GRADE 8 UNIT 3 – EXPRESSIONS AND EQUATIONS

Established Goals:	Transfer
Standards	
	Students will be able to:
	• Graph and analyze the different representations of proportional relationships and interpret the change.
8.EE.B.5	• Derive the equation of a line (y = mx for a line through the origin and the equation y = mx +b for a line intercepting the vertical axis at b) and use similar triangles to explain why the slope (the coordinate plane.
Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.	• Solve linear equations in one variable with rational number coefficients that might require expanding expressions using the distributive property and/or combining like terms, including examples with one solution, infinite solutions, or no solution
	• Solve systems of linear equations in two variables by inspection, algebraically, and/or graphically (estimate solutions) to demonstrate solutions correspond to points of intersection c equations simultaneously.
	• Construct a function to model the linear relationship between two variables and determine the rate of change and initial value of the real world data it represents from either graphs or tabulated values.
	• Sketch a graph of a function from a qualitative description and give a qualitative description of a graph of a function.
8.EE.B.6	
Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation y = mx for a line through the origin and the equation *y = mx + b* for a line intercepting the vertical axis at *b*.	**Meaning**

ENDURING UNDERSTANDING	ESSENTIAL QUESTIONS
• Systems of equations can be solved both graphically and algebraically	• How do you decide which method would be easier to use for finding the solution for a system of equations?
• There are situations that require two or more equations to be satisfied simultaneously.	• How can you use systems of equations to solve real-world problems and interpret the results?
	• How does an algebraic solution differ from a graphic solution in a real-life situation?
• Some word problems can be solved using two variables or only one variable.	• How can I interpret the meaning of a "system of equations" algebraically and geometrically?
	• How does mathematical notation indicate that equations are to be treated as a system?
• Solutions to systems can be interpreted algebraically, geometrically, and in terms of problem contexts.	• What does it mean to solve a system of linear equations?
	• How can the solution to a system be interpreted geometrically?
• The number of solutions to a system of equations can	• How can I recognize how many solutions a system of

Additional established goals (left column, continued):

8.EE.C.7
Solve linear equations in one variable.

a. Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these

possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where a and b are different numbers). b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.	vary from no solution to an infinite number of solutions. • An algebraic expression is variables and numbers combined by operations and can be represented by equivalent forms (such as combining like terms). • The properties of real numbers are true for algebraic as well as numeric expressions. • Expressions can be written using numeric values or variables.	equations has prior to solving? • How can I translate a problem situation into a system of equations? • What does the solution to a system tell me about the answer to a problem situation? • What is an algebraic expression? • How are various properties used in order to simplify, evaluate, and expand algebraic expressions? • Are there other forms of expressions that can illustrate the problem?

Acquisition	
KNOWLEDGE	SKILLS
Students will know how to…	*Students will be skilled at…*

8.EE.C.8
Analyze and solve pairs of simultaneous linear equations.

a. Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.

b. Solve systems of two linear

KNOWLEDGE	SKILLS
• solve equations using one step, two step, and multi-step. • find slope using different methods. • find the y-intercept using slope-intercept form. • Graph functions to model linear relationships. • Solve systems of equations.	• solving equations (one step, two step, and multi-step) • finding slope while using slope intercept form , the slope formula, a linear graph, and a table. • finding and using the y-intercept given an equation, table, or graph. • constructing functions to model a linear relationship given a table or graph. • solving systems of equations using the substitution method, elimination method, or graphing method.

equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. *For example, 3x + 2y = 5 and 3x + 2y = 6 have no solution because 3x + 2y cannot simultaneously be 5 and 6.*

8.F.B.4
Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (*x, y*) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.

8.F.B.5
Sketch a graph of a function from a qualitative description and give a qualitative description of a graph of a function .

Vocabulary	Instruction and Pacing	
	Pretest	1 day
	One step equations	1 week

Equations	Two step equations	1 week
Expression		
Variables	Multi- step equations	2 week
One step equations		
Two step equations	Slope and Slope Intercept Form	2 week
Multi-step equations		
Distributive Property	System of Equations	2 weeks
Inverse Operations		
System of Equations	Post Test	1 day
Elimination Property		
Substitution Property		
Slope		
Slope- Intercept Form		
Y-intercept		
Point-Slope Form		
Coefficient		
Like Terms		

Resources

- *Course 3* Chapter 1: Lessons 6,7 ; Chapter 3: Lessons 5 ; Chapter 6: Lessons 1, 2, 3, 4 ; Chapter 11: Lessons 1, 2, 3, 4, 5, 6, 7
- Supplemental Materials
- Manipulatives:
    - Graph Paper
- Study Island
- http://phschool.com
- https://www.pearsonsuccessnet.com
- Buckle Down
- Games/Centers

Differentiation and Accommodations

Provide graphic organizers
Provide additional examples and opportunities for additional problems for repetition
Provide tutoring opportunities
Provide retesting opportunities after remediation (up to teacher and district discretion)
Teach for mastery not test
Teaching concepts in different modalities
Adjust pace and homework assignments

ELL Modifications
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21st Century Skills	Critical Thinking, Creative Thinking, Collaborating, Communicating, and Technology Literacy
Instructional Strategies	Fairfield Township School recognizes the importance of the varying methodologies that may be successfully employed by teachers within the classroom and, as a result, identifies a wide variety of possible instructional strategies that may be used effectively to support student achievement. These may include, but not be limited to, strategies that fall into categories identified by the Framework for Teaching by Charlotte Danielson: • Communicating with students • Using questioning and discussion techniques • Engaging students in learning • Using assessment in instruction • Demonstrating Flexibility and Responsiveness
Interdisciplinary Connections	

Common Misconceptions	Proper Conceptions
Students confuse the x-axis and the y-axis.	The x-axis is horizontal and the y-axis is vertical.
Students confuse whether to add/subtract or multiply/divide first when solving two step equations.	You add/subtract first, than multiply/divide.
Students confuse which method to use when solving systems of equations.	Determine which is the best method to use before starting the problem.
Students get confused with combining like terms.	Only combine the terms that have the same variable/variables.
Students get confused when moving a term from one side of the equals sign to the other.	Beware of the terms positive or negative sign before moving to the other side of the equals sign.

Performance Task

Tracey has two paintings in her portfolio and paints three more each week. Lisa has twelve paintings in her portfolio and paints two more each week. After how many weeks will Tracey and Lisa have the same number of paintings?

- Write an equation to represent the situation.

- Solve the equation.
- Work must be shown.
- Explain how you used inverse operations to solve the equation.

Rubric

When used as a quiz grade (based on 100%), each bullet would be worth 25 points for a correct answer.

ASSESSMENTS

Suggested Formative Assessment

Problem of the Day

Lesson Quizzes

Exit Ticket

Anecdotal Records (Topic Observation Checklist)

Suggested Summative Assessment

Grade level developed Unit/Envisions Topic Tests

Ed-Connect Express Tests /State Unit Benchmark Assessment/Performance Task