Algebra 2 (Tier 3) Unit Plan
Unit 1: Linear Equations and Inequalities

2015-2016

ORANGE PUBLIC SCHOOLS

OFFICE OF CURRICULUM AND INSTRUCTION

OFFICE OF MATHEMATICS

Algebra 2 Unit 1
Contents

Unit Overview

Unit 1: Linear Equations and Inequalities

Essential Questions

- ➢ What is the difference between linear functions and linear equations?
- ➢ What are different representations of linear functions?
- ➢ How can different representations help us to solve linear equations and inequalities?
- ➢ How do we graph linear equations and inequalities?
- ➢ How can we better communicate to improve our problem solving skills?

Enduring Understandings

- ➢ This unit builds student understanding of the connection between linear functions and linear equations and inequalities that can be used to represent and solve problems. In addition, your students will learn about strategies for effective communication.

Common Core State Standards

Topic 13: Solving Linear Equations

Algebra

1) A.CED.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.
2) A.CED.2: Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
3) A.CED.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. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.
4) A.CED.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.
5) A.REI.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.
6) A.REI.3: Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
7) A.REI.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).
8) A.REI.11: Explain why the x-coordinates of the points where the graph of the equations y = f(x) an y = g(x) intersect are the solution 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.

Topic 14: Problem Solving with Slope Triangles

Algebra

9) A.CED.2: Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

Functions

10) F.IF.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.

11) F.IF.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.

12) F.LE.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).

Topic 15: Solving Linear Inequalities

Number and Quantity

13) N.Q.3: Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Algebra

14) A.CED.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.

15) A.CED.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. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.

16) A.REI.3: Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

17) A.REI.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.

Calendar

September 2015						
Sun	**Mon**	**Tue**	**Wed**	**Thu**	**Fri**	**Sat**
		1	2	3	4	5
6	7	8 First Day of School- Getting to know you and Algebra 1 review	9 Getting to know you and Algebra 1 review	10 Getting to know you and Algebra 1 review	11 Getting to know you and Algebra 1 review	12
13	14 Agile Minds topic 13	15 Agile Minds topic 13	16 Agile Minds topic 13	17 Agile Minds topic 13	18 Agile Minds topic 13	19
20	21 Agile Minds topic 13	22 Agile Minds topic 13	23 Agile Minds topic 13	24 Agile Minds topic 14	25 Agile Minds topic 14	26
27	28 Agile Minds topic 14	29 Agile Minds topic 15	30 Agile Minds topic 15			

October 2015						
Sun	**Mon**	**Tue**	**Wed**	**Thu**	**Fri**	**Sat**
				1 Agile Minds topic 15	2 Agile Minds topic 15	3
4	5 Agile Minds topic 15	6 Agile Minds topic 15	7 Agile Minds topic 15	8 Agile Minds topic 15	9 Agile Minds topic 15	10
11	12 No School	13 Unit 1 Flexible Day	14	15	16	17

Scope and Sequence

Overview		
Lesson	Topic	Suggesting Pacing and Dates
1	13.1 – The Connection Between Linear Functions and Linear Equations	1 day
2	13.2 – Solving Equations with Tables	1 day
3	13.3 – Solving Equations with Graphs	1 day
4	13.4 – Solving One- step Equations	1 day
5	13.5 – Solving Two- step Equations	1 day
6	13.6 – Solving Multi-step Equations	1 day
7	13.7 – How Many Solutions?	1 day
8	13.8 – Rearranging Formulas	1 day
9	14.1 – Slope of a Line	1 day
10	14.2 – Slope Triangles and Linear Equations	1 day
11	14.3 – Communicating While Problem Solving	1 day
12	15.1 – Inequalities on a Number Line	1 day
13	15.2 – Introduction to Solving Linear Inequalities	1 day
14	15.3 – Solve Linear Inequalities using tables and graphs	1 day
15	15.4 – Solving Inequalities with Algebraic Operations	1 day
16	15.5 – Inequalities in a Plane	1 day
17	15.6 – Compound Inequalities in the Plane	1 day
18	15.7 – End of Unit Assessment	1 day

Lesson Analysis

Lesson 1: 13.1 –The Connection Between Linear Functions and Linear Equations

Objective
- Using multiple methods including tables, graphing, and algebra SWBAT work in _____ to create and analyze methods of solving linear equations with at least 80% efficiency on the staying sharp wrap up activity.

Focused Mathematical Practices
- MP 1: Make sense of problems and persevere in solving them
- MP 2: Reason abstractly and quantitatively
- MP 6: Attend to precision
- MP 7: Look for and make use of structure

Vocabulary: Graphic solutions, solve graphically, tabular solution, solving analytically, solving algebraically, function rule, equation, input, output

Common Misconceptions:
- Difficulty understanding the real life applications of each variable
- Misunderstanding the difference between an equation and function rule

Concepts What students will know	Skills What students will be able to do	Material/ Resource	Suggested Pacing	Assessment Check Point
Review • Function rules can be used to represent real life data/situations • Every function rule has a set of input and output values *New* • Different methods can be used to solve linear equations	*Review* • Writing a function rule from a given set of data or situation *New* • Analyzing four different methods to solve a linear equation (graphically, using a table, algebraically, and "undoing") • Matching equations with solutions found using graphs, tables, and algebraic procedures	Agile Minds 13.1, Student activity book, Problem/equation/solution cards	1 day	Staying Sharp 13.1

Lesson 2: 13.2 – Solving Equations with Tables

Objective
- Using given linear functions SWBAT work in _____ to create and analyze tables in order to solve linear equations with at least 80% efficiency on the staying sharp wrap up activity.

Focused Mathematical Practices
- MP 1: Make sense of problems and persevere in solving them
- MP 5: Use appropriate tools strategically
- MP 7: Look for and make use of structure

Vocabulary: input, output, delta-table function

Common Misconceptions:
- Difficulty seeing an equation as two linear functions
- Switching up x and y values on a given table

Concepts What students will know	Skills What students will be able to do	Material/ Resource	Suggested Pacing	Assessment Check Point
Review • An x/y table is one way to represent a linear function • A table has input (x) values and output (y) values *New* • A solution can be found from a table by looking for the x-value that matches the given y-value • A graphing calculator can be used to create and use tables to solve linear equations	*Review* • Identifying a function rule from a given table • Analyzing a linear equation from a given table *New* • Solving a linear equation using a table • Locating a function's table on a graphing calculator • Solving linear equations using the table function on the graphing calculator	Agile Minds 13.2, student activity book	1 day	Staying Sharp 13.2

Lesson 3: 13.3 – Solving Equations with Graphs

Objective

    Using given linear functions SWBAT work in _____ to create and analyze graphs in order to solve linear equations with at least 80% efficiency on the staying sharp wrap up activity.

Focused Mathematical Practices
- MP 1: Make sense of problems and persevere in solving them
- MP 5: Use appropriate tools strategically
- MP 7: Look for and make use of structure

Vocabulary: x-coordinates, y-coordinates, intersection point

Common Misconceptions:
- Having difficulty seeing an equation as two linear function
- Graphing difficulties
- Difficulty understanding how to find and/or identify a point of intersection on a graph

Concepts What students will know	Skills What students will be able to do	Material/ Resource	Suggested Pacing	Assessment Check Point
Review • A graph is another way to represent a linear function • A graph has an x-axis and y-axis to help represent the input and output values of a function *New* • A solution can be found on a coordinate plane by looking for the intersection point between the two sides of the given equation • A graphing calculator can help to graph a function and find a solution to an equation	*Review* • Identifying a function rule from a coordinate grid • Analyzing a linear equation on a coordinate grid *New* • Solving a linear equation on a coordinate grid • Solving linear equations using the graphing function on a graphing calculator • Analyze advantages and disadvantages is using two methods to solve linear equations	Agile Minds 13.3, Student activity book	1 day	Staying Sharp 13.3

Lesson 4: 13.4 –Solving One-Step Equations

Objective
- Using inverse operations SWBAT work in _____ to solve one step linear equations with at least 80% efficiency on the staying sharp wrap up activity.

Focused Mathematical Practices
- MP 1: Make sense of problems and persevere in solving them
- MP 6: Attend to precision
- MP 7: Look for and make use of structure

Vocabulary: inverse operations, balance scale, zero pairs

Common Misconceptions:
- Mixing up inverse operations

Concepts What students will know	Skills What students will be able to do	Material/ Resource	Suggested Pacing	Assessment Check Point
Review • There is always multiple ways to solve an equation *New* • Solving for an equation means finding the x value that makes both sides of the equation equal • When solving an equation you always want to keep both sides "balanced" by performing the same operation to both sides	*Review* • Compare solving equations with tables and graphs *New* • Using inverse operation to "undo" a given operation • Using inverse operations to solve one-step equations	Agile Minds 13.4, Student activity book, algebra tiles, Equation/solution method cards	1 day	Staying Sharp 13.4

Lesson 5: 13.5 – Solving Two-Step Equations

Objective
- Using inverse operations SWBAT work in _____ to solve two step linear equations with at least 80% efficiency on the staying sharp wrap up activity.

Focused Mathematical Practices
- MP 1: Make sense of problems and persevere in solving them
- MP 6: Attend to precision
- MP 7: Look for and make use of structure

Vocabulary: inverse operations, balance scale, zero pairs, equivalent expressions

Common Misconceptions:
- Misunderstanding or incorrectly using order of operations
- Combining incorrect unlike terms
- Mixing up inverse operations

Concepts What students will know	Skills What students will be able to do	Material/ Resource	Suggested Pacing	Assessment Check Point
Review • There is always multiple ways to solve an equation *New* • Solving equations can be viewed as "undoing" the order of operations • Solving for an equation means finding the x value that makes both sides of the equation equal • When solving an equation you always want to keep both sides "balanced" by performing the same operation to both sides	*Review* • Compare solving equations with tables and graphs *New* • An equation is made up of equivalent expressions separated by an equal sign • Using inverse operations to "undo" a given operation • Using inverse operations to solve two-step equations	Agile Minds 13.5, Student activity book, algebra tiles, Student whiteboards and markers	1 day	Staying Sharp 13.5

Lesson 6: 13.6 - Solving Multi-step Equations

Objective
- Using inverse operations SWBAT work in _____ to solve multi step linear equations with at least 80% efficiency on the staying sharp wrap up activity.

Focused Mathematical Practices
- MP 1: Make sense of problems and persevere in solving them
- MP 6: Attend to precision
- MP 7: Look for and make use of structure

Vocabulary: inverse operations, balance scale, zero pairs, equivalent expressions, distributive property, algebraic properties

Common Misconceptions:
- Difficulty identifying like terms
- Incorrectly using distributive property
- Thinking they are wrong if they solve an equation in a different way
- Misunderstanding or incorrectly using order of operations

Concepts What students will know	Skills What students will be able to do	Material/ Resource	Suggested Pacing	Assessment Check Point
Review • There is always multiple ways to solve an equation • Solving equations involves using algebraic properties ***New*** • Solving for an equation means finding the x value that makes both sides of the equation equal • When solving an equation you always want to keep both sides "balanced" by performing the same operation to both sides	***Review*** • Compare solving equations with tables and graphs • Identify inverse operations to "undo" a given operation ***New*** • Identifying which algebraic properties are being used in each step of solving an equation • Using inverse operations to solve multi-step equations with variables on both sides • Using distributive property when there are parenthesis	Agile Minds 13.6, student activity book	1 day	Staying Sharp 13.6

Lesson 7: 13.7 – How Many Solutions?

Objective
- Using multiple methods including tables, graphing, and algebra SWBAT work in _____ to analyze methods of solving linear equations with no solutions and infinite solutions for at least 80% efficiency on the staying sharp wrap up activity.

Focused Mathematical Practices
- MP 1: Make sense of problems and persevere in solving them
- MP 2: Reason abstractly and quantitatively
- MP 7: Look for and make use of structure

Vocabulary: no solutions, infinite solutions, empty set,

Common Misconceptions:
- The meaning of x=0 is different from "no solution"
- Understanding that an equation with infinite solutions means the equations are equivalent to each other

Concepts What students will know	Skills What students will be able to do	Material/ Resource	Suggested Pacing	Assessment Check Point
Review • There is always multiple ways to solve an equation • Solving equations involves using algebraic properties *New* • Some equations do not have just one solution • Some equations have no solutions or an infinite set of solutions	*Review* • Using inverse operations to solve multi-step equations with variables on both sides *New* • Solving equations with no solutions or infinite solutions • Identifying what the equations with no solutions and infinite solutions looks like on a graph and with algebra tiles	Agile Minds 13.7, Student activity book, guided assessment, student computers or computer lab	1 day	Staying Sharp 13.7

Lesson 8: 13.8 – Rearranging Formulas

Objective
- Using equality and identify properties of algebra SWBAT work in _____ to analyze methods of solving literal equations with at least 80% efficiency on the staying sharp wrap up activity.

Focused Mathematical Practices
- MP 1: Make sense of problems and persevere in solving them
- MP 2: Reason abstractly and quantitatively
- MP 6: Attend to precision
- MP 7: Look for and make use of structure

Vocabulary: solutions, algebraic properties, formulas, slope

Common Misconceptions:
- Difficulty solving equations with multiple variables
- Incorrectly identifying which variables are known and which need to still be solved for

Concepts What students will know	Skills What students will be able to do	Material/ Resource	Suggested Pacing	Assessment Check Point
Review • Solving equations involves using algebraic properties • Formulas are commonly used equations **New** • You can rearrange any formula to get the unknown variable by itself • Rearranging formulas can make using them easier	**Review** • Identifying which algebraic properties are being used in each step of solving an equation • Using inverse operations to solve multi-step equations with variables on both sides **New** • Rearrange formulas to get the unknown variable by itself • Solving for the unknown variable after the equation has been rearranged	Agile Minds 13.8, student activity book	1 day	Staying Sharp 13.8

Lesson 9: 14.1 – Slope of a Line

Objective
- Using slope triangles SWBAT work in _____ to find slope of a given line, write equations in slope-intercept form, and graph a line given its slope for at least 80% efficiency on the staying sharp wrap up activity.

Focused Mathematical Practices
- MP 1: Make sense of problems and persevere in solving them
- MP 5: Use appropriate tools strategically
- MP 7: Look for and make use of structure

Vocabulary: slope, y-intercept, slope triangles, slope-intercept form

Common Misconceptions:
- Graphing difficulties
- Switching up values for y-intercept and slope when written in an equation
- Forgetting negative signs when dealing with a negative slope

Concepts What students will know	Skills What students will be able to do	Material/ Resource	Suggested Pacing	Assessment Check Point
Review • Solving equations and inequalities involves using algebraic properties • Different methods can be used to solve linear equations • Function rules can be used to represent real life situations or sets of data ***New*** • Slope is the "steepness" of a graph, it is the rate of change between your x values and y values of the line.	***Review*** • Identifying which algebraic properties are being used in each step of solving an equation and inequality • Using inverse operations to solve multi-step equations with variables on both sides ***New*** • Using slope triangles to understand what slope is • Identify the y-intercept and slope of a line • Write an equation in slope-intercept form • Graph lines with given slopes	Agile Minds 14.1, Student activity book, unit 5 mid-unit assessment	1 day	Staying Sharp 14.1

Lesson 10: 14.2 – Slope Triangles and Linear Equations

Objective
- Using effective communication strategies SWBAT work in _____ to write equations of lines with given information with at least 80% efficiency on the staying sharp wrap up activity.

Focused Mathematical Practices
- MP 1: Make sense of problems and persevere in solving them
- MP 5: Use appropriate tools strategically
- MP 7: Look for and make use of structure

Vocabulary: slope, y-intercept

Common Misconceptions:
- Switching up values for y-intercept and slope when written in an equation
- Forgetting negative signs when dealing with a negative slope

Concepts What students will know	Skills What students will be able to do	Material/ Resource	Suggested Pacing	Assessment Check Point
Review • Slope is the "steepness" of a graph, it is the rate of change between your x values and y values of the line. *New* • Effective communication strategies make giving and receiving information easier and more useful	*Review* • Using slope triangles to understand what slope is • Identify the y-intercept and slope of a line • Graph lines with given slopes *New* • Being effective "givers" and "getters" of information • Writing equations given slopes and y-intercepts	Agile Minds 14.2, Student activity book, giving and getting cards	1 day	Staying Sharp 14.2

Lesson 11: 14.3 – Communicating While Problem Solving

Objective
- Using knowledge of linear equations SWBAT work in _____ to explore the connection between linear equations and linear inequalities with at least 80% efficiency on the staying sharp wrap up activity.

Focused Mathematical Practices
- MP 1: Make sense of problems and persevere in solving them
- MP 3: Construct viable arguments and critique the reasoning of others
- MP 7: Look for and make use of structure

Vocabulary: givers, getters

Common Misconceptions:

Concepts What students will know	Skills What students will be able to do	Material/ Resource	Suggested Pacing	Assessment Check Point
Review • Using context clues is an important problem solving skill • Effective communication makes problem solving easier and more effective *New* • Being good "givers" and "getters" of information can make us stronger problem solvers	*Review* • Identify points on a graph to answer questions about given functions *New* • Solving algebra problems that require good problem solving strategies and effective communication	Agile Minds 14.3, Student activity book	1 day	Staying Sharp 14.3

Lesson 12: 15.1 – Inequalities On a Number Line

Objective
- Using a number line SWBAT work in _____ to find solutions to one variable linear inequalities with at least 80% efficiency on the staying sharp wrap up activity.

Focused Mathematical Practices
- MP 1: Make sense of problems and persevere in solving them
- MP 5: Use appropriate tools strategically
- MP 7: Look for and make use of structure

Vocabulary: Inequalities, number line, compound inequalities

Common Misconceptions:
- Confusion about a graph that is represented on a number line and not just on a coordinate plane
- Incorrect use of inequality symbols while graphing on a number line
- Incorrectly showing the direction of the graph on a number line

Concepts What students will know	Skills What students will be able to do	Material/ Resource	Suggested Pacing	Assessment Check Point
Review • Number lines can be used to represent a set of numbers *New* • Number lines can be used to represent sets of numbers shown by inequalities	*Review* • Identify what numbers would be included in a set of numbers represented by an inequality *New* • Using number lines to depict inequalities • Match inequalities to given number line graphs	Agile Minds 15.1, Student activity book, Inequalities on a number line card sort	1 day	Staying Sharp 15.1

Lesson 13: 15.2 – Introduction to Solving Linear Inequalities

Objective
- Using knowledge of linear equations SWBAT work in _____ to compare linear equations and linear inequalities with at least 80% efficiency on the staying sharp wrap up activity.

Focused Mathematical Practices
- MP 1: Make sense of problems and persevere in solving them
- MP 2: Reason abstractly and quantitatively
- MP 7: Look for and make use of structure
- MP 8: Look for and express regularity in repeated reasoning

Vocabulary: Linear inequalities, solution sets

Common Misconceptions:
- Providing only one solution rather than a solution set

Concepts What students will know	Skills What students will be able to do	Material/ Resource	Suggested Pacing	Assessment Check Point
Review • You can use a variety of methods to solve equations by • A solution for an inequality includes a solution set not just one solution *New* • Inequalities and equations can be solved using the same methods • Solving inequalities can be thought of as finding all possible input values that make the inequality true.	*Review* • Solving linear equations using four different methods *New* • Identifying solution sets to a given inequality that would make the inequality true • Identify how to use the same methods for solving equations to solve inequalities	Agile Minds 15.2, Student activity book, Chart paper and makers	1 day	Staying Sharp 15.2

Lesson 14: 15.3 – Solving Linear Inequalities using Tables and Graphs

Objective
- Using tables and graphs SWBAT work in _____ to solve one variable linear inequalities with at least 80% efficiency on the staying sharp wrap up activity.

Focused Mathematical Practices
- MP 1: Make sense of problems and persevere in solving them
- MP 5: Use appropriate tools strategically
- MP 7: Look for and make use of structure

Vocabulary: linear inequalities, solution set

Common Misconceptions:
- Identifying the same solution for inequalities as you would for an equation
- Difficulties visually seeing on the graph the solution set of an inequality
- Mixing up inequality symbols (i.e. < means greater than and > means less than)

Concepts What students will know	Skills What students will be able to do	Material/ Resource	Suggested Pacing	Assessment Check Point
Review • Graphing calculators can be used to find solutions for linear equations using the graph and tables functions *New* • Solution sets of an inequality will change depending on the inequality symbol even if the equation itself is the same • Although using these methods for solving inequalities is similar to suing it to solve equations it is not the same in terms of identifying the correct solution	*Review* • Using tables and graphs to solve linear equations • Analyzing what the variables represent when using graphs and tables *New* • Using tables and graphs to solve linear inequalities • Determine solution sets of an inequality when using table and graph functions of a graphing calculator • Compare the two methods the solving inequalities	Agile Minds 15.3, student activity book	1 day	Staying Sharp 15.3

Lesson 15: 15.4 – Solving Inequalities with Algebraic Operations

Objective
- Using inverse operations SWBAT work in _____ to solve linear inequalities algebraically with at least 80% efficiency on the staying sharp wrap up activity.

Focused Mathematical Practices
- MP 1: Make sense of problems and persevere in solving them
- MP 6: Attend to precision
- MP 7: Look for and make use of structure

Vocabulary: algebraic operations, algebraic properties

Common Misconceptions:
- Misunderstanding when it is necessary to change direction of the inequality (either changing it with addition or subtraction or forgetting to change it for multiplication and division)
- Difficulties understanding that you can use algebraic properties just as you would when solving equations

Concepts What students will know	Skills What students will be able to do	Material/ Resource	Suggested Pacing	Assessment Check Point
Review • The same algebraic properties used to solve equations apply to solving inequalities *New* • The only difference between solving equations vs. inequalities is when you have a negative coefficient • There are two methods to dealing with a negative coefficient	*Review* • Identifying algebraic properties used when solving equations *New* • Using algebraic properties to solve inequalities • Correctly solve for inequalities with negative coefficients • Check solutions to make sure the inequality was solved correctly	Agile Minds 15.4, Student activity book, student whiteboards	1 day	Staying Sharp 15.4

Lesson 16: 15.5 – Inequalities in a Plane

Objective
- Using a coordinate plane SWBAT work in _____ to explore and graph linear inequalities with two variables with at least 80% efficiency on the staying sharp wrap up activity.

Focused Mathematical Practices
- MP 1: Make sense of problems and persevere in solving them
- MP 5: Use appropriate tools strategically
- MP 7: Look for and make use of structure

Vocabulary: solution set, coordinates

Common Misconceptions:
- Confusing skills for graphing inequalities on a number line with graphing inequalities on a coordinate plane
- Not using context clues in the problem to help understand the solution set and what points should be included

Concepts What students will know	Skills What students will be able to do	Material/ Resource	Suggested Pacing	Assessment Check Point
Review • Solution sets are sets of all coordinate points that make an inequality true *New* • Coordinate plans can be used to identify and show solutions sets for inequalities • Understanding context of the given problem is a tool to help identify solution sets	*Review* • Locate coordinate pair solutions to compound inequalities *New* • Determine solution regions for inequalities on a coordinate plane • Graph linear inequalities on a coordinate plane • Show a solution set on a coordinate plan	Agile Minds 15.5, Student activity book, computer lab	1 day	Staying Sharp 15.5

Lesson 17: 15.6 – Compound Inequalities in the Plane

Objective
- Using SWBAT work in _____ to explore compound inequalities with at least 80% efficiency on the staying sharp wrap up activity.

Focused Mathematical Practices
- MP 1: Make sense of problems and persevere in solving them
- MP 2: Reason abstractly and quantitatively
- MP 7: Look for and make use of structure

Vocabulary: solution set, compound inequalities

Common Misconceptions:
- Confusing skills for graphing inequalities on a number line with graphing inequalities on a coordinate plane
- Not using context clues in the problem to help understand the solution set and what points should be included
- Incorrectly graphing inequalities with negative coefficients

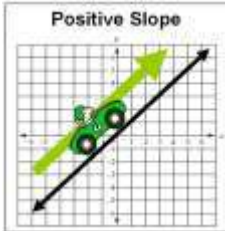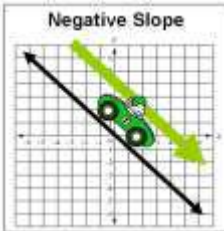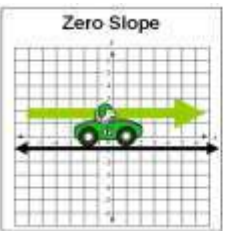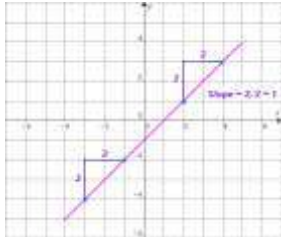| Concepts What students will know	Skills What students will be able to do	Material/ Resource	Suggested Pacing	Assessment Check Point
Review • Solution sets are sets of all coordinate points that make an inequality true **New** • Coordinate plans can be used to identify and show solutions sets for compound inequalities • Understanding context of the given problem is a tool to help identify solution sets	**Review** • Locate coordinate pair solutions to compound inequalities • Graph compound inequalities on a number line **New** • Determine solution regions for compound inequalities on a coordinate plane • Graph compound inequalities on a coordinate plane • Show a solution set on a coordinate plan	Agile Minds 15.6, Student activity book	1 day	Staying Sharp 15.6
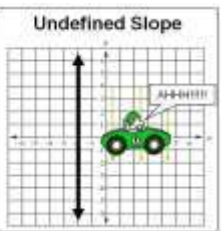
Ideal Math Block

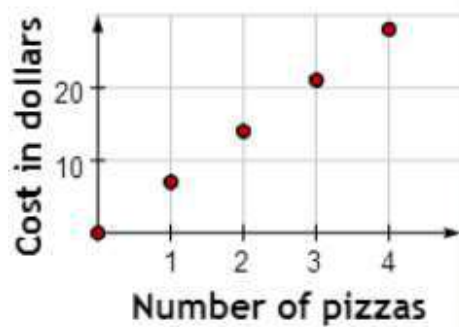*The following outline is the department approved ideal math block for grades 9-12.*

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 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 slip

Multiple Representation

Slope/Linear change	
Concrete	
Pictorial/verbal description	Table Graph
Abstract	Slope between (2, 1) and (4, 3) $$\frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{3-1}{1-2} = \frac{2}{2} = 1$$
Linear Models	
Concrete	
Pictorial/verbal description	Table Graph

Number of pizzas	Cost in dollars
0	0
1	7
2	14
3	21
4	28

Verbal

Medium cheese pizzas cost $7.00. What is the relationship between the number of pizzas you order and the total cost of your order?

Abstract	f(x) = 7x where x represents the number of pizzas and f(x) represents the total cost (in dollars)

Inequalities

Multiple Representation & Notations			
	Inequalities	Interval Notation	Graph (Number line)
	$3 < x \le 7$	$(3, 7]$	
	$-4 \le x \le 1$	$[-4, 1]$	
	$-8 < x < 8$	$(-8, 8)$	
	$0 \le x < \frac{1}{2}$	$[0, \frac{1}{2})$	
	$-6 < x < 0$	$(-6, 0)$	

Unit Authentic Assessment

The Speeding Ticket Task (Tier 3)   **Name: _____**
Part A:

The fine for speeding on the highways of most states is a function of the speed of the car. The speeding fine can be determined by a linear equation, where *f(m)* represents the fine in dollars and *m* represents the number of miles per hour (mph) the car is EXCEEDING the **70 mph** speed limit.

In **Connecticut**, the speed limit on federal highways is 70 miles per hour (mph). The speeding fine has a flat fee $40 and plus $10 for each mph the car is exceeding the speed limit.

i.   Write the rule for *f(m).*

ii.   What would your speeding fine be if you were traveling 78 mph? Show all your work or *explain* how you arrived at your answer.

iii.   Suppose you received a speeding ticket for $200. How fast were you going? *Explain* how you arrived at your answer.

iv.   What are the reasonable domain and range for the speeding fine function? Explain your reason.

       Domain:

       Range:

Part B:

The line on the graph below represents the function of speeding ticket fines in **Vermont**.

The Cost of Fine in Vermont

i. Find the slope and y-intercept of the line. What does the slope and y-intercept mean in terms of the context of the speeding ticket fines?

ii. Write a rule in function notation to represent the cost of speeding in Vermont.

Part C:

The speed limit on the **Florida** highway is 65 miles per hour. The cost of the fine is calculated by charging a fixed amount for each mile per hour the violator exceeds the **65 mph limit**, plus a fixed processing fee. The table below shows the fine, *f(x),* for speeds over the 65 mph limit on Florida highway.

| Speed (*mph* exceeding the 65*mph limit*)	5	10	15	20	25
Fine ($)	60	87.50	115	142.50	170

i.   What is the amount charged for each mile per hour the speeder exceeds the speed limit? Show your work.

ii. What is the additional fixed fee for the cost of the fine in Florida? Show your work.

iii. Write a rule for the cost of a speeding fine on a Florida highway.

iv. Jose got a $126 speeding ticket for speeding on a Florida highway, how fast did he drive? Explain how you can calculate or approximate his speed using at least two 2 different methods.

Extension:

i.   Susan was fined for traveling 78 mph. Which state will have the most expensive speeding ticket? Show your work or explain how you arrived at your answer.

PARCC Sample Assessment Items

The graph of the function $f(x) = -1 + 0.5x$ is shown on the coordinate plane.

For what value of x does $f(x) = 0$?
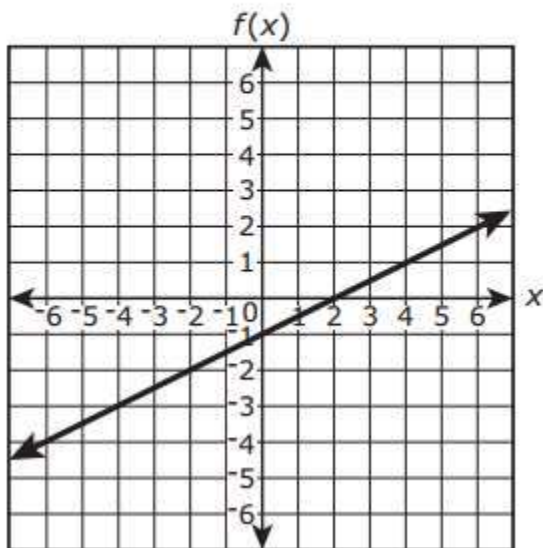
Use the information provided to answer Part A and Part B for question 18.

A high school is having a talent contest and will give different prizes for the best 5 acts in the show. First place wins the most money, and each place after that wins $50 less than the previous place.

Part A

Create a model that can be used to determine the total amount of prize money based on the value of the first place prize.

Enter your model in the space provided.

Part B

The talent contest has a total of $1,000 in prize money. What is the amount of money for **each** of the five prizes? Show your work.

Enter your answers and your work in the space provided.