Orange Public Schools

Office of Curriculum & Instruction

2020-2021 Mathematics Curriculum Guide

Pre-Calculus

Unit 1: Functions, Polynomial and Rational Functions

September 9, 2020 – November 13, 2020

Board Approved: 1.14.2020

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Contents

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Curriculum Map

A STORY OF UNITS (Yearlong Pacing Guide)				
Marking Period	**Unit 1** (9/9/20 – 11/13/20)	**Unit 2** (11/14/20- 1/30/21)	**Unit 3** (1/31/21-4/9/21)	**Unit 4** (4/10/21-6/22/21)
Unit Topic	**Functions, Polynomial and Rational Functions**	**Exponential and Logarithmic Functions, Trigonometry**	**Solving Trigonometric Equations, Trigonometric Applications**	**Analytic Geometry and Systems of Equations**
Description	Explore properties and patterns of polynomial, rational, piecewise functions. Elate different types of functions with their graphs.	Understand the logarithmic function is an inverse function of Exponential. Explore trigonometry function and use special triangles of determine geometrically and value of sine, cosine, tangent for an angle	Use unit circle to explain symmetry and periodicity of trigonometric functions. Use inverse functions to solve trigonometric equations	Derive the equations of ellipses and hyperbolas. Use matrices to solve systems of equations

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Unit Overview

Unit 1: Functions, Polynomial and Rational Functions

Course Description

Pre-Calculus provides a balance of analytical techniques and theoretical instruction. This course focuses on standards to prepare students for more intense study of mathematics. The study of circles and parabolas is extended to include other conics such as ellipses and hyperbolas. Trigonometric functions are further developed to include inverse, general triangles and identities. Matrices provide an organizational structure in which to represent and solve complex problems. Students expand the concepts of complex numbers and the coordinate plane to represent and operate upon vectors.

Learning Material

Textbook: Precalculus,(Ron Larson, Robert Hostetler)

Essential Questions

- Can all relationships in the real-world be modeled with functions?
- How can I use functions to predict real-world events?
- How do I know which function will best model the scenario?
- What techniques can I use to persevere through solving a problem?
- When are multiple solutions or problem solving techniques appropriate?
- How do I determine the most efficient method to solve a problem?
- How are functions and their graphs related?
- What are some properties and patterns of functions and their related parent functions?
- How do patterns and functions help us describe data and real-world physical phenomena?
- Why do we need to model functions in various ways?
- What are common characteristics and properties of polynomials?
- How do we go about efficiently graphing polynomials?
- How do patterns and polynomials help us describe data and physical phenomena and solve a variety of problems?
- What can asymptotes tell us about functions and their behavior?

Enduring Understandings

- Functions and their properties can be used to model and analyze real-world situations to solve problems and make predictions.
- The transfer of knowledge and perseverance are necessary when utilizing problem solving techniques to reach a solution.
- A parent function can provide insight into the function's behavior.

NJSLS

F.BF.1. Write a function that describes a relationship between two quantities.

F.BF.4. Find inverse functions.

F.BF.4b. Verify by composition that one function is an inverse of another.

F.BF.4c. Read values of an inverse function from a graph or table, given that the function has an inverse.

F.BF.4d. Produce an invertible function from a non-invertible function by restricting a domain.

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F.IF.7. Graph functions expressed symbolically and show key features of the graph, by hand in the simple cases and using technology for more complicated cases.
A.APR.6. Rewrite simple rational expressions in different forms; write a(x)/b(x) in the form 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.

A.APR.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.

F.IF.7. Graph functions expressed symbolically and show key features of the graph, by hand in the simple cases and using technology for more complicated cases.

F.IF.7d. Graph rational functions, identifying zeros when suitable factorizations are available, and showing end behavior.

N.CN.3. Find the conjugate of a complex number; use conjugates to find moduli and quotients of complex numbers.

N.CN.8. Extend polynomial identities to the complex numbers. For example, rewrite $x^2 + 4$ as $(x + 2i)(x - 2i)$.

N.CN.9. Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials.

Modifications

Special Education/ 504:	English Language Learners:
-Adhere to all modifications and health concerns stated in each IEP. -Give students a MENU options, allowing students to pick assignments from different levels based on difficulty. -Accommodate Instructional Strategies: reading aloud text, graphic organizers, one-on-one instruction, class website (Google Classroom), handouts, definition list with visuals, extended time -Allow students to demonstrate understanding of a problem by drawing the picture of the answer and then explaining the reasoning orally and/or writing , such as Read-Draw-Write -Provide breaks between tasks, use positive reinforcement, use proximity -Assure students have experiences that are on the Concrete- Pictorial- Abstract spectrum by using manipulatives -Common Core Approach to Differentiate Instruction: Students with Disabilities (pg 17-18) -Strategies for Students with 504 Plans	- Use manipulatives to promote conceptual understanding and enhance vocabulary usage - Provide graphic representations, gestures, drawings, equations, realia, and pictures during all segments of instruction - During ALEKS lessons, click on “Español” to hear specific words in Spanish - Utilize graphic organizers which are concrete, pictorial ways of constructing knowledge and organizing information - Use sentence frames and questioning strategies so that students will explain their thinking/ process of how to solve word problems - Utilize program translations (if available) for L1/ L2 students - Reword questions in simpler language - Make use of the ELL Mathematical Language Routines (click here for additional information) -Scaffolding instruction for ELL Learners -Common Core Approach to Differentiate Instruction: Students with Disabilities (pg 16-17)
Gifted and Talented:	**Students at Risk for Failure:**
- Elevated contextual complexity - Inquiry based or open ended assignments and projects - More time to study concepts with greater depth - Promote the synthesis of concepts and making real world connections - Provide students with enrichment practice that are imbedded in the curriculum such as:	- Assure students have experiences that are on the Concrete- Pictorial- Abstract spectrum - Modify Instructional Strategies, reading aloud text, graphic organizers, one-on-one instruction, class website (Google Classroom), inclusion of more visuals and manipulatives, Field Trips, Google Expeditions, Peer Support, one on one instruction - Assure constant parental/ guardian contact throughout

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● Application / Conceptual Development ● Are you ready for more? - Common Core Approach to Differentiate Instruction: Students with Disabilities (pg. 20) - Provide opportunities for math competitions - Alternative instruction pathways available	the year with successes/ challenges - Provide academic contracts to students and guardians - Create an interactive notebook with samples, key vocabulary words, student goals/ objectives. - Always plan to address students at risk in your learning tasks, instructions, and directions. Try to anticipate where the needs will be and then address them prior to lessons. -Common Core Approach to Differentiate Instruction: Students with Disabilities (pg 19)

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21st Century Life and Career Skills:

21st Century Life and Career Skills:	
Career Ready Practices describe the career-ready skills that all educators in all content areas should seek to develop in their students. They are practices that have been linked to increase college, career, and life success. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study. https://www.state.nj.us/education/cccs/2014/career/9.pdf	
• **CRP1**. Act as a responsible and contributing citizen and employee. • **CRP2**. Apply appropriate academic and technical skills. • **CRP3**. Attend to personal health and financial well-being. • **CRP4**. Communicate clearly and effectively and with reason. • **CRP5**. Consider the environmental, social and economic impacts of decisions. • **CRP6**. Demonstrate creativity and innovation.	• **CRP7**. Employ valid and reliable research strategies. • **CRP8**. Utilize critical thinking to make sense of problems and persevere in solving them. • **CRP9**. Model integrity, ethical leadership and effective management. • **CRP10**. Plan education and career paths aligned to personal goals. • **CRP11**. Use technology to enhance productivity. • **CRP12**. Work productively in teams while using cultural global competence.
Students are given an opportunity to communicate with peers effectively, clearly, and with the use of technical language. They are encouraged to reason through experiences that promote critical thinking and emphasize the importance of perseverance. Students are exposed to various mediums of technology, such as digital learning, calculators, and educational websites.	

Technology Standards

Technology Standards:

All students will be prepared to meet the challenge of a dynamic global society in which they participate, contribute, achieve, and flourish through universal access to people, information, and ideas.

https://www.state.nj.us/education/cccs/2014/tech/

8.1 Educational Technology:

All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.

A. **Technology Operations and Concepts:** Students demonstrate a sound understanding of technology concepts, systems and operations.
B. **Creativity and Innovation:** Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.
C. **Communication and Collaboration:** Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.
D. **Digital Citizenship:** Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.
E. **Research and Information Fluency:** Students apply digital tools to gather, evaluate, and use of information.
F. **Critical thinking, problem solving, and decision making:** Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

8.2 Technology Education, Engineering, Design, and Computational Thinking - Programming:

All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.

A. **The Nature of Technology: Creativity and Innovation-** Technology systems impact every aspect of the world in which we live.
B. **Technology and Society:** Knowledge and understanding of human, cultural, and societal values are fundamental when designing technological systems and products in the global society.
C. **Design:** The design process is a systematic approach to solving problems.
D. **Abilities in a Technological World:** The designed world in a product of a design process that provides the means to convert resources into products and systems.
E. **Computational Thinking: Programming-** Computational thinking builds and enhances problem solving, allowing students to move beyond using knowledge to creating knowledge.

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Interdisciplinary Connections:	
English Language Arts:	
ELA.Literacy.RI-9-10.4	Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the cumulative impact of specific word choices on meaning and tone (e.g., how the language of a court opinion differs from that of a newspaper).
NJSLS ELA-LITERACY.SL.9-10.4	Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.
NJSLS .ELA-LITERACY.W.9-10.2.A	Introduce a topic; organize complex ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.

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Pacing Guide

Overview		
Lesson (Textbook)	Topic	Suggesting Pacing
1.2	Graphs of Equations	2 days
1.4	Functions	2 days
1.5	Analyzing Graphs of Functions	2 days
1.6	A Library of Parent Functions	2 days
1.7	Transformations of Functions	2 days
1.8	Combinations of Functions: Composite Functions	2 days
1.9	Inverse Functions	2 days
1.10	Mathematical Modeling and Variation	2 days
2.1	Quadratic Functions and Models	2 days
2.2	Polynomial Functions of Higher Degree	2 days
2.3	Polynomial and Synthetic Division	2 days
2.4	Complex Numbers	2 days
2.5	Zeros of Polynomial Functions	2 days
2.6	Rational Functions	2 days
2.7	Nonlinear Inequalities	2 days

Summary:

30 days on new content (9 lessons/topics)
2 review day
1 quiz days
2 test day
2 Days Benchmark Assessment

37 days in Unit 1

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Calendar

Please complete the pacing calendar based on the suggested pacing

September 2020						
Sun	Mon	Tue	Wed	Thu	Fri	Sat

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October 2020						
Sun	Mon	Tue	Wed	Thu	Fri	Sat

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November 2020						
Sun	Mon	Tue	Wed	Thu	Fri	Sat

Assessment Framework

Assessment	Estimated Time	Format	Graded
Quizzes (3 to 4)	1/2 period per quiz	Individual	No

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Chapter tests (2 tests)	1 period per test	Individual	Yes
Authentic assessment	TBD	Individual	Yes
Mp1 Benchmark Assessment (Part A and B)	2 periods	Individual	Yes
Assessment check points (exit tickets)	5-10 minutes	Individual	Varies

NWEA Map test (1-2 days): Test Window: September 21 – October 2, 2020

Benchmark Assessment Window: Oct. 28 - Nov. 13, 2020

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Chapter Analysis

Chapter 1: Functions and Their Graphs

Objectives:

1. Using their equations, SWBAT recognize functions and determine its domain, range, and average change over an interval
2. Using their graphs, SWBAT determine parent functions and transform graphs of parents functions
3. Using equations of multiple functions, SWBAT form combinations of functions and composite functions
4. Using its definition, SWBAT define, find, and verify inverse functions
5. Using their equations, SWBAT solve everyday problems that can be modeled using functions

Skills/Knowledge/Understandings:

Understandings:

1. Determine if a relationship represents a function
2. Evaluate the value of a function
3. Determine the domain and range of a function
4. Evaluate, oven a given interval, the average change of a function
5. Determine intervals where a function is increasing, decreasing, and constant
6. Determine the inverse of a function, and whether a function is 1 to 1
7. Evaluate combinations of and composite functions
8. Determine if a function is odd, even, or neither, both graphically and algebraically
9. Graph the 8 basic parent functions
10. Graph, read, and evaluate piecewise-defined functions
11. Understand how transformations are represented, both in equations and in graphs
12. Sketch functions based off their parent functions and corresponding transformations
13. Identify key characteristics of parent functions, using domain, range, maxima and minima, and intervals of increasing and decreasing

Solve real-world problems using a variety of functions

NJSLS:

F.BF.1. Write a function that describes a relationship between two quantities.

F.BF.4. Find inverse functions.

F.BF.4b. Verify by composition that one function is an inverse of another.

F.BF.4c. Read values of an inverse function from a graph or table, given that the function has an inverse.

F.BF.4d. Produce an invertible function from a non-invertible function by restricting a domain.

F.IF.7. Graph functions expressed symbolically and show key features of the graph, by hand in the simple cases and using technology for more complicated cases.

Assessments:

Formative:	Summative:	Authentic:
Daily exit slips, always including at least one question that requires students to summarize and write, in their	Unit 1 exam, involving functions and graphs, operations on functions, inverse functions.	Choose a physical phenomenon that is represented by one of the parent functions. Graph it, denote the domain and range,

own words, what they learned that day.		and find the transformations needed to go from the parent function to this function. Additionally, students need to clearly define what each variable represents in the physical world.

Literacy Connections:
Every exit slip will require students to synthesize their daily learning and write, in their own words, what they learned.

Interdisciplinary Connections:
Physics—Modeling projectile motion

Physics—Using Hooke's Law of springs

History—Using regression models for prediction and analysis

Social Science—Predicting future US census data

Technology Integration:
TI-84 for plotting the general form of the parent functions

TI-84 for graphing functions and finding the zeros

Smart Board for showing visually how function transformations affect graphs.

Key Vocabulary:

Function, Domain, Range, Implicit Domain, Inverse Function, 1-to-1, Parent Function, Composite Function

Piecewise Function, Transformations, Symmetry, Odd/even functions, Increasing/decreasing, Relative extrema

Rate of change

Useful Sites:
Functions and Domain/Range--http://www.purplemath.com/modules/fcns2.htm

Piecewise Functions-- http://www.mathsisfun.com/sets/functions-piecewise.html

Composition of Functions--http://www.purplemath.com/modules/fcncomp.htm

Function Transformations--http://math.kennesaw.edu/~sellerme/sfehtml/classes/math1113/transformation.pdf

Inverse Functions--http://www.purplemath.com/modules/invrsfcn.htm

Lesson Reviews--http://www.khanacademy.org

Text Crosswalk:

Larson and Hostetler, Brooks/Cole, 7th edition. 2007.

Unit 1 covers pages 1-126.

Page 70 shows graphs of all 8 of the most common parent functions.

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The front inside cover of the book shows graphs and properties of the 8 parent functions, as well as of transcendental functions.

A checklist summary of Unit 1 objectives is found on page 116.

An extensive set of review problems is found on pages 117-122.

Page 123 offers a sample Unit Assessment.

Page 124 offers a proof of the midpoint formula.

Pages 125-126 offer challenging problems that require extra critical thinking from students dealing with Unit 1.

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Chapter 2: Polynomial and Rational Functions

Objectives:

1. Using polynomials, SWBAT define rational expressions and divide polynomials to create rational expressions
2. Using its equation, SWBAT determine the zeros (real and complex) of a polynomial
3. Using the equations of rational functions, SWBAT find their intercepts, asymptotes, holes, domain, and range
4. Using their two components, SWBAT perform arithmetic operations on complex numbers

Skills/Knowledge/Understandings:
Understandings:

1) Examine equations of polynomial functions to determine left and right end behavior
2) Identify the zeros of a polynomial function and its multiplicity
3) Identify the domain, range, and degree of polynomial functions
4) Analyze the graphs of polynomial functions with respect to turning points, zeros, and end behavior
5) Form polynomials from zeros and graphs
6) Divide polynomials with long and synthetic division
7) Compare and contrast the properties of real and imaginary numbers
8) Perform arithmetic operations on complex numbers
9) Find the real and complex zeros of a polynomial
10) Find the domain, and the vertical and horizontal asymptotes of a rational function

NJSLS:

A.APR.6. Rewrite simple rational expressions in different forms; write a(x)/b(x) in the form 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.

A.APR.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.

F.IF.7. Graph functions expressed symbolically and show key features of the graph, by hand in the simple cases and using technology for more complicated cases.

F.IF.7d. Graph rational functions, identifying zeros when suitable factorizations are available, and showing end behavior.

N.CN.3. Find the conjugate of a complex number; use conjugates to find moduli and quotients of complex numbers.

N.CN.8. Extend polynomial identities to the complex numbers. For example, rewrite $x^2 + 4$ as $(x + 2i)(x - 2i)$.

N.CN.9. Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials.

Assessments:

Formative:	Summative:	Authentic:
Daily exit slips, always including at least one question that requires students to summarize	Chapter 2 assessment, including end behavior, finding zeros (real and complex), complex	Create-a-graph. Pick a real-world situation that is modeled by a polynomial or rational

and write, in their own words, what they learned that day.	operations, the Fundamental Theorem of Algebra, and graphing polynomials.	function. Then graph it by hand, taking into account the end behavior, zeros, multiplicity, and number of turning points. Label the axis and clearly define what they mean in this specific context.

Literacy Connections:
Students will read an article on population modeling and how their new knowledge can help model and predict future population sizes.

Students will be able to compare and contrast properties of real and imaginary numbers.

Every exit slip will require students to synthesize their daily learning and write, in their own words, what they learned.

Interdisciplinary Connections:
Business-Manufacturing Predictions

History—Population Modeling

Science—Boyle's Law, photosynthesis

Technology Integration:
TI-84 to graph polynomials and verify solutions

TI-84 to approximate the real zeros of a polynomial

Smart Board for visually showing horizontal and vertical asymptotes.

Key Vocabulary:

Polynomial, Degree, Zeros, Multiplicity, Higher-order polynomial, Leading coefficient, Complex numbers

Complex conjugate, Horizontal asymptote, Vertical asymptote, Real and imaginary components, Fundamental Theorem of Algebra, Rational Function

Useful Sites:
Complex numbers--http://www.purplemath.com/modules/complex.htm

Complex numbers video-- https://www.khanacademy.org/math/algebra/complex-numbers/complex_numbers/v/complex-numbers--part-1

End behavior-- http://www.purplemath.com/modules/polyends.htm

Fundamental Theorem of Algebra-- http://www.mathsisfun.com/algebra/fundamental-theorem-algebra.html

How to Find Asymptotes-- http://www.coolmath.com/precalculus-review-calculus-intro/precalculus-algebra/18-rational-functions-finding-horizontal-slant-asymptotes-01.htm

Lesson Reviews--http://www.khanacademy.org

Text Crosswalk:

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Larson and Hostetler, Brooks/Cole, 7th edition. 2007.

Unit 2 covers pages 127-216.

A checklist summary of Unit 2 objectives is found on page 207.

A comprehensive set of review problems can be found on pages 208-211.

A sample Unit Assessment can be found on page 212.

Page 213 offers proofs of the Remainder and Factor Theorems.

Page 214 offers proofs of the Linear Factorization Theorem and the Factors of a Polynomial.

Pages 215-216 offer challenging problems that require extra critical thinking from students dealing with Unit 1.

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5 practices for Orchestrating Productive Mathematical Discussion

5 Practices for Orchestrating Productive Mathematics Discussions	
Practice	Description/ Questions
1. Anticipating	What strategies are students likely to use to approach or solve a challenging high-level mathematical task? How do you respond to the work that students are likely to produce? Which strategies from student work will be most useful in addressing the mathematical goals?
2. Monitoring	Paying attention to what and how students are thinking during the lesson. Students working in pairs or groups Listening to and making note of what students are discussing and the strategies they are using Asking students questions that will help them stay on track or help them think more deeply about the task. (Promote productive struggle)
3. Selecting	This is the process of deciding the *what* and the *who* to focus on during the discussion.
4. Sequencing	What order will the solutions be shared with the class?
5. Connecting	Asking the questions that will make the mathematics explicit and understandable. Focus must be on mathematical meaning and relationships; making links between mathematical ideas and representations.

Ideal Math Block

The following outline is the department approved ideal math block for grades 9-12.

1) Do Now (7-10 min)
    a. Serves as review from last class' or of prerequisite material
    b. Provides multiple entry points so that it is accessible by all students and quickly scaffolds up

2) Starter/Launch (5-10 min)
    a. Designed to introduce the lesson
    b. Uses concrete or pictorial examples
    c. Attempts to bridge the gap between grade level deficits and rigorous, on grade level content
    d. Provides multiple entry points so that it is accessible by all students and quickly scaffolds up

3) Mini-Lesson (15-20 min)
    a. Design varies based on content
    b. May include an investigative approach, direct instruction approach, whole class discussion led approach, etc.
    c. Includes CFU's
    d. Anticipates misconceptions and addresses common mistakes

4) Class Activity (25-30 min)
    a. Design varies based on content
    b. May include partner work, group work/project, experiments, investigations, game based activities, etc.

5) Independent Practice (7-10 min)
    a. Provides students an opportunity to work/think independently

6) Closure (5-10 min)
    a. Connects lesson/activities to big ideas
    b. Allows students to reflect and summarize what they have learned
    c. May occur after the activity or independent practice depending on the content and objective

7) DOL (5 min)
    a. Exit ticket

Ideal math block with Intervention Station

Whole Group Instruction	50 min	INSTRUCTION (Grades 9 – 12) Daily Routine: Mathematical Content or Language Routine Anchor Task: Anticipate, Monitor, Select, Sequence, Connect Collaborative Work* Guided Practice Independent Work (Demonstration of Student Thinking)		TOOLS Manipulatives RESOURCES Agile Mind
Rotation Stations (Student Notebooks & Chromebooks Needed)	1-2X 35 min	STATION 1: Focus on current Grade Level Content STUDENT EXPLORATION* Independent or groups of 2-3 Emphasis on MP's 3, 6 (Reasoning and Precision) And MP's 1 & 4 (Problem Solving and Application) TOOLS/RESOURCES Agile Mind Math Journals	STATION 2: Focus on Student Needs TECH STATION Independent TOOLS/ RESOURCES Khan Academy Approved Digital Provider Fluency Practice	TEACHER STATION: Focus on Grade Level Content; heavily scaffolded to connect deficiencies TARGETED INSTRUCTION 4 – 5 Students TOOLS/ RESOURCES Agile Homework Manipulatives
	5 min	INSTRUCTION Exit Ticket (Demonstration of Student Thinking) TOOLS/RESOURCES Notebooks or Exit Ticket Slips		

ECR

Math Department ECR Protocol

ECR Protocol

(Extended Constructed Response)

Issuing

- Moving forward ECR'S will be disseminated by the first of each month and collected by the end of each month
- Method of Issuing: email and post on the website

Dissemination

- Teachers can elect to print copies for each student or use the Smartboard to project the ECR. (Note: Student work will be included in Student Portfolios)
- Students should be given up to 30 minutes depending on the complexity of the ECR
- Assure appropriate testing environment
- ECR should be completed independently

Scoring

- Conversion tables are available in the *Assessment & Data in Mathematics Bulletin* for genesis inputting purposes
- ECR's will count as Authentic Assessments
- Naming Protocol "Course Month ECR" (ex: Grade 6 October ECR)

Collection

- ECR's will be collected & kept in student portfolios
- Student work will be reviewed during CPT's

October ECR Link

https://www.dropbox.com/sh/1u8442j0c5enzah/AACUyak5wtNm5OO8z0InTCUJa?dl=0

November ECR Link

https://www.dropbox.com/sh/pwz2fqtga59m911/AAAUhMDJyiXPLBuXg3tPyczta?dl=0

ECR Conversion Chart

Points	Genesis Conversion	Points	Genesis Conversion	Points	Genesis Conversion
0	55	0	55	0	55
1	59	1	69	1	69
2	69	2	79	2	89
3	79	3	89	3	100
4	89	4	100		
5	100				