210617-058778
Total: $3,300

Quote #: SO-210617-058778

Site	Description	Product Code	End Date	Quantity	List Price	Tier Price	Adjusted Price	Discount	Total Price
MAURICE J MOYER ACADEMY (AC-679557)	Hosted Basic	SPTKHB	06/30/2015	1.0	$3,200	$3,200	$4,700	$2,200	$2,500
MAURICE J MOYER ACADEMY (AC-679557)	ITA Online Site Webinar License	PDSVW	06/30/2015	1.0	$800	$800	$800	$0	$800

Total: $3,300
Tax: $0

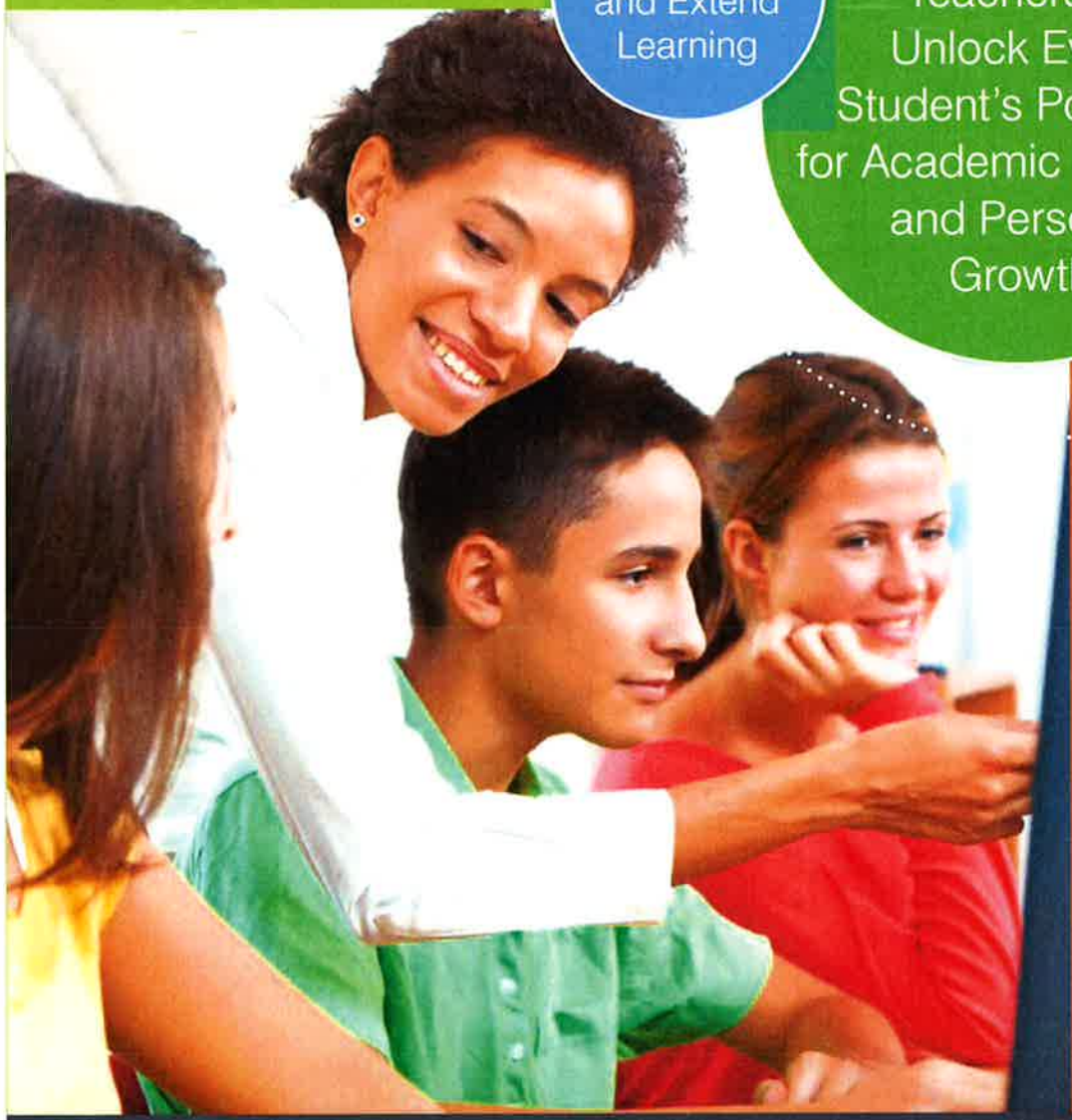
Grand Total: $3,300

Apply, Deepen, and Extend Learning

Empower Teachers to Unlock Every Student's Potential for Academic Success and Personal Growth

Assess, Prescribe, Instruct

Develop 21st Century Skills



CompassLearning®

Administrators,

"It was like having another teacher in the classroom."

Dr. Justin Cunningham
Superintendent
Bonsall Union School District

Teachers,

"We were able to meet the needs of our struggling students, as well as accelerate the rate of learning for our advanced students."

Kari Whalen
Elementary Director
Milwaukee College Preparatory School

Students,

"Overall, Compass Learning has been a great experience, and I look forward to continuing with the program."

Chadd
Student
New York Public Schools

all agree
Compass Learning
delivers results.

Empower Teachers

Ensuring learning is relevant to each and every student is no longer a nicety in the classroom. It's a necessity.

However, creating an environment in which the needs of each individual student are met can be a daunting proposition, particularly when teachers are under intense and ever-growing pressure to do more with less.

Engage Students

The Compass Learning suite of products helps teachers be more efficient and effective in making a difference for each and every student. Our engaging online solutions help teachers understand students' abilities, motivations, interests, strengths, and learning styles, enabling them to effectively differentiate, personalize, and accelerate learning.

Compass Learning's award-winning product suite includes comprehensive K–12 curriculum and is:

- Built on more than 40 years of research on how young people learn, think, and achieve
- Aligned with Common Core and State Standards
- Designed specifically to aid in the development of 21st century skills and college and career readiness
- Complete with tools to report, track, and measure individual, classroom, school, and district performance

Ensure Success

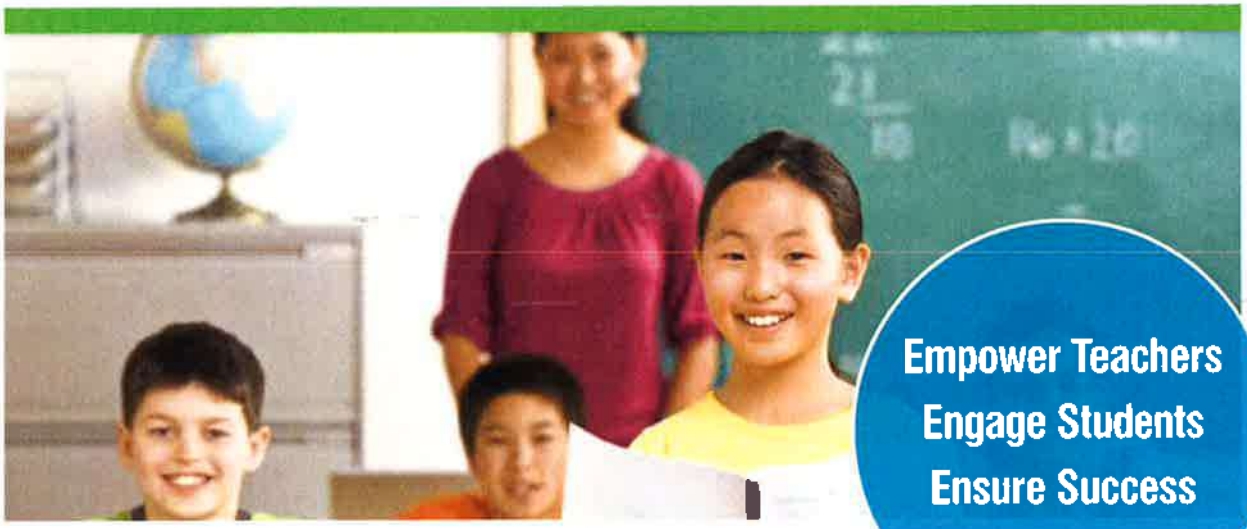
To ensure our partnerships with educators breed success, Compass Learning also offers industry-leading professional development through Impact Teacher Academy. Our professional development provides ongoing education, best-practice implementation, and training for teachers and administrators on Compass Learning's resources and tools to improve teacher effectiveness and student achievement, and deliver measureable results.

At the end of the day, when the final school bell rings, we at Compass Learning truly believe empowered teachers and engaged learners are a formidable force; one that can ensure incomparable successes for students, schools, and districts alike.

If you're looking for a proven partner to help empower teachers, engage students, personalize learning, improve test scores, and increase graduation rates, contact Compass Learning at 1-866-586-7387. Learn more about our company and our experts, view product demos, and read what customers are saying about our suite of products on our website at www.compasslearning.com.

CompassLearning®

CORPORATE OVERVIEW



Empower Teachers
Engage Students
Ensure Success

What We Do:

CompassLearning® empowers teachers to unlock every student's potential for academic achievement and personal growth.

How We Empower Teachers:

We start with students, just like teachers do. We help teachers better understand the needs, motivations, and strengths of every child, so they can personalize instruction and accelerate learning. Our innovative solutions are built on decades of confirmed research about the ways students think and learn; we also take into account their abilities, interests, and expression styles, so teachers can customize and differentiate learning for every student. We leverage our expertise in technology, curriculum, and digital content to deliver solutions that engage all students, anytime, anywhere. At Compass Learning, we not only inspire children to learn, we ensure our offerings align with State and Common Core Standards, so you achieve the accountability needed in this day and age.

CompassLearning offers two online K–12 learning solutions, supported by industry-leading professional development:

ODYSSEY®
by CompassLearning®

CompassLearning Odyssey® assesses a student's strengths and needs, and prescribes a personalized learning path complete with rigorous and engaging curriculum. Odyssey also offers educators customized reports to track and measure student, school, and district progress, as well as inform instructional decisions. Odyssey offers educators a compelling solution to ensure students are proficient or advanced, that they meet State and Common Core Standards, and that they are college and career ready.

RenzulliLearning
by CompassLearning®

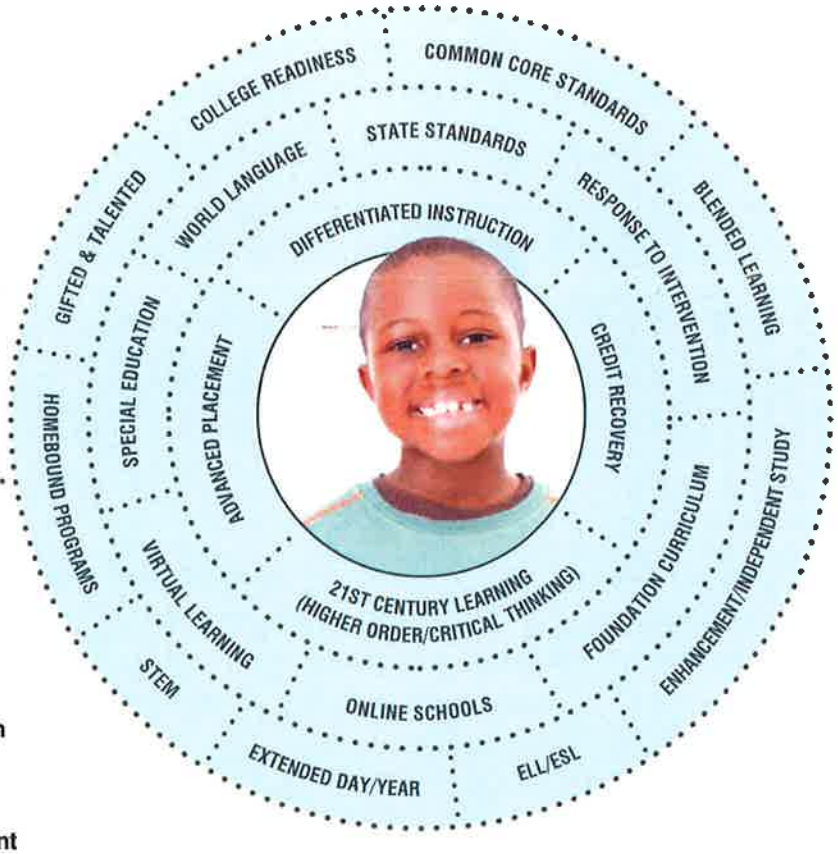
Renzulli® Learning prepares students for 21st century success by asking them to apply, deepen, and extend their learning through differentiated assignments that enhance critical-thinking and problem-solving skills. Renzulli Learning assignments encourage students to think outside the box and apply what they have learned in engaging activities. Renzulli Learning helps teachers more efficiently and effectively differentiate classroom instruction by aligning resources and activities to the student's individual learning style, expression style, and interests.

Impact Teacher Academy®
by CompassLearning®

Impact Teacher Academy® provides professional development and training for teachers and administrators to effectively use Compass Learning resources and tools to improve student achievement and deliver measureable results. Seasoned educators with extensive classroom experience and a strong understanding of instructional best practices, train, develop, and coach teachers and administrators to ensure that they get the most out of their Compass Learning partnership.

How Educators Use Compass Learning Solutions:

More than 7,500 schools across the United States use CompassLearning Odyssey and/or Renzulli Learning to personalize and differentiate instruction for students of all ages, abilities, and interests. Tens of thousands of teachers have used Compass Learning solutions to solve challenges related to:



What We're Known For:

- **Personalization**
- **Highly engaging, rigorous curriculum and content**
- **Development of 21st century skills**
- **Research-based product development**
- **Passionate, experienced, caring team**
- **Proven academic results**

In the 2011 academic year, nearly 250,000* unique students logged into Compass Learning solutions to advance their learning and personal growth each day. One of the best ways to understand what Compass Learning does is through the results of teachers and students that engage in our solutions. You can find a few of the thousands of success stories in our resource library at: http://www.compasslearning.com/results/

TOP WORK PLACES 2011
The Statesman
statesman.com

We're Also Known as a Great Place to Work:

In 2011, the *Austin American-Statesman* named Compass Learning one of the "Best Places to Work" in Austin. Our people, with their passion and commitment to education, drive a culture that supports work-life balance, engagement in the community, lasting careers, and the most rigorous and engaging educational software on the market.

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* Based on data from CompassLearning's cloud-based systems and estimates of the number of students using on-premise, perpetual licenses.

ODYSSEY
by CompassLearning

SOLUTION OVERVIEW

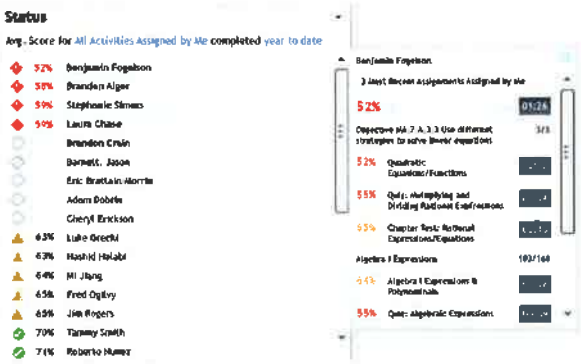
Empowering Teachers to Help Students Build the Foundational Knowledge and Skills Necessary for Academic Success and Personal Growth

One of the many challenges today's teachers face is creating differentiated learning opportunities for the 20–30+ unique students in their classrooms, each with varying degrees of abilities and interests.

CompassLearning Odyssey enables teachers to easily and efficiently assess, prescribe, instruct, and report on progress at the individual student level. Odyssey's compelling content gets students excited to learn and engaged in the process. It also helps teachers understand if students are proficient or advanced and whether they're making progress toward State and Common Core Standards. And because Odyssey automates many of the administrative tasks with which educators are burdened, it frees teachers to do what they do best: teach.

Assess

To get started using CompassLearning Odyssey, students take an assessment from which teachers are able to identify students' strengths and needs; determine ability levels; pinpoint foundational skill gaps; and even challenge more advanced learners. Teachers also have the option of integrating assessment data from external assessments, such as the Northwest Evaluation Association (NWEA) Measures of Academic Progress (MAP).



Prescribe

Once assessments are complete, the system automatically creates an individualized learning path with explicit instructions and learning activities for each student, based on his or her specific needs and abilities.

Instruct

Direct instruction is delivered through reading passages, manipulatives, videos, and animations. The curriculum — which is available for every grade, across every subject — is rigorous, and the activities are interactive and engaging. Plus, it's all based on current and confirmed research around how young minds think and learn, and is directly aligned to State and Common Core Standards.

CompassLearning

Track and Measure

As students complete the online, interactive activities, Odyssey provides ongoing assessment to help teachers track progress toward academic goals in real time.

Odyssey is used for direct instruction or in any number of other implementations based on the classroom, teacher, and students' needs. Core implementations include original credit, Response to Intervention, credit recovery, virtual learning, homebound programs, online schools, blended learning environments, flipped classrooms, special education, and independent study, to name a few.

Customer Reports

Keeping apprised of how students are progressing has never been easier. Using the CompassLearning Odyssey Manager, teachers can generate summaries by objectives, learning path status, and student progress reports. They can even proactively schedule delivery of these reports, helping them effectively and efficiently track and measure student, school, and district progress, as well as mastery of State and Common Core Standards.

Parent Involvement

Not only does CompassLearning Odyssey help empower teachers and engage students, it also helps facilitate parent involvement. Through the CompassLearning Odyssey login, parents can easily monitor their child's progress and achievement on assigned activities.

The Odyssey Community

Odyssey also gives teachers a new way to communicate with students in the place where they live most: online. Students and teachers have access to an Odyssey-based community — one that integrates 21st century learning skills with social media capabilities. This easy-to-use tool helps build online conversations and improve student-to-teacher interactions all within a safe, protected environment; thus, eliminating the security issues of open forums such as Facebook, Twitter, and YouTube.

If you are looking for a proven partner to help empower teachers, engage students, personalize learning, improve test scores, and increase graduation rates, contact Compass Learning at 1-866-586-7387.

Learn more about our company and our experts, view product demos, and read what customers are saying about our suite of products on our website at www.compasslearning.com.

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Renzulli Learning
by CompassLearning

SOLUTION OVERVIEW

Renzulli Learning Enables Students to Apply, Deepen, and Extend Learning for Common Core and Beyond

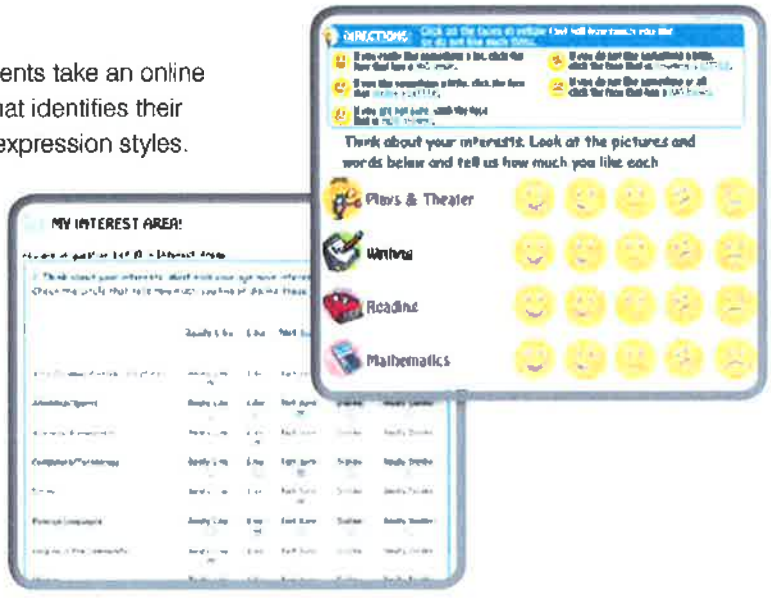
Today's educators are all too aware that students need more than just foundational knowledge and skills to truly be successful in college and 21st century careers. In a globally competitive world, students' ability to think critically, collaborate with peers, defend a point of view, be creative and communicative, and model and manage complex real-world problems will be critical to their success.

CompassLearning's Renzulli Learning empowers teachers to better understand a student's interests, as well as learning and expression styles, and more efficiently and effectively differentiate instruction by aligning resources to the individual student. Renzulli Learning has been designed to meet these next-generation learning challenges by creating opportunities for students to apply, deepen, and extend their learning.

Apply

To get started using Renzulli Learning, students take an online assessment, called the Renzulli Profiler™, that identifies their top three interests, as well as learning and expression styles.

Based on each student's profile, Renzulli Learning then recommends personalized learning activities from a curated database of more than 40,000 resources and activities. Teachers quickly and easily incorporate these resources into standards-based lessons that are differentiated to the individual learning needs of each student in their class. Students apply their abilities and interests to the tailored instruction.



CompassLearning

Deepen

In addition to the instruction, Renzulli Learning also offers a wide range of activities that help students complete projects and gain confidence in doing other self-directed work. These independent study and enrichment activities develop students' deep conceptual understanding and critical thinking and reasoning skills; thus, preparing them for college and 21st century careers.

Extend

Students can also extend their learning with additional self-paced projects. They can choose from engaging virtual field trips to exciting contests and competitions that provide them with unique opportunities to extend what they're learning in the classroom.

If you are looking for a proven partner to help empower teachers, engage students, personalize learning, improve test scores, and increase graduation rates, contact Compass Learning at 1-866-586-7387.

Learn more about our company and our experts, view product demos, and read what customers are saying about our suite of products on our website at www.compasslearning.com.

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F-OVERVRZ-0712

Impact Teacher Academy®
by CompassLearning®

"Compass Learning has a specific, well-designed professional development offering."
Rob Stratton,
Technology Specialist,
Gulf Elementary School

Online Professional Development

Impact Teacher Academy Online provides your teachers and district year-around, economical solution for your professional development and training needs. With more than 250 professional development opportunities each month — offered in 20- and 45-minute increments — even the busiest teachers and budget-strapped districts will benefit from this dynamic program.

- Specifically designed to meet the needs of teachers and administrators who want to get the most out of their Compass Learning investment
- On-demand and live professional development opportunities taught by professional instructors via the internet
- Getting started programs take 45 minutes, while general topics are designed to be completed in approximately 20 minutes
- Fast-paced and focused so educators can complete them during planning time or when it is most convenient for them
- Includes integration strategies and best practices
- Opportunities to ask questions and engage with Impact Teacher Academy professional educators
- Free and powerful enhancements for districts that purchase on-site, virtual, and blended Impact Teacher Academy implementations

*While Impact Teacher Academy Online allows for live interaction with our professional instructor, content is not specific to the individual districts or schools. Our virtual, on-site, and blended offerings support in-depth discussion, planning, and reporting with individual districts related to implementation, measurement, reporting, and customization.

† Courses are subject to change.

‡ Impact Teacher Academy Online requires access to the video center, registration, a computer with speakers, and access to CompassLearning Odyssey. User system must meet the minimum use requirements for optimal viewing.

The Impact Teacher Academy Online supports both CompassLearning Odyssey and Renzulli Learning implementations with sessions that support successful integration strategies and best practices. Sessions include regularly scheduled, live, interactive, streaming web presentations, as well as on-demand video and webinar play back. With the Impact Teacher Academy Online, cost and time are no longer issues.

Impact Teacher Academy Online is accessible wherever there is internet access.‡
It is perfect for:

- Getting started with CompassLearning Odyssey and/or Renzulli Learning right away
- Deepening your understanding of Odyssey and Renzulli Learning
- Mastering the basics quickly, so time with your assigned Implementation Manager is more focused on specific integration strategies
- Providing more learning opportunities between core sessions
- Introducing new and long-term substitute teachers to CompassLearning Odyssey
- Increasing the frequency of personal support
- Repeating and reinforcing exposure to instructional material
- Helping new teachers engage more quickly

Enhance the expertise of your faculty and staff anytime, anywhere, with Impact Teacher Academy Online*.

For more information please contact 866-586-7387.

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ODYSSEY®
by CompassLearning®

CompassLearning Odyssey® Course Listing

Elementary Courses

COURSE	GRADE
Language Arts†	K–5
Odyssey for English Language Learners — Elementary	K–5
Mathematics†	K–5
Science (Supplemental)†	1–5
Social Studies (Supplemental)†	2–5
Matématicas (Spanish)	K–5
Middlebury™ Powerspeak¹² World Languages Spanish 1 and 2, German 1 and 2, French 1 and 2, Latin 1	3–5

CompassLearning Odyssey Cross-curricular

COURSE	GRADE
Brain Buzzers — Art, music, health†	4–7
Thematic Research Projects — Science and social studies†	4–8

Middle School Courses

COURSE	GRADE
Language Arts†	6–8
Odyssey for English Language Learners — Secondary	6–8
Mathematics†	6–8
Honors Algebra†	7–8
Middle School Science Earth and Space Science, Life Science, Physical Science, The Nature of Science	6–8
Social Studies (Supplemental)†	6–8
Matématicas (Spanish)	6
Middlebury Powerspeak¹² World Languages Spanish 1 and 2, German 1 and 2, French 1 and 2, Latin 1 and 2, Chinese 1 and 2	6–8

†Included in CompassLearning Odyssey subscription
*AP is a registered trademark of the College Board
**One-semester course

Odyssey High School

COURSE	GRADE
English I†	9
English II†	10
English III†	11
English IV†	12
Algebra I (Includes Honors Algebra)†	9–12
Geometry†	9–12
Algebra II (Includes Trigonometry)†	9–12
Pre-Calculus (Includes Trigonometry)†	9–12
AP* Calculus	9–12
Physical Science/Integrated Physics and Chemistry†	9–12
Earth/Space Science†	9–12
Biology†	9–12
Chemistry†	9–12
Physics†	9–12
AP* Biology	9–12
U.S. History I (to 1850)†	9–12
U.S. History II (1850–Present)†	9–12
World History†	9–12
U.S. Government/Civics†	9–12
AP* U.S. Government	9–12
AP* Microeconomics	9–12
AP* Macroeconomics	9–12
Economics with Personal Finance†**	9–12
Health†**	9–12
Public Speaking	9–12
World Geography†	9–12
Art History Elective**	9–12
Health and Medicine Elective**	9–12
Media Studies Elective**	9–12
Personal Fitness Elective**	9–12
Sociology Elective**	9–12
Middlebury Powerspeak¹² World Languages Spanish 1 and 2, German 1 and 2, French 1 and 2, Latin 1 and 2, Chinese 1 and 2	9–12

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F-CRSLIST-0812

Compass Learning is a leading provider of K–12 personalized learning solutions that empower teachers to unlock every student's potential for academic achievement and personal growth.

Our software solutions, which are based on current and confirmed research, provide intervention, exploration, and stimulation. Using assessment data, CompassLearning Odyssey® automatically delivers competency-based, personalized instructional paths. Renzulli® Learning determines each student's interests, learning styles, and expression styles, and then provides online enrichment activities based on that information. With professional development offered through our Impact Teacher Academy®, educators learn how to make data-driven decisions, as well as refine and modify CompassLearning Odyssey learning paths and Renzulli Learning activities as they deem appropriate for each student's unique needs. Through award-winning curriculum and assessment, exemplary professional development, and world-class support, we help educators provide students with greater opportunities, inspire a life-long love of learning, and help each and every student achieve academic success.

866-586-7387

www.compasslearning.com

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CollegeBoard

SpringBoard

Initial Teacher Institute: English Language Arts
Agenda at a Glance for the 2014 Edition

Day 1 6 hours	Day 2 6 hours	Day 3 6 hours
Opening Session Provides an introduction to the design and features of the SpringBoard 2014 Common Core Teacher Edition and Digital eBook 30 minutes	Opening Session Builds on Day 1 learning and creates a context for examining rigorous instructional units and Writing Workshops 10 minutes	Opening Session Builds on Days 1 and 2, and creates a context for examining how rigorous instruction is supported through Reading Workshops and performance units 5 minutes
Diving into the 2014 SpringBoard Edition Explores the 2014 Common Core Edition by examining individual units of instruction and connections to the CCSS Instructional Shifts 30 minutes	Modeling a SpringBoard Unit and Examining CCSS Connections, Part 2 Analyzes a SpringBoard unit for content, design, and connections to CCSS via interactive modeling 1 hour and 40 minutes	Modeling SpringBoard Close Reading Workshops Examines the content, structure, and application of Close Reading Workshops and how they prepare students for CCSS expectations 1 hour and 30 minutes
Modeling a SpringBoard Unit and Examining CCSS Connections, Part 1 Analyzes a SpringBoard unit for content, design, and connections to CCSS via interactive modeling 3 hours	Modeling SpringBoard Writing Workshops Examines the content, structure, and application of Writing Workshops and how they prepare students for CCSS expectations 1 hour and 45 minutes	Modeling a SpringBoard Performance Unit Analyzes a SpringBoard unit that uses a dramatic performance of Shakespeare to meet a range of CCSS expectations 3 hours
Creating a Plan for Unit One Guides teachers through the process of unpacking and preparing to teach Unit One of each grade level 1 hour	Modeling a SpringBoard Unit and Examining CCSS Connections, Part 3 Analyzes a SpringBoard unit for content, design, and connections to CCSS via interactive modeling 1 hour and 30 minutes	Planning to Differentiate Guides teachers through the process of planning strategic instruction to meet diverse needs 45 minutes
Closing Session Provides instructions for SpringBoard Digital access and reflection on the day's learning 30 minutes	Closing Session Provides an opportunity to reflect on and clarify Day 2 learning and make connections to Day 1 learning 25 minutes	Closing Session Provides an opportunity to reflect on, clarify, and synthesize content from Days 1–3 10 minutes

CollegeBoard

SpringBoard

Initial Teacher Institute: Mathematics
Agenda at a Glance for the 2014 Edition

Day 1 *6 hours*	Day 2 *6 hours*	Day 3 *6 hours*
Opening Session Provides an overview of the 2014© SpringBoard Common Core Edition and key connections to the CCSS Instructional Shifts and assessment expectations. *1 hour*	**Opening Session** Builds on Day 1 to create a context for examining the CCSS, rigorous instruction, and how to make the expectations of the CCSS accessible through effective planning and use of strategies *10 minutes*	**Opening Session** Builds on Days 1 and 2 to create a context for examining coherence in SpringBoard materials and to prepare for planning rigorous instruction *10 minutes*
Examining SpringBoard and Common Core Connections Analyzes a SpringBoard unit for content, design, and connections to the CCSS and reviews assessment expectations via interactive modeling. *2 hours and 30 minutes*	**Using SpringBoard Strategies in Context** Examines how SpringBoard coherently connects the CCSS for Mathematical Practice and content standards through the use of strategies that make rigor accessible *1 hour and 40 minutes*	**Planning That Leads to Rigorous Instruction** Provides the opportunity to review how to plan rigorous instruction to meet the expectations of the CCSS and to create instructional plans for teaching upcoming units *1 hour and 10 minutes*
Connecting Expectations, Standards, and SpringBoard Strategies Examines connections between the CCSS Standards for Mathematical Practice and SpringBoard, including how strategies help students achieve rigorous expectations. *1 hour*	**Examining the Instructional Framework of SpringBoard** Provides modeling and guided practice for the process of planning, focusing on meeting the rigorous expectations of the CCSS and differentiating for student needs through the use of strategies *3 hours and 30 minutes*	**Spotlight on Collaboration** Examines the skills needed to engage students effectively in higher-order thinking in the collaborative classroom *2 hours and 5 minutes*
SpringBoard Print and Digital Book Walk Explores the components of the Teacher Edition and SpringBoard Digital E-Book and how these features allow for effective instruction that aligns with the expectations of the CCSS *45 minutes*		**Spotlight on Formative Assessment** Examines the role of formative assessment opportunities in the 2014 Edition of SpringBoard and how to use these features to inform instruction *1 hour and 40 minutes*
Closing Session Provides an opportunity to reflect on and clarify concepts learned on Day 1 *15 minutes*	**Closing Session** Provides an opportunity to reflect on and clarify Day 2 learning and make connections to Day 1 learning *10 minutes*	**Closing Session** Provides an opportunity to reflect on, clarify, and synthesize the institute content by describing the elements of SpringBoard that characterize a rigorous, student-centered classroom *25 minutes*

SpringBoard Regional Workshop

Name	Email Address	Confirmation Number	Number Registered
Danielle Steen	danielle.steen@mjm.k12.de.us	ZTN79SCZRLN	1
Dion Hutt	dion.hutt@mjm.k12.de.us	GJNSJCH8YP7	1
Donna Cooke	donna.cooke@mjm.k12.de.us	FHNWDHPNT4X	1
George Kasnic	george.kasnic@mjm.k12.de.us	DRNJT9DSR9N	1
Lauren Laufer	lauren.laufer@mjm.k12.de.us	M9NCQ8P5JN6	1

SpringBoard Regional Workshop

Name	Email Address	Confirmation Number	Number Registered
Ashley Napiorkowski	ashley.napiorkowski@mjm.k12.de.us	V5N8N5FW9D8	1

Dear Lauren:

Your registration is now CONFIRMED pending receipt of payment.
Registered Participant: **Lauren Laufer**
Confirmation Number: **M9NCQ8P5JN6**

Registration Information:

Training Sessions

Lauren Laufer Newark, DE - Initial Institute - English/Language Arts (August 4 - 6, 2014) 04-Aug-2014

Training Session: Initial Institute - English/Language Arts

Date: Monday, August 4, 2014 to Wednesday, August 6, 2014

Location: Hilton Wilmington/Christiana

Address: 100 Continental Drive, Newark, DE 19713

Tel: 302.454.1500

Start/end time: 8:30 AM - 3:30 PM

Please plan to arrive by 8 am. Continental breakfast will be served at 8 am. Lunch will be provided.

Send this email along with payment to the SpringBoard program:

- via fax to **646.607.2881**
- via email at springboardorders@collegeboard.org
- via mail to The College Board (ATTN: SpringBoard, 45 Columbus Avenue, New York, NY 10023

For more information on the SpringBoard Regional Workshop: Click here to respond

Please note that the program reserves the right to cancel this event if there is insufficient registration. If your session is cancelled, you will be notified and your registration fee will be fully refunded. Please do not book travel until 30 days in advance of the training when you receive final confirmation that the event will move forward.

If you have any questions, you may contact SpringBoard via email at springboard@collegeboard.org or call 1.877.999.7723.

We look forward to seeing you there!

Sincerely,
SpringBoard Program
The College Board

Dear George:

Your registration is now CONFIRMED pending receipt of payment.
Registered Participant: **George Kasnic**
Confirmation Number: **DRNJT9DSR9N**

Registration Information:

Training Sessions

George Kasnic Newark, DE - Initial Institute - Mathematics (August 4 - 6, 2014) 04-Aug-2014

Training Session: Initial Institute - Mathematics

Date: Monday, August 4, 2014 to Wednesday, August 6, 2014

Location: Hilton Wilmington/Christiana

Address: 100 Continental Drive, Newark, DE 19713

Tel: 302.454.1500

Start/end time: 8:30 AM - 3:30 PM

Please plan to arrive by 8 am. Continental breakfast will be served at 8 am. Lunch will be provided.

Send this email along with payment to the SpringBoard program:

- via fax to **646.607.2881**
- via email at springboardorders@collegeboard.org
- via mail to The College Board (ATTN: SpringBoard, 45 Columbus Avenue, New York, NY 10023

For more information on the SpringBoard Regional Workshop: Click here to respond

Please note that the program reserves the right to cancel this event if there is insufficient registration. If your session is cancelled, you will be notified and your registration fee will be fully refunded. Please do not book travel until 30 days in advance of the training when you receive final confirmation that the event will move forward.

If you have any questions, you may contact SpringBoard via email at springboard@collegeboard.org or call 1.877.999.7723.

We look forward to seeing you there!

Sincerely,
SpringBoard Program
The College Board

Dear Danielle:

Your registration is now CONFIRMED pending receipt of payment.
Registered Participant: **Danielle Steen**
Confirmation Number: **ZTN79SCZRLN**

Registration Information:

Training Sessions

Danielle Steen Newark, DE - Initial Institute - English/Language Arts (August 4 - 6, 2014) 04-Aug-2014

Training Session: Initial Institute - English/Language Arts

Date: Monday, August 4, 2014 to Wednesday, August 6, 2014

Location: Hilton Wilmington/Christiana

Address: 100 Continental Drive, Newark, DE 19713

Tel: 302.454.1500

Start/end time: 8:30 AM - 3:30 PM

Please plan to arrive by 8 am. Continental breakfast will be served at 8 am. Lunch will be provided.

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We look forward to seeing you there!

Sincerely,
SpringBoard Program
The College Board

Dear Dion:

Your registration is now CONFIRMED pending receipt of payment.
Registered Participant: **Dion Hutt**
Confirmation Number: **GJNSJCH8YP7**

Registration Information:

Training Sessions		
Dion Hutt	Newark, DE - Initial Institute - Mathematics (August 4 - 6, 2014)	04-Aug-2014

Training Session: Initial Institute - Mathematics

Date: Monday, August 4, 2014 to Wednesday, August 6, 2014

Location: Hilton Wilmington/Christiana

Address: 100 Continental Drive, Newark, DE 19713

Tel: 302.454.1500

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We look forward to seeing you there!

Sincerely,
SpringBoard Program
The College Board

Dear Donna:

Your registration is now CONFIRMED pending receipt of payment.
Registered Participant: **Donna Cooke**
Confirmation Number: **FHNWDHPNT4X**

Registration Information:

Training Sessions

Donna Cooke Newark, DE - Initial Institute - English/Language Arts (August 4 - 6, 2014) 04-Aug-2014

Training Session: Initial Institute - English/Language Arts

Date: Monday, August 4, 2014 to Wednesday, August 6, 2014

Location: Hilton Wilmington/Christiana

Address: 100 Continental Drive, Newark, DE 19713

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We look forward to seeing you there!

Sincerely,
SpringBoard Program
The College Board

Dear Ashley:

Your registration is now CONFIRMED pending receipt of payment.
Registered Participant: **Ashley Napiorkowski**
Confirmation Number: **V5N8N5FW9D8**

Registration Information:

Training Sessions		
Ashley Napiorkowski	Newark, DE - Initial Institute - Mathematics (August 4 - 6, 2014)	04-Aug-2014

Training Session: Initial Institute - Mathematics

Date: Monday, August 4, 2014 to Wednesday, August 6, 2014

Location: Hilton Wilmington/Christiana

Address: 100 Continental Drive, Newark, DE 19713

Tel: 302.454.1500

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Sincerely,
SpringBoard Program
The College Board

SpringBoard Math Unit- At-a-Glance– Algebra 1: Common Core Edition © 2014

Unit 1- Equations and Inequalities

Prerequisite Skills:
- Perform operations with fractions (Items 1, 2) 7.NS.A.1b
- Understand exponents (Item 3) 8.EE.A.1
- Perform operations with mixed numbers (Item 4) 7.NS.A.1b
- Compare and perform operations with integers (Items 5, 6) 7.NS.A.3
- Perform operations with decimals (Item 7) 6.NS.B.3
- Solve one-step equations (Item 8) 8.EE.C.7
- Simplify expressions by combining like terms (Item 9) 7.EE.A.1
- Interpret Venn diagrams (Item 10) 6.SP.B.5

Activity or EA	Activity or EA Standards Focus	Lessons within an Activity	Activity or EA Common Core Standards Benchmarks
1 **(Investigative)** Investigating Patterns- *Cross Country Adventures*	In previous grades, students began to develop algebraic thinking skills by writing numeric and algebraic expressions to represent situations and by using tables and graphs to examine the relationship between two quantities. In Activity 1, students build on these skills and concepts by using tables, graphs, and expressions to explore linear and nonlinear patterns in real-world situations. They also use patterns to make predictions.	Lessons 1-1 and 1-2 (2 Lessons)	**HSN-Q.A.1** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. **HSN-Q.A.2** Define appropriate quantities for the purpose of descriptive modeling. **HSA-SSE.A.1a** Interpret parts of an expression, such as terms, factors, and coefficients. **HSF-BF.A.2** Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.*
2 **(Guided)** Solving Equations- *What's My Number?*	In Activity 2, students use properties of equality and inverse operations to write and solve linear equations in one variable, including multi-step equations and equations with variables on both sides. Students also explore linear equations that have no solution or infinitely many solutions, and they solve literal equations for a given variable. Throughout this activity, stress that the equal sign in an equation indicates that the expressions on either side have the same value. If the same operation is performed on both sides of the equation, the two sides will remain equal.	Lessons 2-1 to 2-5 (5 Lessons)	**HSN-Q.A.1** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. **HSN-Q.A.2** Define appropriate quantities for the purpose of descriptive modeling. **HSA-REI.A.1** Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method. **HSA-REI.B.3** Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

EA 1 Patterns and Equations- *Of Music and Monday*	• Identifying patterns • Modeling patterns with expressions • Using patterns to make predictions • Writing, solving, and interpreting multi-step equations • Solving literal equations for a variable		**HSN-Q.A.1** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. **HSN-Q.A.2** Define appropriate quantities for the purpose of descriptive modeling. **HSA-CED.A.1** Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions and simple rational and exponential functions. **HSA-CED.A.4** Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.
3 **(Guided)** Solving Inequalities- *Physical Fitness Zones*	In Activity 3, students write and solve linear inequalities in one variable, including multi-step inequalities and inequalities with variables on both sides. They graph solutions of inequalities on number lines and explore how inequalities can represent constraints in real-world situations. They also solve and graph compound inequalities. Throughout this activity, emphasize the importance of paying attention to the inequality sign and the circumstances in which it should be reversed.	Lessons 3-1 to 3-3 (3 Lessons)	**HSA-CED.A.1** Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions and simple rational and exponential functions. **HSA-CED.A.3** Represent constraints by equations or inequalities and by systems of equations and/or inequalities and interpret solutions as viable or non-viable options in a modeling context. **HSA-REI.B.3** Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
4 **(Guided)** Absolute Value Equations and Inequalities- *Student Distances*	In Activity 4, students use absolute value equations and absolute value inequalities to solve problems. Students apply the definition of absolute value to write an absolute value equation as two separate equations, which they can solve using the algebraic method. They use a similar process when solving and graphing the solutions of absolute value inequalities.	Lessons 4-1 and 4-2 (2 Lessons)	**HSA-CED.A.1** Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions and simple rational and exponential functions.
EA 2 Inequalities and Absolute Value- *Diet and Exercise*	• Writing, solving, and graphing inequalities • Writing and graphing compound inequalities • Solving and graphing absolute value inequalities		**HSA-CED.A.1** Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions and simple rational and exponential functions. **HSA-CED.A.3** Represent constraints by equations or inequalities and by systems of equations and/or inequalities and interpret solutions as viable or non-viable options in a modeling context. **HSA-REI.B.3** Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

Unit 2- Functions

Prerequisite Skills:
- Identify and extend patterns. (Item 1) 4.OA.C.5; 5.OA.B.3
- Solve and interpret inequalities. (Item 2) 6.EE.B.5
- Evaluate algebraic expressions. (Item 3) 6.EE.A.2c
- Graph points on the coordinate plane. (Items 4, 5 and 8) 6.NS.C.8
- Represent data using an equation. (Item 6) 8.F.B.4
- Solve linear equations. (Item 7) 7.EE.B.4a; 8.EE.C.7b

Materials:
Paper cups; rubber bands; paper clips; measuring tapes; same-sized washers; butcher paper or tag board; rulers; markers; graph paper; colored pencils; graphing calculators

Activity or EA	Activity or EA Focus	Lessons within an Activity	Activity or EA Common Core Standards Benchmarks
5 (Investigative) Functions and Function Notation- *Vending Machines*	Prior to this activity, students begin to express relationships between quantities, using tables, graphs, and equations. In Activity 5, students learn to recognize a function, identify the domain and range of a function and to use function notation.	Lessons 5-1 to 5-3 (3 Lessons)	**HSF-IF.A.1** Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x. The graph of f is the graph of the equation $y = f(x)$. **HSF-IF.A.2** Use function notation, evaluate functions from inputs in their domains, and interpret statements that use function notation in terms of a context.
6 (Directed) Interpreting Graphs of Functions- *Shake, Rattle, and Roll*	In Activity 6 students determine the domain and range of various relations and identify relative maxima and minima. Students extend their thinking to real-world situations by interpreting key features of graphs within a context and by determining a reasonable domain and range for the problem situation.	Lessons 6-1 to 6-3 (3 Lessons)	**HSF-IF.B.4** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior and periodicity. **HSF-IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. **HSF-IF.C.7** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. **HSF-IF.C.7a** Graph linear and quadratic functions and show intercepts, maxima, and minima.
7 (Investigative) Graphs of Functions- *Experiment Experiences*	In this Activity, students will use functions to explore real-world relationships. They will use equations, graphs and features of functions as tools to describe and understand the relationships. The activity will reinforce what students have already learned about functions as well as use functions to model natural phenomena.	Lessons 7-1 to 7-3 (3 Lessons)	**HSA-REI.D.10** Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line). **HSF-IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. **HSF-IF.C.7** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. **HSF-IF.C.7a** Graph linear and quadratic functions and show intercepts, maxima, and minima. **HSF-IF.C.7e** Graph exponential functions, showing intercepts and end behavior.

8 **(Investigative)** Transformations of Functions- *Transformers*	In this activity students build on their knowledge of functions and their graphs by exploring vertical and horizontal translations of graphs produced by the addition of a constant, k, to a function.	Lessons 8-1 and 8-2 (2 Lessons)	**HSF-BF.B.3** Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $kf(x)$, $f(kx)$ and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology.
EA 1 Representations of Functions- *Bruce Canyon Hiking*	• Functions, range and domain • Graphs of functions and their key features • Writing and using equations of functions • Transforming functions		**HSF-IF.A.1** Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x. The graph of f is the graph of the equation $y = f(x)$. **HSF-IF.A.2** Use function notation, evaluate functions from inputs in their domains, and interpret statements that use function notation in terms of a context. **HSF-IF.B.4** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior and periodicity.
9 **(Investigative)** Rates of Change- *Ramp it Up*	In this activity, students explore slope as a rate of change by using the ratio of vertical change to horizontal change and developing the slope formula. Students make connections between linear functions and the idea of a constant rate of change. They develop an understanding of when the slope of a line is positive, negative, zero, or undefined.	Lesson 9-1 to 9-3 (3 Lessons)	**HSF-IF.B.6** Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph. **HSF-LE.A.1** Distinguish between situations that can be modeled with linear functions and with exponential functions. **HSF-LE.A.1a** Prove that linear functions grow by equal differences over equal intervals; and that exponential functions grow by equal factors over equal intervals. **HSF-LE.A.1b** Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.
10 **(Guided)** Linear Models- *Stacking Boxes*	In this activity students solve problems by gathering real-world data, recording the results in tables, representing results with graphs, and writing function equations. They also learn to write and use inverse functions. These concepts and skills will be important to students as they use functions in increasingly complex mathematical contexts.	Lessons 10-1 to 10-4 (4 Lessons)	**HSN-Q.A.3** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. **HSA-CED.A.1** Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions and simple rational and exponential functions. **HSF-IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. **HSF-BF.A.1** Write a function that describes a relationship between two quantities. **HSF-BF.A.1a** Determine an explicit expression, a recursive process, or steps for calculation from a context.

11 **(Guided)** Arithmetic Sequences- *Picky Patterns*	In Activity 11, students learn to identify arithmetic sequences of numbers and to express them as functions whose domains are subsets of the integers. Students learn to describe arithmetic sequences algebraically using both explicit and recursive formulas.	Lessons 11-1 to 11-3 (3 Lessons)	**HSF-IF.A.3** Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. **HSF-IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. **HSF-BF.A.2** Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations and translate between the two forms. **HSF-LE.A.2** Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship or two input-output pairs (include reading these from a table).
EA 2 Linear Functions and Equations- *Text Message Plans*	• Modeling with tables, graphs and linear functions • Analyzing linear models		**HSF-IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. **HSF-BF.A.1** Write a function that describes a relationship between two quantities. **HSF-LE.A.2** Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).
12 **(Guided)** Forms of Linear Functions- *Under Pressure*	In Activity 12, students write linear equations in slope-intercept form, point-slope form, and standard form and use these forms to solve problems. They also write the equations of lines parallel or perpendicular to a given line. Throughout this activity, students relate the equations of lines to alternate representations, such as graphs, verbal descriptions, and tables of values.	Lessons 12-1 to 12-4 (4 Lessons)	**HSA-REI.D.10** Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line). **HSF-LE.A.2** Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship or two input-output pairs (include reading these from a table).
13 **(Investigative)** Equations from Data- *Pass the Book*	In Activity 13, students distinguish between situations that can be modeled with linear and nonlinear functions. They make scatter plots of data sets and determine the equations of trend lines. Students also employ technology to perform regressions. They interpret key features of their function models and apply the models to make predictions.	Lessons 13-1 to 13-3 (3 Lessons)	**HSF-IF.A.2** Use function notation, evaluate functions from inputs in their domains, and interpret statements that use function notation in terms of a context. **HSF-IF.B.4** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. **HSF-IF.C.7** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. **HSF-IF.C.7a** Graph linear and quadratic functions and show intercepts, maxima, and minima. **HSF-IF.C.7e** Graph exponential functions, showing intercepts and end behavior.
EA 3 Linear Models and Slope as Rate of Change- *A 10K Run*	• Scatter plots • Linear regression • Line of best fit • Slope and domain • Comparing data		**HSF-IF.C.7** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. **HSF-LE.A.2** Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table). **HSF-LE.B.5** Interpret the parameters in a linear or exponential function in terms of a context.

Unit 3- Extensions of Linear Concepts

Prerequisite Skills:
- Identify linear functions from tables. (Item 1) HSF-LE.A.1b
- Write a linear equation from a table. (Item 2) HSF-LE.A.2
- Represent linear relationships using tables, equations, and graphs. (Item 3) HSF-IF.C.7a, HSF-LE.A.2
- Graph a linear equation in two variables. (Item 4) HSF-IF.C.7a
- Graph horizontal lines. (Item 5) HSF-IF.C.7a
- Identify solutions of linear inequalities in two variables. (Item 6) HSA-REI.D.12
- Graph compound inequalities. (Item 7) 6.EE.B.8
- Identify functions with a constant rate of change. (Item 8) HSF-LE.A.1b

Materials:
Colored pencils; graph paper

Activity or EA	Activity or EA Focus	Lessons within an Activity	Activity or EA Common Core Standards Benchmarks
14 (Investigative) Piecewise-Defined Linear Functions – *Breakfast for Bowser*	In this activity, students expand their study of functions in general, and linear functions specifically, by interpreting, writing, and graphing piecewise-defined functions.	Lessons 14-1 to 14-4 (4 Lessons)	**HSF-IF.A.2** Use function notation, evaluate functions from inputs in their domains, and interpret statements that use function notation in terms of a context. **HSF-IF.B.6** Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph. **HSF-IF.C.7** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. **HSF-IF.C.7a** Graph linear and quadratic functions and show intercepts, maxima and minima. **HSF-IF.C.7b** Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. **HSF-IF.C.9** Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).
15 (Investigative) Comparing Equations- *A Tale of a Trucker*	In this activity, students will calculate and interpret rates of change in order to compare linear functions. They will write equations and inequalities from graphs and tables and use them to compare and analyze functions and their graphs.	Lessons 15-1 to 15-3 (3 Lessons)	**HSF–IF.B.4** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities and sketch graphs showing key features given a verbal description of the relationship. *Key features include intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.** **HSF–IF.B.6** Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.* **HSF–IF.7** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.* **HSF–IF.C.7a** Graph linear and quadratic functions and show intercepts, maxima and minima.

16 (Guided) Inequalities in Two Variables- *Shared Storage*	In this Activity, students will write and graph inequalities in two variables. Students will also read and interpret the graph of the solution set of linear inequalities in two variables within a context.	Lessons 16-1 and 16-2 (2 Lessons)	**HSA-REI.D.12** Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.
EA 1 Graphing Inequalities and Piecewise-Defined Functions- *Earnings on a Graph*	• Linear inequalities • Piecewise functions • Graphing inequalities • Graphing piecewise functions		**HAS-REI.D.12** Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes. **HSF-IF.A.2** Use function notation to evaluate functions from inputs in their domains, and interpret statements that use function notation in terms of a context. **HSF-IF.C.7** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.* **HSF-IF.C.7b** Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.
17 (Guided) Solving Systems of Linear Equations – *A Tale of Two Truckers*	In this activity, students will use methods including graphing, making a table, substitution, and elimination to solve and classify systems of equations. They will also interpret the solution to a system of equations within a real-world context.	Lessons 17-1 to 17-5 (5 Lessons)	**HSA-REI.D.11** Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions. **HSA-REI.C.5** Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions. **HSA-REI.C.6** Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.
18 (Guided) Solving Systems of Linear Inequalities – *Which Region Is It?*	In Activity 18, students solve systems of linear inequalities by graphing. They also interpret solutions of the systems as viable or nonviable within the context of a problem. Throughout this activity, it will be important for students to pay attention to which side of a boundary line should be shaded and whether the line should be solid or dashed.	Lessons 18-1 and 18-2 (2 Lessons)	**HSA-CED.A.3** Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. **HAS-REI.D.12** Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.
EA 2 Systems of Equations and Inequalities- *Tilt the Scales*	• Systems of linear equations • Systems of linear inequalities		**HSA-CED.A.3** Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions a viable or nonviable options in a modeling context. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.* **HSA-REI.C.6** Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.

Unit 4- Exponents, Radicals, and Polynomials

Prerequisite Skills:
- Factors and greatest common factors. (Items 1, 2) 6.NS.B.4, 4.OA.B.4
- Exponential expressions. (Items 3, 4) 6.EE.A.1, 6.EE.A.2c, 6.EE.A.2b
- Distributive property. (Item 5) 3.OA.B.5
- Linear functions. (Item 6) 8.F.B.4
- Graph linear functions. (Item 7) HSF-IF.C.7a
- Ratios. (Item 8) 6.RP.A.1
- Recognize rational and irrational numbers. (Item 9) 8.NS.A.1
- Fraction operations. (Item 10) 5.NF.A.1, 5.NF.B.4, 6.NS.A.1

Materials:
Algebra tiles; graphing calculators

Activity or EA	Activity or EA Focus	Lessons within an Activity	Activity or EA Common Core Standards Benchmarks
19 (Guided) Exponent Rules- *Icebergs and Exponents*	In Activity 19, students investigate and apply properties of exponents to simplify numeric and algebraic expressions. Students will learn that the properties of whole-number exponents also apply to integer exponents as well as rational exponents.	Lessons 19-1 to 19-3 (3 Lessons)	**HSN-RN.A.1** Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. **HSN-RN.A.2** Rewrite expressions involving radicals and rational exponents using the properties of exponents. **HSA-SSE.B.3c** Use the properties of exponents to transform expressions for exponential functions.
20 (Directed) Operations with Radicals – *Go Fly a Kite*	In Activity 20, students simplify and perform operations with radical expressions. They also investigate the meaning of rational exponents and learn to write powers with rational exponents in radical form.	Lessons 20-1 to 20-3 (3 Lessons)	**HSN-RN.A.2** Rewrite expressions involving radicals and rational exponents using the properties of exponents. **HSA-SSE.A.2** Use the structure of an expression to identify ways to rewrite it.
21 (Investigative) Geometric Sequences – *Go Viral!*	In Activity 21, students investigate geometric sequences. They identify sequences as geometric by identifying a common ratio. Students develop recursive and explicit formulas for geometric sequences and use these formulas to make predictions.	Lessons 21- 1 and 21-2 (2 Lessons)	**HSF-IF.A.3** Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. **HSF-BF.A.2** Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.* **HSF-LE.A.1** Distinguish between situations that can be modeled with linear functions and with exponential functions. **HSF-LE.A.1.c** Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.

EA 1 Exponents, Radicals, and Geometric Sequences- *Taking Stock*	• Properties of exponents • Integer exponents • Simplifying expressions involving exponents • Simplifying radical expressions • Performing operations with radical expressions • Distinguishing rational and irrational numbers • Identifying geometric sequences • Recursive and explicit formulas for geometric sequences • Finding a given term of a geometric sequence		**HSN-RN.A.2** Rewrite expressions involving radicals and rational exponents using the properties of exponents. **HSA-SSE.A.2** Use the structure of an expression to identify ways to rewrite it. **HSA-SSE.B.3c** Use the properties of exponents to transform expressions for exponential functions. **HSF-IF.A.3** Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. **HSF-BF.A.2** Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.
22 (Investigative) Exponential Functions- *Protecting your Investment*	In this activity, students explore exponential functions, their application, and their graphs. They learn how different values of the constant factor and the exponent affect the shape of the graph.	Lessons 22-1 to 22-3 (3 Lessons)	**HSA-CED.A.1** Create equations and inequalities in one variable and use them to solve problems. *Include equations arising from linear and quadratic functions, and simple rational and exponential functions.* **HSA-CED.A.2** Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. **HSF-IF.B.4** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.
23 (Investigative) Modeling with Exponential Functions – *Growing, Growing, Gone*	In this activity, students use exponential functions to model compound interest and population growth.	Lessons 23-1 and 23-2 (2 Lessons)	**HSA-SSE.B.3** Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. **HSA-SSE.B.3c** Use the properties of exponents to transform expressions for exponential functions. **HSA-CED.A.1** Create equations and inequalities in one variable and use them to solve problems.
EA 2 Exponential Functions- *Family Bonds*	• Exponential functions • Compound interest		**HSA-SSE.B.3** Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. **HSA-SSE.B.3c** Use the properties of exponents to transform expressions for exponential functions. **HSA-CED.A.2** Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. **HSF-IF.B.4** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.

24 **(Guided)** Adding and Subtracting Polynomials- *Polynomials in the Sun*	In Activity 24, students classify and identify components of polynomials. They also add and subtract polynomials.	Lessons 24-1 to 24-3 (3 Lessons)	**HSA-SSE.1** Interpret expressions that represent a quantity in terms of its context. **HAS-SSE.A.1.a** Interpret parts of an expression, such as terms, factors, and coefficients. **HAS-SSE.A.1.b** Interpret complicated parts of expressions by viewing one or more of their parts as a single entity. **HSA-APR.A.1** Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.
25 **(Investigative)** Multiplying Polynomials- *Tri-Com Computers*	In Activity 25, students explore multiplying polynomials. They also examine the patterns exhibited by the special products of the difference of two squares and the square of a binomial.	Lessons 25-1 to 25-3 (3 Lessons)	**HSA-SSE.A.1** Interpret expressions that represent a quantity in terms of its context. **HSA-SSE.A.1a** Interpret parts of an expression, such as terms, factors, and coefficients. **HSA-SSE.A.1b** Interpret complicated parts of expressions by viewing one or more of their parts as a single entity. **HSA-APR.A.1** Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.
EA 3 Polynomial Operations- *Measuring Up*	• Adding polynomials • Multiplying polynomials		**HSA-APR.A.1** Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.
26 **(Guided)** Factoring- *Factors of Construction* -	In Activity 26, students are introduced to the factoring of polynomials. They begin by identifying the GCF of the terms of a polynomial and then using the GCF to factor. Students also use patterns to factor perfect square trinomials and differences of two squares. Throughout this activity, be sure to emphasize that the factored form of a polynomial is equivalent to the original form.	Lessons 26-1 and 26-2 (2 Lessons)	**HSA-SSE.A.1** Interpret expressions that represent a quantity in terms of its context.* **HSA-SSE.A.1.a** Interpret parts of an expression, such as terms, factors, and coefficients. **HSA-SSE.A.1.b** Interpret complicated expressions by viewing one or more of their parts as a single entity. **HSA-SSE.A.2** Use the structure of an expression to identify ways to rewrite it.
27 **(Directed)** Factoring Trinomials- *Deconstructing Floor Plans*	In Activity 27, students continue factoring polynomials. They learn to factor trinomials of the form $x^2 + bx + c$, both with and without models. They also learn to factor trinomials of the form $ax^2 + bx + c$ by using a guess and check method. Emphasize that students can always check that they have factored a polynomial correctly by multiplying the factors.	Lessons 27-1 and 27-2 (2 Lessons)	**HSA-SSE.A.1** Interpret expressions that represent a quantity in terms of its context.* **HSA-SSE.A.1.a** Interpret parts of an expression, such as terms, factors, and coefficients. **HSA-SSE.A.1.b** Interpret complicated expressions by viewing one or more of their parts as a single entity. **HSA-SSE.A.2** Use the structure of an expression to identify ways to rewrite it.

28 (Directed) Simplifying Rational Expressions- *Totally Rational*	In Activity 28, students learn to simplify and perform operations with rational expressions. They also divide polynomials and express the remainder of the division, if any, as a rational expression. Throughout this activity, it is assumed that values of variables that make denominators equal to 0 are excluded values.	Lessons 28-1 to 28-4 (4 Lessons)	**HSA- APR.D.6** Rewrite simple rational expressions in different forms; write $\frac{a(x)}{b(x)}$ in the form of q(x) + $\frac{X(X)}{b(x)}$, where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using inspection, long division, or, for the more complicated examples, a computer algebra system. **HAS- APR.D.7** (+) Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.
EA 4 Factoring and Simplifying Rational Expressions- *Rock Star Demands*	• Factoring perfect square trinomials • Factoring trinomials of the form $ax^2 + bx + c$ • Dividing polynomials • Expressing the remainder of polynomial division as a rational expression • Dividing rational expressions • Simplifying rational expressions		**HSA-SSE.A.1** Interpret expressions that represent a quantity in terms of its context.* **HSA-SSE.A.1.a** Interpret parts of an expression, such as terms, factors, and coefficients. **HSA-SSE.A.1.b** Interpret complicated expressions by viewing one or more of their parts as a single entity. **HSA-SSE.A.2** Use the structure of an expression to identify ways to rewrite it. **HSA- APR.D.6** Rewrite simple rational expressions in different forms; write $\frac{a(x)}{b(x)}$ in the form of q(x) + $\frac{X(X)}{b(x)}$, where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using inspection, long division, or, for the more complicated examples, a computer algebra system.

Unit 5- Quadratic Functions

Prerequisite Skills:
- Operations on polynomials (Item 1) HSA-APR.A.1
- Factoring polynomials (Item 2) HSA-SSE.A.2
- Evaluating functions (Item 3) HSF-IF.A.2
- Solving equations (Item 4) 7.EE.B.4a
- Solving inequalities (Item 5) 7.EE.B.4b
- Graphing linear functions (Item 6) HSF-IF.C.7
- Interpreting graphs of linear functions (Items 7–8) HSF-IF.B.4

Activity or EA	Activity or EA Focus	Lessons within an Activity	Activity or EA Common Core Standards Benchmarks
29 (Investigative) Introduction to Quadratic Functions- *Touchlines*	In Activity 29, students expand their knowledge of functions by examining quadratic functions. Students identify, write, and graph quadratic functions. They also identify the domain, range, vertex, and maximum or minimum of a quadratic function.	Lessons 29-1 and 29-2 (2 Lessons)	**HSF-IF.B.4** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. *Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.** **HSF-IF.C.7** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.* **HSF-IF.C.7a** Graph linear and quadratic functions and show intercepts, maxima, and minima. **HSF-BF.A.1** Write a function that describes a relationship between two quantities.* **HSF-BF.A.1a** Determine an explicit expression, a recursive process, or steps for calculation from a context.
30 (Guided) Graphing Quadratic Functions- *Transformers*	In Activity 30, students develop fluency in understanding function behavior by graphing, identifying, and distinguishing transformations of the parent quadratic function $y = x^2$.	Lessons 30-1 to 30-3 (3 Lessons)	**HSF-IF.B.4** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. **HSF-IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. **HSF-IF.C.7** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. **HSF-IF.C.7.a** Graph linear and quadratic functions and show intercepts, maxima, and minima.
EA 1 Graphing Quadratic Functions- *Parabolic Paths*	• Writing quadratic functions • Analyzing quadratic functions • Graphing quadratic functions • Transforming quadratic functions		**HSF-IF.B.4** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. *Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.* **HSF-IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. **HSF-IF.C.7** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. **HSF-IF.C.7.a** Graph linear and quadratic functions and show intercepts, maxima, and minima.

31 (Guided) Solving Quadratic Equations by Graphing and Factoring- *Trebuchet Trials*	In this activity, students make connections between the solutions or roots of a quadratic equation and the x-intercepts or zeros of the related function. They determine both the equation of the axis of symmetry and the coordinates of the vertex of a parabola by calculating $\frac{-b}{2a}$ This information is used to graph the parabola.	Lessons 31-1 to 31-3 (3 Lessons)	**HSA-SSE.A.1** Interpret expressions that represent a quantity in terms of a context. **HSA-SSE.A.1a** Interpret parts of an expression, such as terms, factors, and coefficients. **HSA-SSE.A.1b** Interpret complicated expressions by viewing one or more of their parts as a single entity. **HSA-SSE.B.3** Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. **HSA.SSE.B.3a** Factor a quadratic expression to reveal the zeros of the function it defines.
32 (Directed) Algebraic Methods of Solving Quadratic Equations- *Keeping it Quadratic*	In Activity 32, students solve quadratic equations by using square roots, completing the square and the quadratic formula. Throughout this activity, be sure to emphasize when each of these solution methods might be appropriate. Students also use the discriminant of a quadratic equation to analyze its solutions, and solve quadratic equations with complex solutions.	Lessons 32-1 to 32-5 (5 Lessons)	**HSA-SSE.B.3** Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.* **HSA-SSE.B.3b** Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines. **HSA-REI.B.4** Solve quadratic equations in one variable. **HSA-REI.B.4a** Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form.
33 (Investigative) Applying Quadratic Equations- *Rockets in Flight*	In Activity 33, students write quadratic functions to fit data. They then apply the quadratic models to solve problems. Students also interpret solutions of quadratic equations in real-world contexts. Throughout this activity, be sure to emphasize that the meaning of the variables in a function helps to determine its reasonable domain and range.	Lesson 33-1 and 33-2 (2 Lessons)	**HSN-Q.A.3** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. **HSA-CED.A.1** Create equations and inequalities in one variable and use them to solve problems. *Include equations arising from linear and quadratic functions and simple rational and exponential functions.* **HSF-IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.* **HSF-BF.A.1** Write a function that describes a relationship between two quantities.* **HSF-BF.A.1a** Determine an explicit expression, a recursive process, or steps for calculation from a context.

EA 2 Solving Quadratic Equations- *Egg Drop*	• Solving quadratic equations by factoring • Solving quadratic equations by the square root method • Solving quadratic equations using the quadratic formula • Choosing a method to solve a quadratic equation • Writing the equation of a quadratic function to fit data • Using a quadratic model to solve problems • Interpreting solutions of a quadratic equation		**HSN-Q.A.3** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. **HSA-SSE.B.3** Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. _ **HSA-SSE.B.3a** Factor a quadratic expression to reveal the zeros of the function it defines. **HSA-CED.A.1** Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions and simple rational and exponential functions. **HSA-REI.B.4** Solve quadratic equations in one variable. **HSA-REI.B.4b** Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize that when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b. **HSF-IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. **HSF-IF.C.8** Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of a function. **HSF-IF.C.8a** Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context. **HSF-BF.A.1** Write a function that describes a relationship between two quantities.*
34 **(Investigative)** Graphs of Functions – *Photo App*	In this activity, students will connect what they know about linear, quadratic, exponential and piecewise functions by comparing, contrasting, writing and interpreting appropriate models.	Lessons 34-1 to 34-3 (3 Lessons)	**HSF-IF.C.7** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. **HSF-IF.C.7a** Graph linear and quadratic functions and show intercepts, maxima, and minima. **HSF-IF.C.7b** Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. **HSF-IF.C.7e** Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.
35 **(Guided)** Systems of Equations- *Populations Explosion*	In In this activity, students learn to solve linear/exponential and linear/quadratic systems by graphing and by using algebraic methods.	Lessons 35-1 and 35-2 (2 Lessons)	**HSA-REI.C.7** Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. **HSA-REI.D.11** Explain why the *x*-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions. * **HSF-IF.C.9** Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). **HSF-LE.A.3** Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.

EA 3 Solving Systems of Equations- *Sports Collector*	• Identifying the type of function necessary to represent the value of items in a table • Graphing linear, quadratic, and exponential functions • Identifying the domain of a function • Identifying increasing and decreasing functions • Identifying the function with the greatest maximum value • Solving systems of equations		**HSN-Q.A.3** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. **HSA-REI.C.7** Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. **HSF-IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.* **HSF-BF.A.1** Write a function that describes a relationship between two quantities.* **HSF-LE.A.3** Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.

Unit 6- Probability and Statistics

Prerequisite Skills:
- Developing a trend line (Item 1) 8.SP.A.2
- Interpreting slope in context (Item 2) 8.F.B.4, 8.SP.A.3
- Determining missing values in a two-way table (Item 3) 8.SP.A.4
- Developing row percentages from two-way tables (Item 4) 8.SP.A.4
- Computing summary measures of center for univariate data (Items 5a, b) 6.SP.A.3, 6.SP.B.5c
- Developing a graph for univariate data (Item 5c) 6.SP.B.4
- Describing the shape of a univariate distribution (Item 5d) 6.SP.A.2, 6.SP.5B.d

Materials:
Calculator

Activity or EA	Activity or EA Focus	Lessons within an Activity	Activity or EA Common Core Standards Benchmarks
36 (Investigative) Measures of Center and Spread- *To Text or Not to Text*	Measures of center and spread will be developed more extensively using the formulas. The mean will be used to find the mean absolute deviation and standard deviation, which are measures of variability. Skills include calculating and interpreting the standard deviation of a numerical data set, as well as selecting appropriate measures of spread by examining the shape of a distribution.	Lessons 36-1 and 36-2 (2 Lessons)	**HSS-ID.A.2** Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.
37 (Investigative) Dot and Box Plots and the Normal Distribution- *Disturbing Coyotes*	Students will construct representations of univariate data in a real context, and describe characteristics of the data distribution such as center, shape, and spread using graphs and numerical summaries. They will compare distributions, commenting on similarities and differences among them. Students will learn to create a five-number summary and create a modified box plot.	Lessons 37-1 to 37-3 (3 Lessons)	**HSS-ID.A.1** Represent data with plots on the real number line (dot plots, histograms, and box plots). **HSS-ID.A.2** Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets. **HSS-ID.A.3** Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers). **HSS-ID.A.4** Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.
EA 1 Comparing Univariate Distributions- *Splitting the Bill*	• Visual comparison of univariate graphical displays • Computational comparisons of center and spread • Computing specific measures of center and spread (including five number summary) • Determining outliers • Creating modified box plots • Determining appropriate measures of variability		**HSS-ID.A.1** Represent data with plots on the real number line (dot plots, histograms, and box plots). **HSS-ID.A.2** Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets. **HSS-ID.A.3** Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).

38 (Investigative) Correlation- *What's the Relationship?*	Students will assess the relationship between two quantitative variables in terms of form, direction and strength. They will be able to use a scatterplot to relate correlation coefficient values, compute correlation coefficient and distinguish between correlation and causation.	Lessons 38-1 and 38-2 (2 Lessons)	**HSS-ID.C.8** Compute (using technology) and interpret the correlation coefficient of a linear fit. **HSS-ID.C.9** Distinguish between correlation and causation.
39 (Investigative) The Best-Fit Line – *Regressing Linearly*	Students will estimate best-fit lines visually, make predictions from best-fit lines, determine the difference between actual variable value and predicted value (i.e., residual), determine the best-fit line (using technology), interpret slope and intercept of a linear model in context, recognize cases where the use of a best-fit line is not recommended, recognize situations that do not fit a linear model, and use a residual plot to decide if a scatterplot has a linear relationship.	Lessons 39-1 to 39-4 (4 Lessons)	**HSS-ID.B.6** Represent data on two quantitative variables on a scatter plot, and describe how the variables are related: a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models. b. Informally assess the fit of a function by plotting and analyzing residuals. c. Fit a linear function for a scatter plot that suggests a linear association. **HSS-ID.C.7** Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.
40 (Investigative) Bivariate Data – *Categorically Speaking*	Students will learn to summarize categorical data in a two-way frequency table. They will use the table to interpret frequency and relative frequency. By using these tables they will learn to recognize and describe patterns of association. They will also learn about creating row percentages, developing a segmented bar graph, and analyzing row percentages and segmented bar graphs to investigate association.	Lessons 40-1 and 40-2 (2 Lessons)	**HSS-ID.B.5** Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.
EA 2 Bivariate Distributions- *Dear Traveling Tooth*	• Describing a bivariate numerical relationship and associating that description with a correlation coefficient • Developing a linear model, interpreting its components, using the model for prediction, and recognizing its limitations • Reading a two-way table • Creating row percentages • Developing a segmented bar graph • Analyzing row percentages and segmented bar graphs to investigate association		**HSS-ID.B.5** Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data. **HSS-ID.B.6** Represent data on two quantitative variables on a scatter plot, and describe how the variables are related: a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models. b. Informally assess the fit of a function by plotting and analyzing residuals. c. Fit a linear function for a scatter plot that suggests a linear association. **HSS-ID.C.7** Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data. **HSS-ID.C.8** Compute (using technology) and interpret the correlation coefficient of a linear fit.

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Unit 1- Proof, Parallel, and Perpendicular Lines

Prerequisite Skills:
- Solving a linear equation (Item 1) 8.EE.C.7b
- Graphing a linear equation (Item 2) HSA-CED.A.2
- Finding slope and writing an equation for the graph of a line (Items 3–5) 8.EE.B.6
- Describing the pattern of a sequence (Item 6) 4.OA.C.5
- Draw a right triangle (Item 7) 4.G.A.2
- Finding the measure of an angle (Item 8) 4.MD.C.6

Activity or EA	Activity or EA Standards Focus	Lessons within an Activity	Activity or EA Common Core Standards Benchmarks
1 (Guided) Geometric Figures *What's My Name?*	In previous grades, students learned to name, read, and diagram the basic building blocks of geometry—namely points, lines, segments, rays, and angles. In Activity 1, students review what they have learned and develop flexibility by learning to identify different ways to name the same objects.	Lesson 1-1 and 1-2 (2 Lessons)	**HSG-CO.A.1** Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.
2 (Investigative) Logical Reasoning *Riddle Me This*	The focus of this activity is the development of the concepts of inductive and deductive reasoning based upon experience with geometric and algebraic models. To be successful with this activity, students will need to be able to identify both numeric and graphic patterns and to manipulate simple algebraic expressions. If students have difficulty identifying patterns, have them work in small groups to create their own patterns and then exchange patterns and try to identify them.	Lesson 2-1 to 2-2 (2 Lessons)	**Foundational Common Core Activity**

3 **(Directed)** **The Axiomatic System of Geometry** *Back to the Beginning*	Students are introduced to the fundamentals of an axiomatic system. They learn the necessity of clear and precise definitions as well as the need for certain basic terms that are undefined. Students are introduced to the concepts of postulates and theorems and how to structure a two-column proof given a hypothesis. They also investigate the truth values of the converse, inverse, and contrapositive of a true statement.	Lesson 3-1 to 3-3 (3 Lessons)	**HSG-CO.A.1** Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.
EA 1 **Geometric Figures and Basic Reasoning** *The Art and Math of Folding Paper*	• Geometric relationships • Conditional statements • Making conjectures		**HSG-CO.A.1** Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.
4 **(Guided)** **Segment and Angle Measurement** *It All Adds Up*	This activity focuses on measurement of line segments and angles and their bisectors as well as the postulates for adding their measures.	Lesson 4-1 and 4-2 (2 Lessons)	**HSG-CO.A.1** Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.
5 **(Guided)** **Distance and Midpoint Formulas** *We ♥ Descartes*	The focus of this lesson is the development and application of the formulas for finding the distance between two points on a coordinate plane and the coordinates of the midpoint of a line segment. To be successful with this activity, students will need to have mastered the skill of plotting points in the plane and understand that points on the same vertical line have the same x-coordinate and points on the same horizontal line have the same y-coordinate. They also will need to know how to apply the Pythagorean Theorem.	Lesson 5-1 and 5-2 (2 Lessons)	**HSG-GPE.B.6** Find the point on a directed line segment between two given points that partitions the segment in a given ratio.
EA 2 **Distance, Midpoint, and Angle Measurement** *A Walk in the Park*	• Segments and angles • Distance and bisectors		**HSG-CO.A.1** Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.

6 (Directed) Proofs about Line Segments and Angles *Now I'm Convinced*	Students learn the basics of two-column proofs. This may be a difficult topic for some students. Emphasize that the only allowed justifications in the right column are given information, a definition, a postulate, or a previously proved theorem. Some students find it helpful to think of a two-column proof as similar to a chess game in which the objective is to move from the starting point (the condition) to a winning position (the conclusion) using only certain allowed moves, namely statements that can be justified.	Lesson 6-1 and 6-2 (2 Lessons)	**HSG-CO.C.9** Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.
7 (Investigative) Parallel and Perpendicular Lines *Patios by Madeline*	This activity develops the concept of proof in the context of parallel and perpendicular lines. Watch for students who may want to use measurement and patterns in lieu of a deductive proof.	Lesson 7-1 to 7-3 (3 Lessons)	**HSG-CO.C.9** Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.
8 (Investigative) Equations of Parallel and Perpendicular Lines *Skateboard Geometry*	Students investigate the connection between slopes of parallel and perpendicular lines. They also write the equation of a line that is parallel to a given line and the equation of a line that is perpendicular to a given line.	Lesson 8-1 and 8-2 (2 Lessons)	**HSG-GPE.B.5** Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).
EA 3 Angles, Parallel Lines, and Perpendicular Lines *Graph of Steel*	• Segments and angles • Distance and bisectors		**HSG-CO.C.9** Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints. **HSG-GPE.B.5** Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., fi nd the equation of a line parallel or perpendicular to a given line that passes through a given point).

Unit 2- Transformations, Triangles, and Quadrilaterals

Prerequisite Skills:
- Simplifying the square-root of an Expression (Item 1) HSN-RN.A.2
- Solving a quadratic equation (Item 2) HSA-REI.B.4b
- Finding a value of a function (Item 3) HSF-IF.A.2
- Finding slope and writing an equation for the graph of a line (Items 4–5) 8.EE.B.6
- Writing the equation of a line given two points (Item 6) HSA-CED.A.2
- Finding the midpoint and length of a line segment (Item 7) 8.G.B.8, HSN-CN.B.6
- Solving a linear system (Item 8) 8.EE.C.8b

Activity or EA	Activity or EA Focus	Lessons within an Activity	Activity or EA Common Core Standards Benchmarks
9 (Investigative) Translations, Reflections, and Rotations *The Marching Cougars*	Students investigate transformations both on and off the coordinate plane. They represent transformations as functions and identify characteristics of both rigid and nonrigid motions. Students focus on translations, reflections, and rotations, describing how figures are affected when these rigid motions are performed. They also complete proofs involving reflections and perpendicular bisectors, and they solve problems involving reflectional and rotational symmetry. They use geometry software to explore various transformations and determine whether distance and/or angle are preserved. Throughout this activity, emphasize the distinction between rigid and nonrigid motions.	Lesson 9-1 to Lesson 9-4 (4 Lessons)	**HSG-CO.A.2** Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch). **HSG-CO.A.3** Given a rectangle, parallelogram, trapezoid, or regular polygons, describe the rotations and reflections that carry it onto itself. **HSG-CO.A.4** Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments. **HSG-CO.A.5** Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. **HSG-CO.B.6** Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent. **HSG-CO.C.9** Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.
10 (Directed) Compositions and Congruence *More Rigid Motions*	Students learn about compositions of transformations both on and off the coordinate plane. They identify a sequence of transformations that will carry a pre-image to an image, and vice versa. Finally, they define congruence in terms of rigid motions. Emphasize the relationship between rigid motions and congruent figures.	Lesson 10-1 and 10-2 (2 Lessons)	**HSG-CO.A.5** Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another. **HSG-CO.B.6** Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.

EA 1 **Transformations** *Designing the Plaza*	• Rigid motions • Translations, reflections, and rotations		**HSG-CO.A.2** Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch). **HSG-CO.A.3** Given a rectangle, parallelogram, trapezoid, or regular polygon describe the rotations and reflections that carry it onto itself. **HSG-CO.A.5** Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another. **HSG-CO.B.6** Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.
11 **(Guided)** **Congruence Transformations and Triangle Congruence** *Truss Your Judgment*	Students explore congruence using a transformational approach. They investigate triangle congruence criteria, including SSS, SAS, SSA, AAS, and HL. After writing proofs for each of the triangle congruence criteria, students apply them to solve real-world problems.	Lessons 11-1 to 11-4 (4 Lessons)	**HSG-CO.B.7** Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent. **HSG-CO.B.8** Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.
12 **(Directed)** **Flowchart Proofs** *Go with the Flow*	Students practice their skills writing two-column and paragraph proofs. They apply what they know about writing these proofs to writing flowchart proofs. As they complete the activity, students develop a better understanding of the categories of valid reasons that can be used in proofs.	Lessons 12-1 and 12-2 (2 Lessons)	**HSG-CO.C.10** Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point. **HSG-SRT.B.5** Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.
EA 2 **Congruence, Triangles, and Proof** *Building a Fitness Center*	• Geometric Relationships • Conditional Statements • Making Conjectures		**HSG-CO.B.7** Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent. **HSG-CO.B.8** Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions. **HSG-SRT.B.5** Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

13 **(Guided)** **Properties of Triangles** *Best Two Out of Three*	Students explore angle relationships in triangles. They prove theorems about angle relationships, such as the Triangle Sum Theorem, the Exterior Angle Theorem, and the Isosceles Triangle Theorem. They practice their skills in writing two-column and paragraph proofs. They apply these theorems to solve problems, such as finding missing angle measures in triangles.	Lesson 13-1 and 13-2 (2 Lessons)	**HSG-CO.C.10** Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent. **HSG-CO.D.12** Make formal geometric constructions with a variety of tools and methods (paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.
14 **(Investigative)** **Concurrent Segments in Triangles** *What's the Point?*	Students will investigate segments of triangles and points of concurrency. They will make conjectures about the intersection of segments of triangles and use algebraic methods to prove their conjectures.	Lesson 14-1 to 14-3 (3 Lessons)	**HSG-CO.10** Prove theorems about triangles. Theorems include; the medians of a triangle meet at a point. Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.
EA 3 **Properties of Triangles** *Where does the Fountain Go?*	• Properties of triangles • Angles in triangles • Segments in triangles • Points of concurrency		**HSG-CO.C.10** Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point. **HSG-CO.D.12** Make formal geometric constructions with a variety of tools and methods (paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.

15 **(Investigative)** **Quadrilaterals and Their Properties** *A 4-gon Hypothesis*	Students investigate quadrilaterals including kites, trapezoids, parallelograms, rectangles, rhombuses, and squares. They prove and apply theorems including the Triangle Midsegment Theorem and theorems about parallelograms, such as opposite sides are congruent, opposite angles are congruent, and the diagonals bisect each other.	Lesson 15-1 to 15-4 (4 Lessons)	**HSG-CO.C.10** Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point. **HSG-CO.C.11** Prove theorems about parallelograms. Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals. **HSG-SRT.B.5** Use congruence criteria for triangles to solve problems and to prove relationships in geometric figures.
16 **(Guided)** **More About Quadrilaterals** *A 4-gon Conclusion*	Students focus on proving that quadrilaterals are specific types of quadrilaterals. Students will use opposite sides, opposite angles, and diagonals to prove that a quadrilateral is a parallelogram, rectangle, rhombus, or square.	Lesson 16-1 to 16-4 (4 Lessons)	**HSG-CO.C.11** Prove theorems about parallelograms. Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals. **HSG-SRT.B.5** Use congruence criteria for triangles to solve problems and to prove relationships in geometric figures.
EA 4 **Quadrilaterals** *Lucy Latimer's Logo*	• Properties of quadrilaterals • Identifying special quadrilaterals		**SG-CO.C.9** Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints. **HSG-CO.C.11** Prove theorems about parallelograms. Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.

Unit 3- Similarity and Trigonometry

Prerequisite Skills:
- Translating a figure (Item 1) HSG-CO.A.2
- Simplifying a square-root expression (Item 2) HSN-RN.A.2
- Solving a one-variable equation (Item 3) HSA-REI.B.3, HSA-REI.B.4b
- Finding the distance between two points (Item 4) 8.G.B.8
- Solving a multistep problem using proportional relationships (Item 5) 7.RP.A.3
- Solving a literal equation for a given variable (Item 6) HSA-CED.A.4
- Simplifying expressions involving square roots (Item 7) HSN-RN.A.2
- Finding the length of a side of a right triangle (Item 8) 8.G.B.7
- Identifying angle relationships of parallel lines cut by a transversal (Item 9) HSG-CO.C.9

Materials:
Graph paper, ruler

Activity or EA	Activity or EA Focus	Lessons within an Activity	Activity or EA Common Core Standards Benchmarks
17 (Investigative) Dilations and Similarity Transformations *Scaling Up/Scaling Down*	Students perform dilations on and off the coordinate plane. They describe dilations using function notation and a scale factor. Students use properties of similar figures to solve problems.	Lesson 17-1 and 17-2 (2 Lessons)	**HSG-CO.A.2** Compare transformations that preserve distance and angle to those that do not. **HSG-SRT.A.1** Verify experimentally the properties of dilations given by a center and a scale factor. **HSG-SRT.A.1a** A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged. **HSG-SRT.A.1b** The dilation of a line segment is longer or shorter in the ratio given by the scale factor. **HSG-SRT.A.2** Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides. **HSG-MG.A.3** Apply geometric methods to solve design problems.
18 (Guided) Similar Triangles *Measuring Up*	Students generate and identify similar triangles, they justify the AA Similarity Postulate, and they apply similar triangles to solve problems. Finally, they prove and apply the Triangle Proportionality Theorem. As you begin this activity, remind students that similar triangles have congruent angles and proportional sides. Encourage students to apply this definition throughout the activity.	Lessons 18-1 to 18-3 (3 Lessons)	**HSG-SRT.B.3** Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar. **HSG-SRT.B.4** Prove theorems about triangles. Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity. **HSG-SRT.B.5** Use similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

EA 1 **Similarity in Polygons** *Monitoring Progress*	• Properties of similar figures • Similarity transformations		**HSG-SRT.A.2** Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides. **HSG-SRT.B.5** Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.
19 **Geometric Mean** *Do You Mean It?*	Students explore the various relationships that result when an altitude is drawn to the hypotenuse of a right triangle and complete a proof of the Right Triangle Altitude Theorem. They learn the definition of the geometric mean and apply it to solve problems involving similar triangles.	Lesson 19-1 and 19-2 (2 Lessons)	**HSG-SRT.B.5** Use similarity criteria for triangles to solve problems and to prove relationships in geometric figures.
20 **(Investigative)** **The Pythagorean Theorem and Its Converse** *Is That Right?*	Students prove the Pythagorean Theorem using triangle similarity. They apply the relationships in the theorem, including Pythagorean triples, to solve problems. They also apply the converse of the Pythagorean Theorem to determine right triangles and use Pythagorean inequalities to classify triangles as acute, right, or obtuse.	Lesson 20-1 and 20-2 (2 Lessons)	**HSG-SRT.B.4** Prove theorems about triangles. Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity. **HSG-SRT.C.8** Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.★
21 **(Directed)** **Special Right Triangles** *The Community Quilting Project*	Students explore relationships in 45°-45°-90° and 30°-60°-90° right triangles. They apply the relationships in these special right triangles.	Lesson 21-1 and 21-2 (2 Lessons)	**HSG-SRT.C.8** Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.★
EA 2 **Right Triangles** ***Powered by the Wind***	• Altitudes of right triangles and geometric means • Proving and applying the Pythagorean Theorem • Relationships in special right triangles		**HSG-SRT.B.4** Prove theorems about triangles. Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity. **HSG-SRT.B.5** Use similarity criteria for triangles to solve problems and to prove relationships in geometric figures. **HSG-SRT.C.8** Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.★

22 (Investigative) Basic Trigonometric Relationships *The Sine of Things to Come*	Students will investigate trigonometric functions. They begin by finding the ratios of side lengths of similar right triangles and use this information to discover the trigonometric functions sine, cosine, and tangent. They will solve right triangles and learn the meaning of the inverse of a trigonometric function.	Lesson 22-1 to 22-4 (4 Lessons)	**HSG-SRT.C.6** Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles. **HSG-SRT.C.7** Explain and use the relationship between the sine and cosine of complementary angles. **HSG-SRT.C.8** Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.★ **HSG-MG.A.1** Use geometric shapes, their measures, and their properties to describe objects. (e.g., modeling a tree trunk or a human torso as a cylinder).★
23 (Guided) The Law of Sines and Cosines *There Ought to Be a Law*	Students will learn and prove the Law of Sines and the Law of Cosines and how to use them to solve triangles and real-world problems. Students have learned the trigonometric ratios and how to solve right triangles in previous lessons. You may wish to present an example of how to solve a right triangle and review the sine and cosine ratios as well as the Pythagorean Theorem.	Lessons 23-1 to 23-4 (4 Lessons)	**HSG-SRT.D.10(+)** Prove the Laws of Sines and Cosines and use them to solve problems. **HSG-SRT.D.11(+)** Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles. (e.g., surveying problems, resultant forces)
EA 3 Trigonometry *Zipping Along*	• Trigonometric functions • Law of Sines • Law of Cosines • Solving triangles		**HSG-SRT.C.6** Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles. **HSG-SRT.C.7** Explain and use the relationship between the sine and cosine of complementary angles. **HSG-SRT.C.8** Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.★ **HSG-SRT.D.10(+)** Prove the Laws of Sines and Cosines and use them to solve problems. **HSG-SRT.D.11(+)** Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles. **HSG-MG.A.1** Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).★

Unit 4- Circles, Coordinates, and Constructions

Prerequisite Skills:
- Simplifying radicals (Item 1) HSN-RN.A.2
- Solving linear and quadratic equations (Item 2) HSA-REI.B.3, HSA-REI.B.4
- Multiplying polynomials (Item 3) HSA-APR.A.1
- Distance formula (Item 4) 8.G.B.8
- Protractor Postulate (Item 5) HSG-CO.A.1
- Ruler Postulate and Segment Addition Postulate (Item 6) HSG-CO.A.1
- Identifying radius, diameter, and chord (Item 7) 7.G.B.5
- Identifying the perpendicular bisector of a segment (Item 8) HSG-CO.C.9
- Completing the square (Item 9) HSA-REI.B.4a
- Interpreting features of functions (Item 10) HSF-IF.B.4
- Graphing quadratic functions (Item 11) HSF-IF.C.7a
- Parallel and perpendicular lines (Item 12) HSG-CO.A.1

Materials: Ruler, Scissors, Compass, Straightedge, Protractor, Chart paper or whiteboards and markers, BLM: Lesson 24-2 Item 2: Statements for a Proof, BLM: Lesson 24-2 Item 2: Reasons, for Proof Statements, BLM: Soccer Field Diagram, BLM: 30°Angle Diagram

Activity or EA	Activity or EA Focus	Lessons within an Activity	Activity or EA Common Core Standards Benchmarks
24 (Investigative) Tangents and Chords *Off on a Tangent*	Students develop a precise definition of a circle and focus on relationships among tangents, radii, diameters, chords, and arcs. They make conjectures and prove theorems about the special segments and angles of circles, and they apply those theorems to solve problems.	Lesson 24-1 to 24-3 (3 Lessons)	**HSG-CO.A.1** Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc. **HSG-C.A.2** Identify and describe relationships among inscribed angles, radii, and chords. *Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.*
25 (Guided) Arcs and Angles *Coming Full Circle*	Students focus on relationships in circles—between angles in arcs, radii, diameters, chords, tangents, and secants. They make conjectures and complete proofs about these relationships. Students also explore inscribed quadrilaterals and prove properties about their angles.	Lesson 25-1 to 25-4 (4 Lessons)	**HSG-C.A.2** Identify and describe relationships among inscribed angles, radii, and chords. Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle. **HSG-C.A.3** Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.

EA 1 **Circles** *Vertigo Round*	• Central angles, inscribed angles, and intercepted arcs • Angles formed by two chords, tangents, and secants • Lengths of chord, tangent, and secant segments		**HSG-CO.A.1** Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc. **HSG-C.A.2** Identify and describe relationships among inscribed angles, radii, and chords. Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle. **HSG-C.A.3** Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.
26 **(Guided)** **Coordinate Proofs** *Prove It!*	Students combine their knowledge of algebra and geometry to use variables to represent the coordinates of points and use these in formulas they already know, like midpoint, distance, and slope, to write coordinate proofs.	Lessons 26-1 to 26-4 (4 Lessons)	**HSG-CO.C.10** Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point. **HSG-GPE.B.5** Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point). **HSG-GPE.B.6** Find the point on a directed line segment between two given points that partitions the segment in a given ratio.
27 **(Directed)** **Equation of a Circle** *Round and Round*	Students derive general equations for circles. They complete the square to find the center and radius of a circle from the given equation of the circle. Finally, they use the technique of completing the square to write an equation of a circle in the form $(x - h)2 + (y - k)2 = r2$ in order to identify the center and radius of the circle.	Lesson 27-1 and 27-2 (2 Lessons)	**HSG-GPE.A.1** Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation. **HSG-GPE.B.4** Use coordinates to prove simple geometric theorems algebraically. For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point (1, 3) lies on the circle centered at the origin and containing the point (0, 2).
28 **(Directed)** **Equations of Parabolas** *Throwing a Curve*	Students learn the vocabulary associated with a parabola and derive the equation of a parabola.	Lesson 28-1 and 28-2 (2 Lessons)	**HSG-GPE.A.2** Derive the equation of a parabola given a focus and directrix.

29 (Investigative) Constructions *Constructive Thinking*	Students will learn basic constructions using a compass and straightedge. Using definitions, theorems, and the properties of circles, geometric constructions are equivalent to visual logic problems. From the eight basic constructions introduced in this activity, numerous problems can be explored from a construction perspective.	Lesson 29-1 to 29-3 (3 Lessons)	**HSG-CO.D.12** Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line. **HSG-CO.D.13** Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle. **HSG-C.A.3** Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle. **HSG-C.A.4(+)** Construct a tangent line from a point outside a given circle to the circle.
EA 2 Coordinates and Constructions *Location Matters*	• Coordinate proofs • Writing equations of circles • Finding the center and radius of a circle from its equation • Writing equations of parabolas • Geometric constructions		**HSG-CO.C.10** Prove theorems about triangles. sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point. **HSG-CO.D.12** Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line. **HSG-GPE.A.1** Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation. **HSG-GPE.B.4** Use coordinates to prove simple geometric theorems algebraically. For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point (1, 3) lies on the circle centered at the origin and containing the point (0, 2). **HSG-GPE.B.6** Find the point on a directed line segment between two given points that partitions the segment in a given ratio.

Unit 5- Extending Two Dimensions to Three Dimensions

Prerequisite Skills:
- Solving a literal equation for a given variable (Item 1) HSA-CED.A.4
- Identifying two- and three dimensional figures (Item 2) 5.G.B.4
- Analyzing similar triangles (Items 3–5) HSG-SRT.B.5
- Solving an area problem involving a circle (Item 6) 7.G.B.4
- Finding area of a composite figure (Items 7–8) 6.G.A.1

Materials:
Index cards, Scissors, Tracing paper, Protractor, Straightedge, Polygon worksheets, Globes or other sphere-shaped objects, sphere per group (globe or ball), large rubber bands or masking tape for each group, flexible protractors (optional)

Activity or EA	Activity or EA Focus	Lessons within an Activity	Activity or EA Common Core Standards Benchmarks
30 (Investigative) Deriving Area Formulas *Shape Up*	Students will formally derive and use area formulas for composite figures, triangles, parallelograms, rhombuses, and trapezoids. Students will use their knowledge of the relationships in special right triangles and diagonals of a parallelogram to develop the formulas.	Lesson 30-1 to 30-3 (3 Lessons)	**HSG-SRT.D.9** (+) Derive the formula A = 1/2 ab sin(C) for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side. **HSG-GPE.B.7** Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.★ **HSG-MG.A.1** Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).★ **HSG-MG.A.2** Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).★
31 (Guided) Regular Polygons *Plenty of Polygons*	Students will develop a formula for finding the sum of the measures of the interior angles of a polygon and a formula for finding the measure of each interior angle of a regular polygon. They will determine the measure of each exterior angle of a polygon and the sum of the measures of all the exterior angles. Finally, students will discover how to use the apothem to find a formula for the area of a regular polygon.	Lesson 31-1 to 31-3 (3 Lessons)	**HSG-GPE.B.7** Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.★ **HSG-MG.A.1** Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).★

32 (Investigative) Length and Area of Circles *Pi in the Sky*	Students will develop and apply formulas for circumference of a circle, area of a circle, area of a sector, and arc length. Students will use prior knowledge of similarity and scale factor to show that all circles are similar. They will also draw on prior knowledge to convert between degree measure and radian measure.	Lesson 32-1 to 32-3 (3 Lessons)	**HSG-CO.A.1** Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc. HSG-C.A.1 Prove that all circles are similar. **HSG-C.B.5** Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector. **HSG-GMD.A.1** Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieri's principle, and informal limit arguments.
EA 1 Area and Perimeter *Play Planning*	• Finding perimeters and areas of composite figures • Finding perimeters and areas of regular polygons • Convert between radian and degree measures • Show that all circles are similar		**HSG-C.B.5** Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and defi ne the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector. **HSG-GPE.B.7** Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.★ **HSG-MG.A.1** Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).★
33 (Investigative) Three-Dimensional Figures *What's Your View?*	Students develop their understanding of three-dimensional figures including prisms, pyramids, cylinders, cones, and spheres. They explore cross sections and other views. In addition, they learn about solids of rotation, which are three-dimensional figures generated by revolving two dimensional figures about a line.	Lesson 33-1 to 33-3 (3 Lessons)	**HSG-GMD.B.4** Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.

34 (Guided) Prisms and Cylinders *Exterior Experiences*	Students find surface areas and volumes of prisms and cylinders. They apply formulas to solve contextual problems involving these measurements. When required, they justify their solutions informally using arguments such as Cavalieri's Principle.	Lesson 34-1 and 34-2 (2 Lessons)	**HSG-GMD.A.1** Give an informal argument for the formulas for the volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieri's principle, and informal limit arguments. **HSG-GMD.A.3** Use volume formulas for cylinders, pyramid, cones, and spheres to solve problems.★ **HSG-MG.A.1** Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).★ **HSG-MG.A.3** Apply geometric methods to solve design problems. (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios). ★
35 (Guided) Pyramids and Cones *Perfect Packaging*	Students develop their understanding of volumes and surface areas of pyramids and cones by exploring various strategies for designing environmentally friendly packaging. Students develop informal arguments for the volumes of pyramids and cones. They apply formulas for surface area and volume, as well as concepts of density based on volume, to model real-world packaging.	Lesson 35-1 to 35-3 (3 Lessons)	**HSG-GMD.A.1** Give an informal argument for the formulas for the volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieri's principle, and informal limit arguments. **HSG-GMD.A.3** Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.★ **HSG-MG.A.1** Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).★ **HSG-MG.A.2** Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).★ **HSG-MG.A.3** Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).★
EA 2 Surface Area and Volume *Action Packed Measurements*	Surface areas of prisms, cylinders, and cones • Volumes of prisms, cylinders, and cones • Solve design problems using applications of geometric concepts, including density based on area and volume		**HSG-GMD.A.3** Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.★ **HSG-GMD.B.4** Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects. **HSG-MG.A.1** Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).★ **HSG-MG.A.2** Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).★ **HSG-MG.A.3** Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).★

36 (Guided) Spheres *Isn't That Spatial?*	Students develop their understanding of surface areas and volumes of spheres. They explore various facets of spherical geometry, including parallel lines and the sum of angles in a triangle. They apply geometric methods to design problems involving spheres and hemispheres.	36-1 to 36-3 (3 Lessons)	**HSG-GMD.A.2(+)** Give an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures. **HSG-GMD.A.3** Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.★ **HSG-MG.A.1** Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).★ **HSG-MG.A.3** Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).★
37 (Investigative) Changing Dimensions *Model Behavior*	Students investigate how changes in the linear dimensions of three-dimensional figures affect surface area and volume. Students use these relationships to describe objects and model real-world scenarios.	37-1 and 37-2 (2 Lessons)	**HSG-MG.A.1** Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).★
EA 3 Changing Dimensions of Spheres *Spherical Storage*	• Surface areas of spheres • Volumes of spheres • Application of geometric concepts, including changing dimensions of three-dimensional figures, to solve problems		**HSG-GMD.A.3** Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.★ **HSG-MG.A.1** Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).★

Unit 6- Probability

Prerequisite Skills:
- Express percentages as decimals (Item 1) 4.NF.C.6
- Express decimals rounded to a given number of decimal places (Item 2) 5.NBT.A.4
- Express a fraction in simplest form (Item 3) 3.NF.A.3b
- Add fractions (Item 4) 5.NF.A.1

Materials: Coin, number cube

Activity or EA	Activity or EA Focus	Lessons within an Activity	Activity or EA Common Core Standards Benchmarks
38 (Guided) Sample Spaces Springboard *Superstar and More*	Students expand their study of probability of simple events to the probability of events involving "and," "or," and "not," and use two-way frequency tables to determine probabilities.	Lessons 38-1 and 38-2 (2 Lessons)	**HSS-CP.A.1** Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not"). **HSS-CP.A.4** Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities.
39 (Guided) Venn Diagrams and Probability Notation *Annabel High School*	Students expand their study of probability of simple events to the probability of events involving "and," "or," and "not." Students are introduced to Venn diagrams and two-way frequency tables as ways to display large sets of data. They use these data displays to calculate probabilities as a way of interpreting the data.	Lesson 39-1 and 39-2 (2 Lessons)	**HSS-CP.A.1** Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not") **HSS-CP.A.4** Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities.
40 (Guided) Addition Rule and Mutually Exclusive Events *Hector Street*	Students expand their understanding of the probability of compound events. Through guided instruction they develop the Addition Rule and use the rule to find the probability of intersecting as well as mutually exclusive events.	Lesson 40-1 and 40-2 (2 Lessons)	**HSS-CP.B.7** Apply the Addition Rule, P(A or B) = P(A) + P(B) − P(A and B), and interpret the answer in terms of the model.

EA 1 **Probability and the Addition Rule** *Diane's Books*	Evaluate probabilities from a given table of counts • Evaluate probabilities involving "and," "or," and "not" • Explain whether or not events are mutually exclusive • Use the Addition Rule • Express probabilities using probability/set notation		**HSS-CP.A.1** Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not") **HSS-CP.B.7** Apply the Addition Rule, P(A or B) = P(A) + P(B) − P(A and B), and interpret the answer in terms of the model. **HSS-MD.B.7** Analyze decisions and strategies using probability concepts (e.g. product testing, medical testing, pulling a hockey goalie at the end of a game.)
41 **(Investigative)** **Dependent Events** *Coco Wildlife Conservation Trust*	Students expand their study of probability to conditional probability, the use of tree diagrams and the Multiplication Rule, geometric probability as well as permutations and combinations.	Lesson 41-1 to 41-3 (3 Lessons)	. **HSS-CP.A.3** Understand the conditional probability of A given B as $\frac{P(A \text{ and } B)}{P(B)}$, and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the condition probability of B given A is the same as the probability of B. **HSS-CP.A.4** Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities. **HSS-CP.A.6** Find the conditional probability of A given B as the fraction of B's outcomes that also belong to A, and interpret the answer in terms of the model.
42 **(Investigative)** **Independent Events** *The Caribou, the Bear, and the Tyrannosaurus*	Students expand their study of probability of compound events to the probability of independent events. They adapt the Multiplication Rule to independent events, and use geometric probability in contextual situations and use permutations and combinations to solve probability problems.	Lesson 42-1 to 42-3 (3 Lessons)	**HSS-CP.A.2** Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent. **HSS-CP.A.3** Understand the conditional probability of A given B as $\frac{P(A \text{ and } B)}{P(B)}$, and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the condition probability of B given A is the same as the probability of B. **HSS-CP.A.4** Construct and interpret two-way frequency tables of data when two categories are associated with one object being classified. Use the two-way as a sample space to decide if events are independent and approximate conditional probabilities. **HSS-CP.A.5** Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. **HSS-CP.B.8 (+)** Apply the general Multiplication Rule in a uniform probability model, P(A and B) = P(A)P(B|A) = P(B)P(A|B), and interpret the answer in terms of the model. **HSS-CP.B.9 (+)** Use permutations and combinations to compute probabilities of compound events and solve problems. **HSS-CP.B.6 (+)** Use probabilities to make fair decisions. **HSS-MD.B.7 (+)** Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).

EA 2 Conditional Probability and Independent Events *DIANE'S e-BOOKS*	• Independent events • Conditional probability • Multiplication Rule • Geometric probability • Permutations and combinations		**HSS-CP.A.2** Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent. **HSS-CP.A.3** Understand the conditional probability of A given B as $\frac{P(A \text{ and } B)}{P(B)}$, and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the condition probability of B given A is the same as the probability of B. **HSS-CP.A.4** Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities. **HSS-CP.A.5** Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. **HSS-CP.B.6** Find the conditional probability of *A* given *B* as the fraction of *B*'s outcomes that also belong to *A*, and interpret the answer in terms of the model. **HSS-CP.B.7(+)** Analyze decisions and strategies using probability concepts. **HSS-CP.B.8** Apply the general Multiplication Rule in a uniform probability model, $P(A \text{ and } B) = P(A)P(B \mid A) = P(B)P(B \mid A)$, and interpret the answer in terms of the model. **HSS-CP.B.9** Use permutations and combinations to compute probabilities of compound events and solve problems.

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Unit 1- Equations, Inequalities, Functions

Prerequisite Skills:
- Evaluating functions (Item 1) HSF-IF.A.2
- Finding slope and intercepts (Item 2) HSF-IF.B.4
- Graphing linear equations (Item 3) HSF-IF.C.7a
- Writing linear equations (Items 4–5) HSF-IF.B.4
- Finding additive and multiplicative inverses (Item 6) 7.NS.A.1b
- Solving linear and literal equations (Items 7, 9, 10) HSA-REI.B.3, HSA-REI.D.10
- Understanding absolute value (Item 8) 6.NS.C.7
- Finding domain and range (Item 11) HSF-IF.B.5
- Identifying lines of symmetry (Item 12) 4.G.A.3

Activity or EA	Activity or EA Standards Focus	Lessons within an Activity	Activity or EA Common Core Standards Benchmarks
1 (Directed) Creating Equations *One to Two*	Students write and solve linear equations in one variable, including multistep equations and equations with variables on both sides. They also write equations in two variables and show solutions to those equations on a coordinate plane. Finally, they write, solve, and graph absolute value equations and inequalities. Throughout this activity, emphasize the importance of performing the same operation on both sides of an equation or inequality in an effort to keep the equation or inequality balanced.	Lessons 1-1 to 1-3 (3 Lessons)	**HSA-CED.A.1** Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear functions. **HSA-CED.A.2** Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
2 (Investigative) Graphing to Find Solutions *Choices*	Students represent constraints using equations and/or inequalities. They graph these constraints on a coordinate plane. Then they use their graphs to determine solutions to a system of equations or system of inequalities. Throughout this activity, emphasize the process of writing equations and inequalities from verbal descriptions and generating solutions once the constraints are graphed on the coordinate plane.	Lesson 2-1 and 2-2 (2 Lessons)	**HSA-CED.A.2** Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. **HSA-CED.A.3** Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.

3 **(Guided) Systems of Linear Equations** *Monetary Systems Overload*	Students write and graph systems of equations. They solve the systems of equations using graphing, substitution, and elimination. They also use technology and matrices to solve systems of equations. Throughout this activity, emphasize that there is more than one way to solve a system of equations and that some methods are more efficient in certain situations.	Lesson 3-1 to 3-4 (4 Lessons)	**HSA-CED.A.2** Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
EA 1 **Equations, Inequalities, and Systems** *Gaming Systems*	• Systems of equations • Systems of inequalities • Absolute value equations		**HSA-CED.A.1** Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear functions. **HSA-CED.A.2** Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. **HSA-CED.A.3** Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.
4 **(Guided) Piecewise-Defined Functions** *Absolutely Piece-ful*	Students identify and graph various piecewise-defined functions. They explore functions made up of parts of linear functions. They look at the absolute value and step functions. Finally, they transform various parent piecewise functions. Throughout this activity, emphasize the use of technology to graph piecewise-defined functions as well as how changes in coefficients and constants affect the graphs of functions.	Lesson 4-1 to 4-3 (3 Lessons)	**HSF-BF.B.3** Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $kf(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. **HSF-IF.C.7** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. **HSF-IF.C.7b** Graph piecewise-defined functions, including step functions and absolute value functions.
5 **(Investigative) Function Composition and Operations** *New from Old*	Students perform operations on functions. Students then write composite functions. Throughout this activity, emphasize that when evaluating functions combined with operations, the value of an input evaluated first in the separate functions and then operated is equal to the value of the combined function with that input. Combining functions ahead of time is efficient when evaluating many input values.	Lesson 5-1 to 5-3 (3 Lessons)	**HSF-BF.A.1** Write a function that describes a relationship between two quantities. **HSF-BF.A.1b** Combine standard function types using arithmetic operations.

6 **(Guided) Inverse Functions** *Old from New*	Students find inverse functions. They also use composition of functions to determine if functions are inverses of one another. Throughout this activity, emphasize how the domain of a function is related to the range of the inverse of the function and vice versa.	Lesson 6-1 and 6-2 (2 Lessons)	**HSF-BF.B.4** Find inverse functions. **HSF-BF.B.4a** Solve an equation of the form f(x) = c for a simple function f that has an inverse and write an expression for the inverse.
EA 2 **Piecewise-Defined, Composite, andInverse Functions** *Currency Conversion*	• Piecewise-defined functions • Composition of functions • Inverse functions		**HSF-BF.A.1** Write a function that describes a relationship between two quantities. **HSF-BF.A.1b** Combine standard function types using arithmetic operations. **HSF-BF.B.3** Identify the effect on the graph of replacing f(x) by f(x) + k, kf(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. **HSF-BF.B.4** Find inverse functions. HSF-BF.B.4a Solve an equation of the form f(x) = c for a simple function f that has an inverse and write an expression for the inverse. **HSF-IF.C.7** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. **HSF-IF.C.7b** Graph piecewise-defined functions, including step functions and absolute value functions.

Unit 2- Quadratic Functions

Prerequisite Skills:
- Factoring polynomials (Items 1–4) HSA-SSE.B.3
- Graphing functions (Items 5–7) HSF-BF.B.3
- Solving quadratic equations (Item 8) HSA-REI.B.4

Activity or EA	Activity or EA Focus	Lessons within an Activity	Activity or EA Common Core Standards Benchmarks
7 (Guided) Applications of Quadratic Functions *Fences*	Sudents write a quadratic function for a given problem situation. They graph and interpret features of these functions. They factor quadratic expressions, solve quadratic equations, and interpret the meaning of the solutions. Finally they solve quadratic inequalities and graph the solutions to these inequalities. Throughout this activity, emphasize whether the solutions to the equations and inequalities make sense for the given situation.	Lesson 7-1 to 7-4 (4 Lessons)	**HSA-CED.A.1** Create equations and inequalities in one variable and use them to solve problems. **HSA-CED.A.2** Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. **HSA-SSE.A.1** Interpret expressions that represent a quantity in terms of its context. **HSA-SSE.A.1a** Interpret parts of an expression, such as terms, factors, and coefficients. **HSF-IF.B.4** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. **HSF-IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.
8 (Directed) Introduction to Complex Numbers *Cardano's Imaginary Numbers*	Students explore complex numbers. They begin by defining the complex number i and writing complex numbers in the form a + bi, where a and b are real numbers. Students also graph complex numbers in the complex plane. Students then add, subtract and multiply complex numbers. They factor quadratic expressions with complex conjugates. Finally, students solve equations with complex solutions. Throughout this activity, make connections between properties of real numbers and properties of complex numbers.	Lesson 8-1 to 8-3 (3 Lessons)	**HSN-CN.A.1** Know there is a complex number i such that $i^2 = -1$, and every complex number has the form a + bi with a and b real. **HSN-CN.A.2** Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers. **HSN-CN.C.7** Solve quadratic equations with real coefficients that have complex solutions. **HSN-CN.C.8** Extend polynomial identities to the complex numbers.

9 **(Guided)** **Solving $ax^2 + bx + c = 0$** *Deriving the Quadratic Formula*	Students solve quadratic equations using a variety of techniques. They solve quadratic equations by taking square roots and by completing the square. Students derive the quadratic formula and then use it to solve equations. They use the discriminant to determine the nature of the solutions. Throughout this activity, emphasize when to use each solution method and compare and contrast these solution methods and the process of solving by factoring.	Lesson 9-1 to 9-3 (3 Lessons)	**HSN-CNC.9** Solve quadratic equations with real coefficients that have complex solutions.
EA 1 **Applications of Quadratic Functions and Equations** *No Horsing Around*	• Quadratic functions • Quadratic equations • Discriminants • Complex numbers		**HSA-CED.A.1** Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear functions. **HSA-CED.A.2** Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. **HSF-IF.B.4** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. **HSF-IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. **HSN-CN.A.1** Know there is a complex number i such that i^2 = −1, and every complex number has the form a + bi with a and b real. **HSN-CN.A.2** Use the relation i^2 = −1 and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers. **HSN-CN.C.7** Solve quadratic equations with real coefficients that have complex solutions. **HSN-CN.C.8** Extend polynomial identities to the complex numbers.
10 **(Investigative)** **Writing Quadratic Equations** *What Goes Up Must Come Down*	Students write equations of parabolas given a graph or key features of the parabola. They determine a quadratic function given three points on a plane that the function passes through. They also find a quadratic model for a given set of data values and use the model to make predictions about the data. Throughout this activity, emphasize the definition of a parabola and how the equation of a parabola relates to a quadratic function.	Lesson 10-1 to 10-3 (3 Lessons)	**HSA-CED.A.1** Create equations and inequalities in one variable and use them to solve problems. **HSA-CED.A.2** Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

11 **(Guided)** **Transformations of $y = x^2$** *Parent Parabola*	Students explore transformations of parabolas. Students also write quadratic functions in vertex form. Throughout this activity, emphasize the effects of coefficients and constants on the graphs of functions.	Lesson 11-1 to 11-3 (3 Lessons)	**HSF-BF.B.3** Identify the effect on the graph of replacing f(x) by f(x) + k, kf(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. **HSF-IF.C.8** Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.
EA 2 **Writing and Transforming Quadratic Functions** *The Safari Experience*	• Standard form of a parabola • Vertex form of a parabola • Transformations • Directrix • Focus • Axis of symmetry		**HSA-CED.A.1** Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear functions. **HSA-CED.A.2** Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. **HSA-IF.C.8** Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. **HSF-BF.A.3** Identify the effect on the graph of replacing f(x) by f(x) + k, kf(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology.
12 **(Guided)** **Graphing Quadratics and Quadratic Inequalities** *Calendar Art*	Students graph quadratic equations and quadratic inequalities. They write quadratic functions from verbal descriptions and identify and interpret key features of those functions. They also graph quadratic inequalities and use those graphs to determine solutions to the quadratic inequalities. Throughout this activity, have students discuss the key features of quadratic functions and discuss how those key features help them graph the functions.	Lesson 12-1 to 12-5 (5 Lessons)	**HSF-IF.B.4** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. **HSF-IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.
13 ***(Guided)*** ***Systems of Linear and Nonlinear Equations*** *Supply and Demand*	Students solve systems of equations that include a linear and nonlinear equation. First they look at solutions graphically and then transition to algebraic solution methods. Throughout this activity, emphasize whether solutions are reasonable.	Lesson 13-1 and 13-2 (2 Lessons)	**HSA-REI.D.11** Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, absolute value.
EA 3 **Graphing Quadratic Functions and Solving Systems** *The Green Monster*	• Graph of a parabola • Maximum of a parabola • Domain and range of quadratic functions • System of equations with a linear equation and quadratic equation		**HSA-REI.D.11** Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, absolute value. **HSF-IF.B.4** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. **HSF-IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.

Unit 3- Polynomials

Prerequisite Skills:
- Rectangular prisms (Item 1) 6.G.A.2, 6.G.A.4
- Combining like terms (Item 2) 8.EE.C.7b
- Factoring
  - GCF
  - Difference of squares
  - Trinomials

(Items 3, 4) HSA-SSE.B.3
- Multiplying polynomials (Item 5) HSA-APR.A.1
- Evaluating functions (Item 6) HSF-IF.A.2
- x- and y-intercepts (Item 7) HSF-IF.C.7a
- Symmetry (Item 8) HSF-IF.B.4
- Reading graphs (Item 9) HSF-IF.C.7c

Activity or EA	Activity or EA Focus	Lessons within an Activity	Activity or EA Common Core Standards Benchmarks
14 (Investigative) Introduction to Polynomials *Postal Service*	Students are introduced to polynomial functions by writing and graphing a third-degree equation that represents a real-world situation. Then students identify the relative minimums and maximums of third-degree equations and examine the end behavior of polynomial functions. Finally, students determine whether functions are even or odd, using algebraic and geometric techniques. Students' work with second-degree functions and their graphs, as well as their introduction to the concepts of minimum and maximum, should help students successfully engage with this activity. To help solidify the definition of polynomial functions for students, present examples of functions that students have worked with—linear, quadratic, and exponential—and have students explain whether or not each function is a polynomial function.	Lesson 14-1 and 14-2 (2 Lessons)	**HSA-SSE.A.1** Interpret expressions that represent a quantity in terms of its context. **HSA-SSE.A.1a** Interpret parts of an expression, such as terms, factors, and coefficients. **HSA-SSE.A.1b** Interpret complicated expressions by viewing one or more of their parts as a single entity. **HSF-IF.B.4** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.

15 (Guided) Polynomial Operations *Polly's Pasta*	Students learn how to perform operations with polynomials including addition, subtraction, multiplication, long division, and synthetic division. Because polynomials may have several terms, emphasize to students the importance of performing polynomial operations carefully so that no terms are skipped.	Lesson 15-1 to 15-3 (3 Lessons)	**HSA-APR.A.1** Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials. **HSA-APR.C.4** Prove polynomial identities and use them to describe numerical relationships. **HSA-APR.D.6:** Rewrite simple rational expressions in different forms; write $\frac{a(x)}{b(x)}$ in the form of $q(x) + \frac{r(x)}{b(x)}$, where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using inspection, long division, or, for the more complicated examples, a computer algebra system.
16 (Investigative) Binomial Theorem *Pascal's Triangle*	Students learn the binomial theorem and how it can be used for binomial expansion. In Lesson 16-1, students use their prior knowledge of factorials and combinations to build Pascal's Triangle. Then they use the Triangle to perform binomial expansion. In Lesson 16-2, students apply the binomial theorem to identify terms and coefficients of a binomial expansion.	Lesson 16-1 and 16-2 (2 Lessons)	**HSA-APR.C.5(+)** Know and apply the Binomial Theorem for the expansion of $(x + y)^n$ in powers of x and y for a positive integer n, where x and y are any numbers, with coefficients determined for example by Pascal's Triangle.
EA 1 Polynomial Operations *This Test is Square*	• Polynomial functions • Operations with polynomials • Graphs of polynomials • Binomial expansion • Binomial Theorem		**HSA-APR.A.1** Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials. **HSA-APR.C.5(+)** Know and apply the Binomial Theorem for the expansion of (x + y)n in powers of x and y for a positive integer n, where x and y are any numbers, with coefficients determined for example by Pascal's Triangle. **HSA-APR.D.6:** Rewrite simple rational expressions in different forms; write $\frac{a(x)}{b(x)}$ in the form of $q(x) + \frac{r(x)}{b(x)}$, where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using inspection, long division, or, for the more complicated examples, a computer algebra system. **HSF-IF.B.4** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. **HSF-BF.B.3** Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them. **HSA-SSE.A.1** Interpret expressions that represent a quantity in terms of its context. **HSA-SSE.A.1a** Interpret parts of an expression, such as terms, factors, and coefficients

17 **(Directed)** **Factors of Polynomials** *How Many Roots?*	Students will build on techniques they have learned previously for factoring polynomials, such as factoring trinomials and factoring a difference of squares to factor higher order polynomials. Be sure students are comfortable with the quadratic formula and concepts related to complex solutions of equations. Many students find factoring challenging. Encourage students to follow the models provided and to look for structure in each problem.	Lesson 17-1 to 17-2 (2 Lessons)	**HSN-CN.C.9** Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials. **HSA-SSE.A.2** Use the structure of an expression to identify ways to rewrite it.
18 **(Guided)** **Graphs of Polynomials** *Getting to the End Behavior*	Students graph polynomial functions by hand or by using technology. They recognize even and odd functions from their algebraic expressions and use various strategies to describe the roots of polynomial functions. Students compare properties of functions represented in different ways and use graphing to solve polynomial inequalities. Throughout this activity, emphasize that when graphing or analyzing polynomial functions, it is helpful to write the polynomials in standard form, remembering to note missing terms for which the coefficient is zero.	Lesson 18-1 to 18-3 (3 Lessons)	**HSA-APR.B.2** Know and apply the Remainder Theorem: For a polynomial p(x) and a number a, the remainder on division by x − a is p(a), so p(a) = 0 if and only if (x − a) is a factor of p(x). **HSA-APR.B.3** Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial. **HSF-BF.B.3** Identify the effect on the graph of replacing f(x) by f(x) + k, kf(x), f(kx), and f(x + k) for specific values of k (both positive and negative); fi nd the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

EA 2 **Factoring and Graphing Polynomials** *Sketch Artist*	• Factoring polynomials • Graphing polynomial functions		**HSN-CN.C.9** Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials. **HSA-SSE.A.2** Use the structure of an expression to identify ways to rewrite it. **HSA-APR.B.2** Know and apply the Remainder Theorem: For a polynomial p(x) and a number a, the remainder on division by x − a is p(a), so p(a) = 0 if and only if (x − a) is a factor of p(x). **HSA-APR.B.3** Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial. **HSF-BF.B.3** Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them. **HSF-IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. **HSF-IF.C.7** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. **HSF-IF.7c** Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior. **HSF-IF.C.8** Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. **HSF-IF.C.9** Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).

Unit 4-Series, Exponential and Logarithmic Functions

Prerequisite Skills:
- Pattern recognition (Items 1, 2, 3) 7.NS.A.3
- Properties of exponents (Items 4, 5, 6) 8.EE.A.1
- Solving equations (Item 7) HSA-REI.B.3
- Writing and graphing functions (Item 8) HSA-IF.B.4, HSA-BF.A.1a

Activity or EA	Activity or EA Focus	Lessons within an Activity	Activity or EA Common Core Standards Benchmarks
19 (Guided) Arithmetic Sequences and Series *Arithmetic Alkanes*	Students learn to identify arithmetic sequences and to determine the *n*th term of such sequences using recursive and explicit formulas. They also write formulas for the sum of the terms in arithmetic sequences, known as an arithmetic series, and calculate the *n*th partial sums of arithmetic series. Finally, they represent arithmetic series using sigma notation and determine the sums. There is a lot of notation in this activity, and students may get lost in the symbols. Encourage students to read carefully, and check often to be sure they can explain the meanings of the formulas and the variables within the formulas.	Lesson 19-1 to 19-3 (3 Lessons)	**HSA-SSE.B.4** Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems.★ **HSF-BF.A.1** Write a function that describes a relationship between two quantities.★ **HSF-BF.A.1a** Determine an explicit expression, a recursive process, or steps for calculation from a context. **HSF-BF.A.2** Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.★
20 (Guided) Geometric Sequences and Series *Squares with Patterns*	Students learn about geometric sequences and series. First they learn to identify and define a geometric sequence, including identifying the common ratio. Then they will examine and find sums of finite and infinite geometric series. Students will use information they learned in the previous activity about writing sequences and series in explicit and recursive forms.	Lesson 20-1 to 20-3 (3 Lessons)	**HSA-SSE.B.4** Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems.★ **HSF-BF.A.1** Write a function that describes a relationship between two quantities.★ **HSF-BF.A.1a** Determine an explicit expression, a recursive process, or steps for calculation from a context. **HSF-BF.A.2** Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.★

EA 1 Sequences and Series *The Chessboard Problem*	Identifying terms in arithmetic and geometric sequences • Identifying common differences and common ratios • Writing implicit and explicit rules for arithmetic and geometric sequences		**HSA-SSE.B.4** Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems.★ **HSF-BF.A.1** Write a function that describes a relationship between two quantities.★ **HSF-BF.A.1a** Determine an explicit expression, a recursive process, or steps for calculation from a context. **HSF-BF.A.2** Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.★
21 (Investigative) Exponential Functions and Graphs *Sizing Up the Situation*	Students examine exponential functions and their graphs. They begin by investigating linear growth and decay and compare rates of change in exponential and linear data. Next, they learn to write exponential functions. They perform transformations of the parent exponential function and, finally, they examine base exponential functions. Students will rely on prior knowledge to investigate rates of change of exponential functions and to perform transformations of the parent function. Review transformations of previous types of functions, including quadratic and cubic.	Lesson 21-1 to 21-5 (5 Lessons)	**HSF-IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. **HSF-IF.B.6** Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specifi ed interval. Estimate the rate of change from a graph. **HSF-IF.C.7** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.★ **HSF-IF.C.7e** Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.
22 (Investigative) Logarithms and Their Properties *Earthquakes and Richter Scale*	Students examine logarithmic functions and their graphs. They begin reviewing exponential functions. Then they examine the relationship between logarithmic and exponential functions and write equations using both forms. Students discover and use the properties of logarithms and graph logarithmic functions.	Lessons 22-1 to 22-4 (4 Lessons)	**HSF-IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.★ **HSF-IF.C.7** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.★ **HSF-IF.C.7e** Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.

EA 2 Exponential Functions and Common Logarithms *Whether or Not*	• Examining exponential patterns and functions • Identifying and analyzing exponential graphs • Transforming exponential functions • Graphing and transforming natural base exponential functions • Examining common logarithmic functions • Understanding properties of logarithms		**HSF-IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.★ **HSF-IF.B.6** Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph. **HSF-IF.C.7** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.★ **HSF-IF.C.7e** Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude. **HSF-BF.A.1** Write a function that describes a relationship between two quantities.★ HSF-BF.A.1a Determine an explicit expression, a recursive process, or steps for calculation from a context. **HSF-BF.B.3** Identify the eff ect on the graph of replacing $f(x)$ by $f(x) + k$, $kf(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); fi nd the value of k given the graphs. Experiment with cases and illustrate an explanation of the eff ects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.
23 (Investigative) Inverse Functions: Exponential and Logarithmic Functions *Undoing It All*	Students extend the concept of logarithms to bases other than 10. They also extend their knowledge of inverse functions to include the inverse relationship between $y = b^x$ and $y = \log_b x$. Students will discover and apply properties of logarithms and apply the concept of graphing by transformations to logarithmic functions.	Lesson 23-1 to 23-3 (3 Lessons)	**HSF-BF.A.1** Write a function that describes a relationship between two quantities.★ **HSF-BF.A.1c** (+) Compose functions. **HSF-BF.B.3** Identify the effect on the graph of replacing f(x) by f(x) + k, kf(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them. **HSF-BF.B.4** Find inverse functions. **HSF-BF.B.4b** (+) Verify by composition that one function is the inverse of another. **HSF-IF.C.**7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.★ **HSF-IF.C.7e** Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.

24 (Directed) Logarithmic and Exponential Equations and Inequalities *College Costs*	Students explore exponential and logarithmic equations and solve them using properties of exponents and logarithms. They will also use technology to approximate the solutions of exponential and logarithmic equations using tables of values and graphing. Students will also investigate and learn how to solve exponential and logarithmic inequalities.	Lesson 24-1 to 24-4 (4 Lessons)	**HSA-CED.A.1** Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions. **HSA-CED.A.2** Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. **HSA-CED.A.4** Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law V = IR to highlight resistance R. **HSA-REI.D.11** Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions. **HSF-LE.A.4** For exponential models, express as a logarithm the solution to $ab^{ct} = d$ where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology.
EA 3 Exponential and Logarithmic Equations *Evaluating your Interest*	• Solving exponential equations • Solving logarithmic equations • Solving real-world applications of exponential and logarithmic functions		**HSA-CED.A.1** Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions. **HSA-CED.A.2** Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. **HSF-IF.C.7** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.★ **HSF-IF.C.7e** Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude. **HSF-LE.A.4** For exponential models, express as a logarithm the solution to $ab^{ct} = d$ where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology. **HSF-BF.A.1** Write a function that describes a relationship between two quantities.★ **HSF-BF.A.1c (+)** Compose functions. **HSF-BF.B.3** Identify the eff ect on the graph of replacing f(x) by f(x) + k, kf(x), f(kx), and f(x + k) for specific values of k (both positive and negative); fi nd the value of k given the graphs. Experiment with cases and illustrate an explanation of the eff ects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them. **HSF-BF.B.4** Find inverse functions. **HSF-BF.B.4b (+)** Verify by composition that one function is the inverse of another.

Unit 5- Radical and Rational Functions

Prerequisite Skills:
- Rewriting radical expressions in equivalent forms (Item 1) HSA-SSE.B.3
- Simplifying rational expressions (Item 2) HSA-SSE.B.3
- Simplifying monomials (Item 3) HSA-SSE.B.3
- Determining asymptotic restrictions (Item 4) HSF-IF.B.4
- Factoring trinomials and difference of squares binomials (Item 5) HSA-SSE.B.3
- Finding inverses of functions (Item 6) HSF-BF.B.4
- Writing interval notation (Item 7) HSF-IF.A.2
- Solving direct variation problems (Item 8) HSA-REI.B.3

Activity or EA	Activity or EA Focus	Lessons within an Activity	Activity or EA Common Core Standards Benchmarks
25 (Guided) Square Root and Cube Root Functions *Go, Boat, Go!*	Students explore the square root and cube root functions. They graph these functions and transform them. They solve square root equations and cube root equations. Throughout this activity, be sure students take note of the key attributes of the graphs of these functions and are able to analyze the effect a transformation has on the function.	Lesson 25-1 to 25-4 (4 Lessons)	**HSA-REI.A.2** Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise. **HSF-IF.B.4** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity. ★ **HSF-IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. ★ **HSF-IF.C.7** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. ★ **HSF-IF.C.7b** Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. **HSF-BF.A.1** Write a function that describes a relationship between two quantities. ★ **HSF-BF.A.1b** Combine standard function types using arithmetic operations. **HSF-BF.B.3** Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

26 (Directed) Inverses: Roots, Squares, and Cubes *Swing, Swing, Swing*	Students investigate the inverse relationship between roots and powers. They graph and write the inverse of square root and quadratic functions. They graph and write the inverse of cube root and cubic functions. Throughout this activity, be sure students recall how the domain of a function is related to the range of the inverses of the function and vice versa.	Lesson 26-1 to 26-3 (3 Lessons)	**HSA-REI.A.2** Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise. **HSA-REI.D.11** Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions. ★ **HSF-IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. ★ **HSF-IF.C.7** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. ★ **HSF-IF.C.7b** Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. **HSF-BF.B.4** Find inverse functions. **HSF-BF.B.4a** Solve an equation of the form f(x) = c for a simple function f that has an inverse and write an expression for the inverse. For example, $f(x) = 2x^3$ or $f(x) = \frac{(x+1)}{(x-1)}$ for x 1. **HSF-BF.B.4d (+)** Produce an invertible function from a non-invertible function by restricting the domain.
EA 1 Radical Functions: Square Roots, Cube Roots, and Their Inverses *How Big is that Ball?*	• Square root functions • Cube roots functions • Transformations of square root and cube root functions • Inverses of square root and cube root functions		**HSA-REI.A.2** Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise. **HSF-IF.B.4** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity. ★ **HSF-IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. ★ **HSF-IF.C.7** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. ★ **HSF-IF.C.7b** Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. **HSF-BF.B.3** Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. **HSF-BF.B.4a** Solve an equation of the form f(x) = c for a simple function f that has an inverse and write an expression for the inverse. For example, $f(x) = 2x^3$ or $f(x) = \frac{(x+1)}{(x-1)}$ for x 1. **HSF-BF.B.4d (+)** Produce an invertible function from a non-invertible function by restricting the domain.

27 (Investigative) Introduction to Rational Functions *Planning a Summer Camp*	Students are introduced to rational functions. They write rational functions for real-world situations and graph these functions. They determine asymptotic behaviors and analyze other features of the graphs. Throughout this activity, be sure students communicate their understanding and make decisions based on their work.	Lesson 27-1 and 27-2 (2 Lessons)	**HSA-SSE.A.1** Interpret expressions that represent a quantity in terms of its context. **HSA-SSE.A.1a** Interpret parts of an expression, such as terms, factors, and coefficients. **HSA-SSE.A.1b** Interpret complicated expressions by viewing one or more of their parts as a single entity. **HSA-CED.A.2** Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. **HSF-IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. ★
28 (Guided) Inverse Variation and Rational Functions *Stream Survival*	Students solve problems involving inverse variation. They also solve problems related to combined variation. In the activity, students will also graph equations of inverse variation and transformations of the parent reciprocal function. Throughout this activity, be sure students add any new vocabulary to their math notebooks and take good notes, to which they can refer when working on problems on their own.	Lesson 28-1 and 28-2 (2 Lessons)	**HSA-CED.A.2** Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. **HSF-IF.B.4** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. ★ **HSF-IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. ★ **HSF-BF.B.3** Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.
EA 2 Rational Functions and Variation *A Condo for my Cat*	• Rational functions • Inverse variation		**HSA-CED.A.2** Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. **HSF-IF.B.4** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. ★ **HSF-IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. ★ **HSF-BF.B.3** Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

29 (Directed) Simplifying Rational Expressions *It's All Rational*	students simplify rational expressions. They add, subtract, multiply, and divide these rational expressions. Finally they graph rational functions. Throughout this activity, emphasize the importance of remembering	Lesson 29-1 to 29-4 (4 Lessons)	**HSA-SSE.A.2** Use the structure of an expression to identify ways to rewrite it. **HSA-APR.D.6** Rewrite simple rational expressions in different forms; write $\frac{a(x)}{b(x)}$ in the form $\frac{q(x)+r(x)}{b(x)}$ where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using inspection, long division, or, for the more complicated examples, a computer algebra system. **HSA-APR.D.7** Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions. **HSF-IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. ★
30 (Guided) Rational Equations and Inequalities *A Rational Pastime*	Students solve rational equations and inequalities both algebraically and graphically. They write equations and inequalities to model real-world situations. Throughout this activity, be sure students eliminate any extraneous solutions.	Lesson 30-1 and 30-2 (2 Lessons)	**HSA-CED.A.1** Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions. **HSA-REI.A.2** Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.
EA 3 Rational Expressions, Equations, and Inequalities *Work it Out*	• Rational expressions • Rational equations • Rational inequalities		**HSA-APR.D.7** Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions. **HSA-CED.A.1** Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions. **HSA-REI.A.2** Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise. **HSF-IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. ★

Unit 6- Trigonometry

Prerequisite Skills:
- Finding the length of the sides of special right triangles (Items 1, 2) HSG-SRT.C.8
- Translating the graph of the parent quadratic function y = x2 (Item 3) HSA-SSE.B.3
- Identifying the coordinates of a point (Items 4, 5) 5.G.A.1
- Determining the circumference of a circle (Items 6, 7) 7.G.B.4
- Writing a linear function to model a real-world scenario (Item 8) HSA-CED.A.1, HSA-CED.A.2, HSF-BF.A.1a

Activity or EA	Activity or EA Focus	Lessons within an Activity	Activity or EA Common Core Standards Benchmarks
31 (Investigative) Understanding Radian Measure *Revolving Restaurant*	Students are introduced to radian measure. They will use a real-world problem to develop understanding of radian measure and how it differs from degree measure. Students will use what they have learned in previous courses about circles, circumference, central angles, and arcs.	Lesson 31-1 to 31-2 (2 Lessons)	**HSF-TF.A.1** Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.
32 (Directed) Trigonometric Functions *Which Angle is Up?*	Students have learned to calculate trigonometric ratios for acute angles using the ratios of the sides of a right triangle. In this activity, students will use reference angles and the unit circle to find trigonometric ratios of any angle. It is important that students understand angle measure expressed in both degrees and radians.	Lesson 32-1 to 32-2 (2 Lessons)	**HSF-TF.A.2** Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.
33 (Directed) Trigonometric Identities: Pythagorean Connection *More Than Just Triangles*	Students will use the Pythagorean Theorem to derive the Pythagorean identity, sin2 θ + cos2 θ = 1. They will then combine this identity with the reciprocal identities to derive related Pythagorean identities. Emphasis should be on identifying relationships, not memorization. Monitor students' progress to ensure that they can justify each step used as they derive identities and solve problems.	Lesson 33-1 and 33-2 (2 Lessons)	**HSF-TF.C.8** Prove the Pythagorean identity sin2 (θ) + cos2 (θ) = 1 and use it to find sin (θ), cos (θ), or tan (θ), given sin (θ), cos (θ), or tan (θ), and the quadrant of the angle.
EA 1 Radians, Unit Circles, and Trigonometry *A Floral Clock*	• Radian measure • Unit circle on the coordinate plane • Special right triangles and the unit circle • Trigonometric identities		**HSF-TF.A.1** Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle. **HSF-TF.A.2** Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle. **HSF-TF.C.8** Prove the Pythagorean identity sin2 (θ) + cos2 (θ) = 1 and use it to find sin (θ), cos (θ), or tan (θ), given sin (θ), cos (θ), or tan (θ), and the quadrant of the angle.

34 (Guided) Graphs of Trigonometric Functions *Creation of a Mural*	Students analyze, graph, and write equations for parent trigonometric functions and their transformations, including phase shifts. They identify period, midline, amplitude, and asymptotes, as applicable.	Lessons 34-1 to 34-5 (5 Lessons)	**HSF-IF.C.7** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. ★ **HSF-IF.C.7e** Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude. **HSF-BF.B.3** Identify the effect on the graph of replacing f(x) by f(x) + k, kf(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs . Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.
35 (Investigative Choosing Functions to Model Periodic Phenomena *The Sky Wheel*	Students will use what they have learned in this unit about trigonometric functions and their graphs to model real-world periodic phenomena using functions of the form y = a sin b(x − h) + k or y = a cos b(x − h) + k. You may wish to review Example C in Lesson 34-5 and discuss the following Bell-Ringer Activity with students as preparation.	Lesson 35-1 (1 Lesson)	**HSF-TF.B.5** Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline. ★ **HSF-IF.B.4** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity. ★
EA 2 Trigonometric Functions *Totally Tires*	• Sine and cosine functions • Translating trigonometric functions • Trigonometric models of periodic phenomena		**HSF-IF.B.4** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity. ★ **HSF-IF.C.7** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. ★ **HSF-IF.C.7e** Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude. **HSF-BF.B.3** Identify the effect on the graph of replacing f(x) by f(x) + k, kf(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them. **HSF-TF.B.5** Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline. ★

Unit 7- Probability and Statistics

Prerequisite Skills:
- Constructing data displays (Items 1a–c) 6.SP.B.4, HSS-ID.A.1
- Shape of data distribution (Item 1d) 6.SP.A.2
- Finding measures of center (Item 1e) 6.SP.B.5c
- Association in bivariate data (Item 2) 8.SP.A.1, HSS-ID.C.9

Materials: Scissors

36 (Guided) Normal Distribution *Take Me Out to the Ballgame*	Students revisit single-variable statistics concepts (data distributions and representations, shape, center, and spread) and further develop an understanding of normal distributions using z-scores, tables, and technology.	Lesson 36-1 to 36-4 (4 Lessons)	**HSS-ID.A.1** Represent data with plots on the real number line (dot plots, histograms, and box plots). **HSS-ID.A.2** Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets. **HSS-ID.A.3** Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers). **HSS-ID.A.4** Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.
37 (Investigative) Random Sampling *Part-Time Jobs*	Students investigate the process of sampling a population and identify possible bias in samples. Students apply these concepts and more in exploring experimental and observational studies.	Lesson 37-1 to 37-3 (3 Lessons)	**HSS-IC.A.1** Understand statistics as a process for making inferences about population parameters based on a random sample from that population. **HSS-IC.B.3** Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.
EA 1 Normal Models, Surveys, and Experiments *Researching Readers*	• Properties of normal distributions • Sampling techniques in studies • Characteristics of experimental studies • Characteristics of observational studies		**HSS-ID.A.1** Represent data with plots on the real number line (dot plots, histograms, and box plots). **HSS-ID.A.2** Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets. **HSS-ID.A.3** Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers). **HSS-ID.A.4** Use the mean and standard deviation of a data set to fi t it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve. **HSS-IC.A.1** Understand statistics as a process for making inferences about population parameters based on a random sample from that population. **HSS-IC.B.3** Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.

***38 (Investigative)* Simulations** *Is Martin Improving?*	Students are introduced to simulations and how they can be used to determine the truth of a conjecture. Students often enjoy performing simulations like the one in this activity, but you should make sure that they understand why they're doing the simulation and what it means.	Lesson 38-1 and 38-2 (2 Lessons)	**HSS-IC.A.2** Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. For example, a model says a spinning coin falls heads up with probability 0.5. Would a result of 5 tails in a row cause you to question the model?
39 (Investigative) Margin of Error *Can't Get No Satisfaction*	Students investigate how to use a margin of error in an estimate of a population proportion. Students will use simulation models for random samples.	Lesson 39-1 and 39-2 (2 Lessons)	**HSS-ID.A.1** Represent data with plots on the real number line (dot plots, histograms, and box plots). **HSS-ID.A.4** Use the mean and standard deviation of a data set to fi t it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.
40 (Investigative) Designing and Conducting Simulations *Time Flies When You Are Having Fun*	Students will build on their prior learning about simulations. Students will benefit if they already have a clear understanding of why simulations are done. Students will use simulations to determine statistical significance.	Lesson 40-1 and 40-2 (2 Lessons)	**HSS-IC.B.5** Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.
EA 2 Simulations, Margin of Error, and Hypothesis Testing *Psychic or just Hot Air?*	• Simulation of random processes • Testing the truth of a conjecture • Statistical significance • Margin of error		**HSS-IC.A.1** Understand statistics as a process for making inferences about population parameters based on a random sample from that population. **HSS-IC.A.2** Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. **HSS-IC.B.4** Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling. **HSS-IC.B.5** Use data from a randomized experiment to compare two treatments; use simulations to decide if diff erences between parameters are significant. **HSS-IC.B.6** Evaluate reports based on data.

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Unit 1- Sequences, Series, Exponential and Logarithmic Functions

Prerequisite Skills:
- Solving systems of equations (Item 1) HSA-REI.C.6
- Graphing linear equations (Item 2) HSF-IF.C.7
- Simplifying radical expressions (Item 3) HSA-SSE.A.2
- Predicting with scatter plots (Item 4) HSA-CED.A.2
- Describing and extending patterns (Items 5 and 10) 4.OA.C.5
- Simplifying monomial expressions (Item 6) HSA-SSE.B.3
- Factoring quadratic expressions and solving quadratic equations (Item 7) HSA-SSE.B.3, HSA-REI.B.4
- Finding intercepts (Item 8) HSF-IF.B.4
- Calculating simple interest (Item 9) 7.RP.A.3

Activity or EA	Activity or EA Standards Focus	Lessons within an Activity	Activity or EA Common Core Standards Benchmarks
1 (Guided) Arithmetic Sequences *DVD Promotions*	Students explore arithmetic sequences and series. They write expressions to represent arithmetic sequences. They calculate the nth term or nth partial sum of an arithmetic series. Finally, they begin to apply mathematical induction to prove statements. Throughout this activity, emphasize proper use of notation, including subscripts and sigma notation.	Lesson 1-1 to 1-3 (3 Lessons)	HSF-BF.A.2 Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms. HSF-LE.A.2 Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).
2 (Guided) Geometric Sequences *She Sells Sea Shells*	Sudents explore geometric sequences and series. They write expressions to represent arithmetic sequences. They calculate the sum of a geometric sequence. Finally, they determine whether an infinite geometric sequence or series converges. Throughout this activity, emphasize proper use of notation and terminology related to geometric sequences.	Lesson 2-1 to 2-4 (4 Lessons)	**HSF-BF.A.2** Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms. **HSF-LE.A.2** Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).

3 **(Investigative)** **Modeling Recursive Relationships** *Money Market Accounts*	Students write equations of sequences recursively. Then they rewrite the equations in explicit form. Throughout this activity, emphasize that students understand which sequences are arithmetic and which are geometric and can distinguish between the two forms of equations and convert between them fluently.	Lesson 3-1 and 3-2 (2 Lessons)	**HSF-BF.A.2** Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms. **HSF-IF.A.3** Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.
EA 1 **Sequences** *The Old Square Craft*	• Arithmetic sequences • Geometric sequences • Sums of sequences		**HSF-BF.A.2** Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms. **HSF-LE.A.2** Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).
4 **(Investigative)** **Exponential Functions** *Pennsylvania Lottery*	Students write equations of exponential functions. They look at doubling time of investments. While they explore compound and continuously compounding interest, they learn about the number e. Throughout this activity, emphasize the characteristics of exponential functions and how the values of the base and exponent impact the graph of an exponential function.	Lesson 4-1 to 4-3 (3 Lessons)	**HSF-IF.C.7e** Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude. **HSF-IF.C.8b** Use the properties of exponents to interpret expressions for exponential functions. **HSF-LE.A.4** For exponential models, express as a logarithm the solution to $ab^{ct} = d$ where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology.
5 **(Directed)** **Logarithms** *Power Trip*	Students work with logarithms. They evaluate and simplify common and natural logarithms. They use properties of logarithms and solve logarithmic equations. Throughout this activity, emphasize that students are showing the steps when simplifying the expressions and know how logarithmic functions and exponential functions relate to each other.	Lesson 5-1 to 5-3 (3 Lessons)	**HSF-BF.B.5 (+)** Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents. **HSF-IF.C.8b** Use the properties of exponents to interpret expressions for exponential functions.
EA 2 **Exponential and Logarithmic Functions** *Population Explosion*	• Exponential functions • Exponential equations • Logarithmic equations		**HSF-BF.B.5 (+)** Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents. **HSF-IF.C.7e** Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude. **HSF-IF.C.8b** Use the properties of exponents to interpret expressions for exponential functions.

6 **(Guided) Transformations of Functions** *I Doubt It*	Students analyze transformations of functions. They graph functions based on transformations from the parent function. They identify even and odd functions. Finally they perform the operations of addition, subtraction, multiplication, and division on functions. Throughout the activity, be sure students understand how the new functions are similar to the parent functions and how they differ.	Lesson 6-1 to 6-2 (2 Lessons)	**HSF-IF.C.7a** Graph linear and quadratic functions and show intercepts, maxima, and minima. **HSF-IF.C.7b** Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. **HSF-IF.C.7c** Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior. **HSF-IF.C.7d** Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior. **HSF-IF.C.7e** Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude. **HSF-BF.B.3** Identify the effect on the graph of replacing f(x) by f(x) + k, kf(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.
7 **(Investigative) Modeling with Power Functions** *Highway Safety*	Students write, graph, analyze, and model with power functions. They use regression models to find appropriate functions. They also analyze key features of graphs of power functions. Throughout this activity, emphasize end behavior of functions as well as when to choose to use a power function over another type of function.	Lesson 7-1 and 7-2 (2 Lessons)	**HSF-IF.C.7** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. **HSF-BF.B.3** Identify the effect on the graph of replacing f(x) by f(x) + k, kf(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them. **HSF-LE.A.3** Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function. **HSS-ID.B.6** Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. **HSS-ID.B.6a** Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models. **HSS-ID.B.6b** Informally assess the fit of a function by plotting and analyzing residuals. **HSS-ID.B.6c** Fit a linear function for a scatter plot that suggests a linear association. **HSS-ID.C.7** Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data. **HSS-ID.C.8** Compute (using technology) and interpret the correlation coefficient of a linear fit.

8 **(Directed) Compositions of Functions and Inverses** *Search and Rescue*	Students compose functions. They determine the composition of two functions and determine the inverse of a function. Throughout this activity, emphasize that proper terminology and notation are used.	Lesson 8-1 and 8-2 (2 Lessons)	HSF-BF.A.1c (+) Compose functions. HSF-BF.B.4b (+) Verify by composition that one function is the inverse of another. HSF-BF.B.4c (+) Read values of an inverse function from a graph or a table, given that the function has an inverse. HSF-BF.B.4d (+) Produce an invertible function from a non-invertible function by restricting the domain.
EA 3 **Transformations, Compositions, and Inverses** *Feeding Frenzy*	• Transformations • Power functions • Composition of functions • Inverses of functions		HSF-BF.A.1c (+) Compose functions. HSF-BF.B.4b (+) Verify by composition that one function is the inverse of another. HSF-BF.B.4c (+) Read values of an inverse function from a graph or a table, given that the function has an inverse. HSF-BF.B.4d (+) Produce an invertible function from a non-invertible function by restricting the domain.

Unit 2- Functions and Their Graphs

Prerequisite Skills:
Simplifying monomial expressions (Items 1, 4) HSA.SSE.B.3
- Multiplying and dividing polynomials (Items 2, 5) HSA.SSE.B.3
- Factoring quadratic expressions and solving quadratic equations (Item 3) HSA.SSE.B.3, HSA.REI.B.4
- Finding intercepts of parabolas (Item 6) HSF IF.B.4
- Describing and extending patterns (Items 7, 9) 4.OA.C.5
- Calculating simple interest (Item 8) 7.RP.A.3
- Finding linear regression models (Item 10) HSA.CED.A.2

Activity or EA	Activity or EA Focus	Lessons within an Activity	Activity or EA Common Core Standards Benchmarks
9 (Investigative) Polynomials *Sunspots*	Students model data with polynomial functions. They compare models to best fit a data set. They describe and analyze graphs of polynomial functions. They also graph polynomial functions using technology. Throughout this activity, emphasize the key features and end behaviors of the graphs of the polynomial functions.	Lesson 9-1 and 9-2 (2 Lessons)	**HSF-IF.B.4** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity. **HSF-IF.C.7c** Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.
10 (Directed) Analyzing Polynomial Functions *Graph It*	Students graph and analyze polynomial functions. They use information about end behavior and relative maximums and minimums to sketch polynomial functions. They use the Fundamental Theorem of Algebra and the Linear Factorization Theorem. They also find zeros of polynomial functions using the Rational Root Theorem. Finally students explore the Factor Theorem and Remainder Theorem. Throughout this activity, emphasize the information that can be gleaned from key attributes of polynomial functions and how those attributes are related to the graph of the function.	Lesson 10-1 to 10-3 (3 Lessons)	**HSA-APR.B.3** Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial. **HSF-IF.C.7c** Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.

11 **(Directed)** **Complex Polynomial Roots and Inequalities** *Open Question*	Students explore polynomial functions. They rewrite polynomial functions in factored form and find zeros of the functions, including zeros that are complex factors. Finally they solve polynomial inequalities. Throughout this activity, emphasize how conjugate pairs work together and also emphasize correct notation.	Lesson 11-1 to 11-3 (3 Lessons)	**HSA-APR.B.3** Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial. **HSA-APR.C.5(+)** Know and apply the Binomial Theorem for the expansion of $(x + y)^n$ in powers of x and y for a positive integer n, where x and y are any numbers, with coefficients determined for example by Pascal's Triangle. **HSF-IF.C.7c** Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.
EA 1 **Polynomial Functions** *Coffee Time*	• Polynomial functions • Complex polynomial roots • Zeros of polynomial functions • Polynomial inequalities		**HSF-IF.B.4** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
12 **(Investigative)** **Rational Expressions and the Reciprocal Function** *Playing Catch-Up*	Students investigate rational functions. They begin by writing rational expressions and rational functions that model real-world situations. They examine asymptotic behaviors and sketch graphs of rational functions. Throughout this activity, emphasize the end behaviors of the rational functions and the behaviors of the graphs around the axes.	Lesson 12-1 and 12-2 (2 Lessons)	**F-IF.C.7d (+)** Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.
13 **(Guided)** **Rational Functions** *Rationalizing Water Collection*	Students explore rational functions. They graph rational functions and transformations of rational functions. They examine asymptotic behavior of rational functions. They write functions involving rational equations and solve rational inequalities. Throughout this activity, emphasize that students understand the end behaviors of rational functions and understand the concept of asymptotes.	Lesson 13-1 to 13-3 (3 Lessons)	**F-IF.C.7d (+)** Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.
EA 2 **Rational Functions** *Taneytown Reunion*	• Rational functions • Graphing rational functions • Asymptotes		**HSF-IF.B.4** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.

Unit 3- Trigonometric Functions

Prerequisite Skills:
- Using special right triangle relationships (Item 1) HSG-SRT.C.8
- Using right triangle trigonometry (Items 2, 3, 4) HSG-SRT.C.8
- Explaining functions and their inverses (Items 5–7) HSF-BF.B.4
- Transformations of functions (Item 8) HSF-BF.B.3

Activity or EA	Activity or EA Focus	Lessons within an Activity	Activity or EA Common Core Standards Benchmarks
14 (Guided) Angles and Angle Measure *What's My Angle Measure?*	Students explore angles and angle measures. They draw angles in standard position and identify coterminal angles. They measure angles in degrees and radians and convert from one measure to another. Finally, students use trigonometric ratios to complete reference triangles. Throughout this activity, emphasize the terminology associated with angles in standard position.	Lesson 14-1 to 14-3 (3 Lessons)	**HSF-TF.A.1** Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle. **HSF-TF.A.3 (+)** Use special triangles to determine geometrically the values of sine, cosine, tangent for $\frac{\pi}{3}$, $\frac{\pi}{4}$, and $\frac{\pi}{6}$ and use the unit circle to express the values of sine, cosine, and tangent for x, + x, and 2 − x in terms of their values for x, where x is any real number.
15 (Investigative) Sinusoidal Functions *Bicycle Wheels*	Students are introduced to sinusoidal periodic functions through the context of following a paint spot on a bicycle wheel. They recognize situations that involve periodic data and sketch graphs of periodic functions. Students then analyze the key features of periodic functions, including period, amplitude, and phase shift. Throughout this activity, ensure students understand how changes in parameters affect the graphs of periodic functions.	Lesson 15-1 to 15-3 (3 Lessons)	**HSF-TF.B.5** Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.
16 (Guided) Trigonometric Functions and the Unit Circle *Wheels Revisited*	Students use the unit circle. They will be asked to label angles and coordinates on the unit circle in an effort to memorize unit circle values. They will define the reciprocal trigonometric functions using the unit circle and evaluate all six trigonometric functions of angles in standard position. Throughout this activity, stress memorization of key values, and continually tell students that repetition will make knowing these values second nature.	Lesson 16-1 to 16-2 (2 Lessons)	**HSF-TF.A.3 (+)** Use special triangles to determine geometrically the values of sine, cosine, tangent for $\frac{\pi}{3}$, $\frac{\pi}{4}$, and $\frac{\pi}{6}$ and use the unit circle to express the values of sine, cosine, and tangent for x, + x, and 2 − x in terms of their values for x, where x is any real number.

17 (Guided) Graphs of the Form y = A sin[B(x − C)] + D *Trigonometric Graphs*	Students graph trigonometric functions over a specified interval. They describe how changes in parameters affect the graphs. They find amplitudes and periods of trigonometric functions and write trigonometric functions given a graph. Throughout this activity, point out the similarities and differences between the sine and cosine functions.	Lesson 17-1 and 17-2 (2 Lessons)	**HSF-TF.A.4 (+)** Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions.
18 (Investigative) Graphs of Other Trigonometric Functions *More Trigonometric Graphs*	Students explore the reciprocal trigonometric functions. They graph these functions and find the domain and range of the functions. Students also transform the functions. Throughout this activity, have discussions about how the parameter changes affect the graphs of the functions.	Lesson 18-1 and 18-2 (2 Lessons)	**HSF-IF.C.7d (+)** Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.
EA 1 Angles, the Unit Circle, and Trigonometric Graphs *Orbiting Spacecraft*	• Trigonometric functions • Reference angles		**HSF-IF.C.7d (+)** Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior. **HSF-TF.A.4 (+)** Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions.
19 (Investigative) Inverse Trigonometric Functions *Viewing Angle*	Students investigate the inverse trigonometric functions. They define and apply these functions. They also find values of inverse trigonometric functions. Throughout this activity, be sure students understand the domain and range of these functions and can identify when each inverse function is used.	Lesson 19-1 to 19-3 (3 Lessons)	**HSF-BF.B.4c (+)** Read values of an inverse function from a graph or a table, given that the function has an inverse. **HSF-BF.B.4d (+)** Produce an invertible function from a non-invertible function by restricting the domain. **HSF-TF.B.6 (+)** Understand that restricting a trigonometric function to a domain on which it is always increasing or always decreasing allows its inverse to be constructed. **HSF-TF.B.7 (+)** Use inverse functions to solve trigonometric equations that arise in modeling contexts; evaluate the solutions using technology, and interpret them in terms of the context.

20 (Directed) Solving Simple Trigonometric Equations *Daylight Minutes*	Students generate and solve trigonometric equations. They use inverse functions and reference angles to solve these equations. Some solutions will be found over a specific interval. Throughout this activity, be sure students understand multiple ways to solve the equations. Be sure that they check their solutions.	Lesson 20-1 to 20-2 (2 Lessons)	**HSF-TF.B.7 (+)** Use inverse functions to solve trigonometric equations that arise in modeling contexts; evaluate the solutions using technology, and interpret them in terms of the context.
EA 2 Inverse Trigonometric Functions and Trigonometric Equations *How Deep is the River?*	• Inverse trigonometric functions • Trigonometric equations		**HSF-BF.B.4c (+)** Read values of an inverse function from a graph or a table, given that the function has an inverse. **HSF-BF.B.4d (+)** Produce an invertible function from a non-invertible function by restricting the domain. **HSF-TF.B.6 (+)** Understand that restricting a trigonometric function to a domain on which it is always increasing or always decreasing allows its inverse to be constructed. **HSF-TF.B.7 (+)** Use inverse functions to solve trigonometric equations that arise in modeling contexts; evaluate the solutions using technology, and interpret them in terms of the context.

Unit 4- Analytic Trigonometry and Trigonometric Applications

Prerequisite Skills:
- Factoring polynomials (Item 1) HSA-SSE.B.3
- Simplifying rational expressions (Item 2) HSA-APR.D.6
- Using trigonometry (Item 3) HSF-TF.B.7
- Using trigonometric functions (Items 4, 5) HSF-TF.A.3
- Solving for measures in right triangles (Items 6, 7) HSF-TF.A.3
- Writing equations for trigonometric graphs (Item 8) HSF-TF.B.5

Activity or EA	Activity or EA Focus	Lessons within an Activity	Activity or EA Common Core Standards Benchmarks
21 (Directed) Trigonometric Identities *Imagine That*	Students examine trigonometric expressions and identities. They verify identities and simplify trigonometric identities. Throughout this activity, be sure students only work on one side of the equation when verifying trigonometric identities.	Lesson 21-1 and 21-2 (2 Lessons)	**HSF-TF.C.8** Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$ and use it to find $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ given $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ and the quadrant of the angle.
22 (Investigative) Identities and Equations *Triangle Measure*	Students investigate cofunction identities and trigonometric equations. They use the unit circle to write equivalent trigonometric expressions and write cofunction identities for sine and cosine. Students also solve trigonometric equations using identities and by graphing. Throughout this activity, be sure students are showing all their work and not skipping steps.	Lesson 22-1 to 22-2 (2 Lessons)	**HSF-TF.A.3 (+)** Use special triangles to determine geometrically the values of sine, cosine, tangent for $\frac{\pi}{3}$, $\frac{\pi}{4}$, and $\frac{\pi}{6}$ and use the unit circle to express the values of sine, cosine, and tangent for x, $+x$, and $2-x$ in terms of their values for x, where x is any real number.
23 (Guided) Multiple Angle Identities *Sounds Like Trigonometry*	Students are guided through how to use sum and difference identities and half-angle identities. They derive these identities and use them to find exact values of trigonometric functions. They also use these identities to solve trigonometric equations. Throughout this activity, be sure students take good notes and follow the examples closely.	Lesson 23-1 to 23-3 (3 Lessons)	**HSF-TF.C.9 (+)** Prove the addition and subtraction formulas for sine, cosine, and tangent and use them to solve problems.

EA 1 **Trigonometric Identities and Equations** *A Quick-Start Guide for Trigonometry*	• Trigonometric identities • Trigonometric equations		**HSF-TF.A.3 (+)** Use special triangles to determine geometrically the values of sine, cosine, tangent for $\frac{\pi}{3}$, $\frac{\pi}{4}$, and $\frac{\pi}{6}$ and use the unit circle to express the values of sine, cosine, and tangent for x, + x, and 2 − x in terms of their values for x, where x is any real number. **HSF-TF.C.9 (+)** Prove the addition and subtraction formulas for sine, cosine, and tangent and use them to solve problems.
24 **(Investigative) Law of Cosines** *The Chocolate Factory*	Students explore how circular motion is converted to linear motion and vice versa by examining the behavior of the mechanical equipment in a chocolate factory. The activity reviews right triangle trigonometry and develops the Law of Cosines from a context. Throughout this activity, be sure students understand that they can apply the Law of Cosines to solve any triangle when two sides and an included angle (SAS) or all three sides (SSS) are known.	Lesson 24-1 and 24-2 (2 Lessons)	**HSG-SRT.D.10(+)** Prove the Laws of Sines and Cosines and use them to solve problems.
25 **(Guided) Law of Sines** *Got Lost?*	Students explore a scenario of an airplane lost over the Pacific Ocean. While students discover mathematical relationships and use the Law of Sines throughout this activity, be sure they take good notes, outlining and diagramming all the cases for which the Law of Sines can be applied.	Lesson 25-1 and 25-2 (2 Lessons)	**HSG-SRT.D.10(+)** Prove the Laws of Sines and Cosines and use them to solve problems.
EA 2 **Right and Oblique Triangles, Area** *Tilting Towers and Triangles*	• Law of Cosines • Law of Sines		**HSG-SRT.D.10 (+)** Prove the Laws of Sines and Cosines and use them to solve problems.

Unit 5- Conics, Parametric Equations, and Vectors

Prerequisite Skills:
- Solving quadratic equations (Items 1–2) HSA-REI.B.4
- Graphing inverse trigonometric functions (Item 3) HSF-TF.B.6
- Using trigonometric functions (Items 4–6, 9) HSF.TF.A.3
- Writing equations of lines (Item 7) HSF-LE.A.2
- Solving systems of equations (Item 8) HSA-REI.C.6
- Solving for measures in right triangles (Item 10) HSF-TF.A.3

Activity or EA	Activity or EA Focus	Lessons within an Activity	Activity or EA Common Core Standards Benchmarks
26 (Directed) Parabola Equations and Graphs *The Human Cannonball*	Students explore parabolas. Students define conic sections. They relate the locus definition of a parabola to its equation. They find the inverse relation for a parabola. Students find the standard form of a parabola and graph parabolas. Throughout this activity, be sure students are proficient in being able to identify the focus, directrix, vertex, and line of symmetry of a parabola.	Lesson 26-1 and 26-2 (2 Lessons)	**HSF-BF.B.4c (+)** Read values of an inverse function from a graph or a table, given that the function has an inverse. **HSF-BF.B.4d (+)** Produce an invertible function from a non-invertible function by restricting the domain. **HSG-GPE.A.3 (+)** Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant.
27 (Investigative) Ellipses and Hyperbolas *Radio Navigation*	Students explore ellipses and hyperbolas. Students define and graph ellipses. Students define and graph hyperbolas. They write equations for each of these types of conic sections. Throughout this activity, be sure students are taking notes that include correctly labeled diagrams of these conic sections.	Lesson 27-1 to 27-3 (3 Lessons)	**HSG-GPE.A.3 (+)** Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant.

28 **(Directed) Polar Graphs** *Air Traffic Controller*	Students work with polar graphs. They define polar coordinates and plot points in the polar grid. Students convert rectangular coordinates to polar coordinates and vice versa. Finally, students graph polar curves. Throughout this activity, be sure students keep track of the new terminology that is introduced in their math notebooks.	Lesson 28-1 to 28-3 (3 Lessons)	**HSN-CN.B.4 (+)** Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers), and explain why the rectangular and polar forms of a given complex number represent the same number.
29 **(Guided) Polar Curves and Polar Conics** *Roses, Rings, and Hearts*	Students explore polar curves. Students write equivalent rectangular equations and polar equations. They sketch graphs represented by polar equations. Students classify different types of polar equations and compare and contrast the graphs of these equations. Throughout this activity, be sure students understand the reasoning behind how the graphs are made.	Lesson 29-1 to 29-3 (3 Lessons)	**HSN-CN.B.4 (+)** Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers), and explain why the rectangular and polar forms of a given complex number represent the same number.
EA 1 **Conic Sections and Polar Graphs** *Make a Beeline (or a Bee Curve)*	• Polar graphs • Conic sections		**HSN-CN.B.4 (+)** Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers), and explain why the rectangular and polar forms of a given complex number represent the same number. **HSG-GPE.A.3 (+)** Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant.

30 **(Guided) Parametric Equations** *Ships in the Fog*	Students work with parametric equations. They interpret parameters of equations in the contexts of real-world situations. They write rules to describe the position of an object in relation to time. They define and write parametric equations. Students also use parametric equations to solve real-world problems. Throughout this activity, be sure students take very accurate notes, regularly refer to the classroom Word Wall, and use the new math terms in their class discussions.	Lesson 30-1 to 30-3	**This Activity is focused on incorporating the Standards for Mathematical Practice** MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments and critique the reasoning of others. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure. MP.8 Look for and express regularity in repeated reasoning.
31 **(Investigative) Parametric Equations Revisited** *Keep Your Eye on the Ball*	Students further their study of parametric equations. They write equations to model circular motion. They solve problems involving angular and linear velocities. Parametric equations are expanded on to include trigonometric functions. Throughout this activity, be sure students use mathematical terms and academic vocabulary precisely.	Lesson 31-1 to 31-3 (3 Lessons)	**This Activity is focused on incorporating the Standards for Mathematical Practice** MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments and critique the reasoning of others. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure. MP.8 Look for and express regularity in repeated reasoning.
EA 2 **Parametric Equations** *A Pirate's Life*	• Graphing parametric equations • Converting with parametric equations • Modeling and solving parametric equations		**This EA evaluates student understanding of the Standards for Mathematical Practice** MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments and critique the reasoning of others. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure. MP.8 Look for and express regularity in repeated reasoning.

32 **(Directed) Vectors and Complex Numbers** *The Robotic Arm*	Students explore vectors and complex numbers. Students define and use vectors. They find the direction and magnitude of a vector. They sketch vectors and vector sums in the coordinate plane. Students represent complex numbers as vectors and add, subtract, multiply, and divide complex numbers. Finally, students find and graph the polar form of a complex number. Throughout this activity, suggest students draw vector diagrams in their notes, labeling each part for reference.	Lesson 32-1 to 32-5 (5 Lessons)	**HSN-CN.A.3 (+)** Find the conjugate of a complex number; use conjugates to find moduli and quotients of complex numbers. **HSN-CN.B.4 (+)** Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers), and explain why the rectangular and polar forms of a given complex number represent the same number. **HSN-CN.B.5 (+)** Represent addition, subtraction, multiplication, and conjugation of complex numbers geometrically on the complex plane; use properties of this representation for computation. For example, $(-1+3i)^3 = 8$ because $(-1+3i)$ has modulus 2 and argument 120°. **HSN-CN.B.6 (+)** Calculate the distance between numbers in the complex plane as the modulus of the difference, and the midpoint of a segment as the average of the numbers at its endpoints. **HSN-VM.A.1 (+)** Recognize vector quantities as having both magnitude and direction. Represent vector quantities by directed line segments, and use appropriate symbols for vectors and their magnitudes (e.g., v, $\|v\|$, $\|v\|$, v). **HSN-VM.A.2 (+)** Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point. **HSN-VM.B.4a (+)** Add vectors end-to-end, component-wise, and by the parallelogram rule. Understand that the magnitude of a sum of two vectors is typically not the sum of the magnitudes. **HSN-VM.B.4b (+)** Given two vectors in magnitude and direction form, determine the magnitude and direction of their sum. **HSN-VM.B.4c (+)** Understand vector subtraction $v - w$ as $v + (-w)$, where $-w$ is the additive inverse of w, with the same magnitude as w and pointing in the opposite direction. Represent vector subtraction graphically by connecting the tips in the appropriate order, and perform vector subtraction component-wise. **HSN-VM.B.5a (+)** Represent scalar multiplication graphically by scaling vectors and possibly reversing their direction; perform scalar multiplication component-wise, e.g., as $c(v_x, v_y) = (cv_x, cv_y)$ **HSN-VM.B.5b (+)** Compute the magnitude of a scalar multiple cv using $\|cv\| = |c|v$. Compute the direction of cv knowing that when $|c|v \neq 0$, the direction of cv is either along v (for $c > 0$) or against v (for $c < 0$).

33 (Investigative) Applications of Vectors *Moving Walkways*	Students use vectors to solve problems involving both rectilinear motion and planar motion. Students write equations to describe both types of motion. They use vectors to describe the velocity of objects and interpret speed as the magnitude of a velocity vector. They also graph position vectors in the coordinate plane. Throughout this activity, be sure students sketch diagrams and use tables to organize data.	Lesson 33-1 and 33-2 (2 Lessons)	**HSN-VM.A.3 (+)** Solve problems involving velocity and other quantities that can be represented by vectors.
EA 3 Complex Numbers and Vectors *Electrifying*	• Complex numbers • Vectors		**HSN-CN.A.3 (+)** Find the conjugate of a complex number; use conjugates to fi nd moduli and quotients of complex numbers. **HSN-CN.B.4 (+)** Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers), and explain why the rectangular and polar forms of a given complex number represent the same number. **HSN-CN.B.5 (+)** Represent addition, subtraction, multiplication, and conjugation of complex numbers geometrically on the complex plane; use properties of this representation for computation. For example, (−1+3i) 3 = 8 because (−1+3i) has modulus 2 and argument 120°. **HSN-VM.A.1 (+)** Recognize vector quantities as having both magnitude and direction. Represent vector quantities by directed line segments, and use appropriate symbols for vectors and their magnitudes (e.g., v, |v|, ||v||, v). **HSN-VM.A.2 (+)** Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point. **HSN-VM.A.3 (+)** Solve problems involving velocity and other quantities that can be represented by vectors. **HSN-VM.B.4 (+)** Add and subtract vectors. **HSN-VM.B.5 (+)** Multiply a vector by a scalar.

Unit 6- Matrices, Systems of Equations, and Volume

Prerequisite Skills:
- Solving systems of equations in two variables (Items 1, 2, 5) HSA-REI.C.6
- Finding volume (Items 3, 8) HSG-GMD.A.3
- Understanding transformations in the coordinate plane (Items 4, 7) HSG-CO.A.2, HSG-CO.B.6
- Solving systems of equations in three variables (Items 1, 2, 5) HSA-REI.C.6

Activity or EA	Activity or EA Focus	Lessons within an Activity	Activity or EA Common Core Standards Benchmarks
34 (Guided) Matrix Operations *How Much Wood Would You Need?*	Students use matrices to organize numerical data. They find specific entries given a matrix. They add, subtract, and multiply matrices. Students also find the value of the determinant of a matrix and use it to find the inverse. Throughout the activity, ensure that students note the similarities and differences between properties and operations for real numbers and properties and operations for matrices.	Lesson 34-1 to 34-3 (3 Lessons)	**HSN-VM.C.6 (+)** Use matrices to represent and manipulate data, e.g., to represent payoffs or incidence relationships in a network. **HSN-VM.C.7 (+)** Multiply matrices by scalars to produce new matrices, e.g., as when all of the payoffs in a game are doubled. **HSN-VM.C.8 (+)** Add, subtract, and multiply matrices of appropriate dimensions. **HSN-VM.C.10 (+)** Understand that the zero and identity matrices play a role in matrix addition and multiplication similar to the role of 0 and 1 in the real numbers. The determinant of a square matrix is nonzero if and only if the matrix has a multiplicative inverse. **HSA-REI.C.9 (+)** Find the inverse of a matrix if it exists and use it to solve systems of linear equations (using technology for matrices of dimension 3 × 3 or greater).
35 (Guided) Matrices and Transformations *Sizing Up Real Estate*	Students use matrices as vectors to transform figures in the coordinate plane. They translate, reflect, and rotate figures. Students also find the value of the determinant of a matrix and use it to find areas of figures. Throughout the activity, ensure that students are developing a conceptual understanding of transformations while also acquiring necessary process skills.	Lesson 35-1 to 35-3 (3 Lessons)	**HSN-VM.C.9 (+)** Understand that, unlike multiplication of numbers, matrix multiplication for square matrices is not a commutative operation, but still satisfies the associative and distributive properties. **HSN-VM.C.10 (+)** Understand that the zero and identity matrices play a role in matrix addition and multiplication similar to the role of 0 and 1 in the real numbers. The determinant of a square matrix is nonzero if and only if the matrix has a multiplicative inverse. **HSN-VM.C.11 (+)** Multiply a vector (regarded as a matrix with one column) by a matrix of suitable dimensions to produce another vector. Work with matrices as transformations of vectors. **HSN-VM.C.12 (+)** Work with 2 × 2 matrices as transformations of the plane, and interpret the absolute value of the determinant in terms of area.
EA 1 Matrices *A Tale of Two Orchards*	• Matrix operations • Transformations with matrices		**HSN-VM.C.6 (+)** Use matrices to represent and manipulate data, e.g., to represent payoff s or incidence relationships in a network. **HSN-VM.C.7 (+)** Multiply matrices by scalars to produce new matrices, e.g., as when all of the payoffs in a game are doubled. **HSN-VM.C.8 (+)** Add, subtract, and multiply matrices of appropriate dimensions. **HSN-VM.C.12 (+)** Work with 2 × 2 matrices as transformations of the plane, and interpret the absolute value of the determinant in terms of area. **HSA-REI.C.9 (+)** Find the inverse of a matrix if it exists and use it to solve systems of linear equations (using technology for matrices of dimension 3 × 3 or greater).

36 **(Directed)** **Matrices and Systems of Equations** *Hit the Trail*	Students use matrices to represent and solve linear systems of equations. They use an inverse matrix to solve the matrix equation. Throughout the activity, ensure that students take notes on all of the math operations that can be performed using matrices. Be sure to encourage students to ask questions any time they feel unsure or confused.	Lesson 36-1 to 36-3 (3 Lessons)	**HSA-REI.C.8 (+)** Represent a system of linear equations as a single matrix equation in a vector variable. **HSA-REI.C.9 (+)** Find the inverse of a matrix if it exists and use it to solve systems of linear equations (using technology for matrices of dimension 3 × 3 or greater).
37 **(Investigative)** **Volume** *Stack 'em High*	Students find volume of three-dimensional figures using Cavalieri's Principle. They informally derive the formula for volume of a sphere. Students are introduced to the concept of a limit. Finally, students represent a volume using a Riemann sum. Throughout the activity, ensure that students document all new terminology and examples into their math notebooks for future reference.	Lesson 37-1 to 37-3 (3 Lessons)	**HSG-GMD.A.2 (+)** Give an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures.
EA 2 **Matrices and Systems** *Let it Snow, Man!*	• Matrices and systems of equations • Volume of spheres		**HSN-VM.C.6 (+)** Use matrices to represent and manipulate data, e.g., to represent payoff s or incidence relationships in a network. **HSG-GMD.A.2 (+)** Give an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures. **HSA-REI.C.8 (+)** Represent a system of linear equations as a single matrix equation in a vector variable.