Curriculum Sample Template
Max. 8 Pages

Grade Level	Eighth Grade	**Content Area**	Mathematics
Course Title (grades 9-12 Only)	N/A		
Length of Unit	4 days + 1 day for the summative assessment	**Time of Year**	4th quarter
Expected Prior Knowledge *The knowledge/skills mastered earlier in the year foundational to the mastery of the required Standard in the current sample.*	Standards: Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). Interpret the equation y = mx + b as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. CK: Reinforce the knowledge of algebra with geometry and vice versa. Know that the midpoint of a line segment of any slope, projected perpendicularly onto the horizontal x-axis or vertical y-axis will be the midpoint of its projection. Know the similar triangles connection (AA Similarity) with slope and that this is the tangent of the angle the line makes with the x-axis.		
Alignment to Program of Instruction *Briefly outline methods of instruction found in this sequence of lessons that align to the Program of Instruction described in A.3.*	This unit aligns to the Core Knowledge Sequence for Math, to the sequence for Singapore Math, and to the 2010 AZ Math Standards. The domains of Algebra and Analytic Geometry for Expressions and Equations will be taught at the 8th Grade level. The skill of understanding and interpreting proportional relationships is revisited at increasingly higher levels of rigor as set forth in the ADE 2010 Mathematics Standards (CCSS), and taught through Core Knowledge and Singapore Math. The content knowledge of Pre-Algebra is spiraled throughout the Core Knowledge Sequence from 5th to 7th grade, and then Algebra in 8th Grade. The content knowledge of Geometry is spiraled throughout the Core Knowledge Sequence from Kindergarten to 8th Grade, with practice in Analytic Geometry in 8th Grade incorporating the skill required in the standard addressed in this math unit. As described in the Program of Instruction, cooperative learning will take place throughout this unit. Each lesson includes a combination of teacher-led instruction, small group interaction, independent practice, and ongoing assessment. Prior to beginning instruction, the teacher will administer an aligned pre-test to assess student understanding, and use data from this to target individual students' needs throughout the unit. Students will individually graph their results on both the pre- and post-tests, and graph their results in an individual portfolio, which serves as a visual representation of their progress towards their "Big Goal" in Math.		
Standard Number and Description *List the Number* and full description for the required Standard.*	8. EE. 6 Understand the connections between proportional relationships, lines, and linear equations. 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.		
Summative Assessment	Students will complete 9 questions to assess their understanding of the connections between proportional relationships, lines and linear equations. The assessment will include both converting an equation to a line on a		

Describe a cumulative and comprehensive activity, clearly separate from instruction and guided or independent practice, which allows each student to individually demonstrate mastery of the required Standard. A copy of the summative assessment must be attached to the curriculum sample.	graph, and deriving and equation from a line. The assessment and answer key are below.
Scoring Scale and Mastery Level *Explain how the assessment is scored, to include points per question, how points are awarded, total points possible, criteria necessary to demonstrate mastery, and grading scale. A copy of the answer key and scoring rubric (whichever applicable) must be attached to the curriculum sample.*	Each item will be worth one point, for a total of 9 points. Students must show their work for all problems. Items will be scored according to an answer key (see provided). Grading for the assessment will be based on the following scale: 0-5= Falls Far Below; 6-7=Approaching; 8= Meets; 9= Exceeds. According to our program of instruction, 80% will indicate mastery. Thus, a score of 8 or 9 points will indicate mastery of this standard.
Materials/Resources Needed	White board, dry erasers, graph paper, rulers, pen, pencil, 3X5 notecards. Access to internet, to watch videos http://www.youtube.com/watch?v=rE11ojJFjPs http://www.mathsisfun.com/equation_of_line.html

Lesson (add as needed)	**Instruction** **TW= Teacher will; SW = Student will; TPS= Think, Pair, Share; INM = Introduction to new material; CFU = Check for understanding; GP= Guided practice; IP = Independent practice**	**Student Activities**
1	**Activation of Prior Knowledge:** TW lead students through a review of their pre-test for this unit. TW allow time for each student to graph his/her result on the pre-test. TW lead a discussion of what students already know, and what they will know by the time they take the post-test. **Objective:** Students will understand how similar triangles can be used to measure slope between points on a line. **INM:** Key Points: 1. Slope is a ratio. 2. Slope is change in y over change in x. 3. Slope can be positive or negative. 4. Similar triangles have the same proportions, but not necessarily the same size. **Modeling:** TW will draw a straight line on a graph. TW then draw a right triangle connecting to easily measurable points. TW ask the students to count with her the number of horizontal and vertical units are in the legs of the triangle. TW then introduce the concept of slope as that	SW review their pre-test results, and graph the number of items they got correct into their portfolio. SW discuss which content they already knew, and what they will learn over the course of this unit. SW repeat today's objective, and discuss how it will help them reach their Big Goal in Math. SW watch demonstration and interacts by counting units. SW writes slope on paper, and holds up, so teacher can CFU. SW make flashcard with definition of slope, run and rise.

	ratio of these units, as well as define “rise” and”run” in relation to changes in y and x. TW then repeat the process for a second triangle on the same line. **Guided Practice:** TW instruct students to draw a third triangle, calculate its slope, and then compare the slope of the third triangle to the first two. TW lead a discussion of what general rule can be derived from these observations. **Independent Practice:** TW provide additional equations, including examples with positive and negative slopes, for students to work on. TW provide scaffolding and support as needed. **Assessment:** TW use the Independent Assessment to track student mastery of the objective in a data tracker. The teacher will remediate for any student who does not show mastery. **Closure:** TW refer class back to today's objective, sharing what they learned today. TW assign the homework for tonight, http://www.mathsisfun.com/equation_of_line.html, which includes a review and ten problems.	SW use triangles to calculate the slope for a third similar triangle along the straight line. SW write in their Math Journal the general rule they have derived regaring similar triangles. SW fill out worksheets. Any student who does not show adequate mastery of this objective will meet with the teacher in a small group setting. SW listen to the homework assignment for the night.
2	**Activation of Prior Knowledge:** TW lead the class in a review of last night’s homework. TW review the difference between similar and congruent triangles. **Objective:** SW understand the difference between positive and negative slope relative to the the change of y to x. SW understand why similar triangles may have different slopes. **INM:** Key Points: 1. The simplified ratio of the vertical side length to the horizontal side length of each congruent triangle formed by the slope of a line is equivalent to the absolute value of the slope. 2. Length is always measured as a positive value. 3. Similar triangles have the same numeric slope, but it may be positive or negative, depending on orientation. **Modeling:** TW take a triangle used in the homework, and reverse its orientation. She will then calculate the slope for the reversed orientation. **Guided Practice:** TW give the students one of the problems which was	SW watch minireview, http://www.youtube.com/watch?v=rE11ojJFjPs SW repeat today’s objective, and discuss how it will help them reach their Big Goal in Math. SW actively watch demonstration. SW write observations in Math Journal. SW perform the guided practice, and hold up the number answer, so the

	in the homework set, reverse its orientation, and ask students to calculate its slope. TW collect several student graphs with negative slopes, hold them up in front of the class, and ask the students to describe any similarities they see in all the negative graphs. **Independent Practice:** TW ask the students to continue the practice with the rest of the homework examples from the previous night. TW ask student pairs to put their work on the board for the class. TW provide scaffolding and support as needed. **Assessment:** TW use the Independent Assessment to track student mastery of the objective in a data tracker. The teacher will remediate for any student who does not show mastery. **Closure:** TW refer class back to today's objectives, sharing what they learned today. TW will assign homework for the class, which is to write five equations in slope-intercept form on one side of a sheet, and graphs of the answers on the other side.	teacher can CFU. SW write in their Math Journals their observations about the meaning of negative slope, including graphs to illustrate. SW complete the independent practice. Student pairs put their answers on the board, and explain how they got their answers. SW listen to the homework assignment for the night.
3	**Activation of Prior Knowledge:** TW lead the class in a review of last night's homework. TW review the academic vocabulary learned yesterday. Then, TW direct students to review their notes in their Math Journal, and share what they wrote with a partner. **Objective:** SW understand the concept of y-intercept, be able to use it to go from an equation to a line, and vice versa. SW be able to derive the equation y = mx for a line through the origin. **INM:** Key Points: 1. An intercept is a point where a line crosses an axis. 2. If a line passes through the origin, the value of b is 0. 3. If a line passes through the origin, its equation is y = mx. **Modeling:** TW draw on the board a line that passes through the origin. She asks the students to calculate the slope of the line using the triangle method. She writes the y = mx + b formula, and puts in the slope that students calculate. She asks the students where the line intersects the y-axis, and writes in 0 for the b. She then rewrites the formula as y = mx.	SW will review their homework and flashcards. SW trade their equation sheet with a partner, answer the questions, and then compare their answers with their partner. SW read through their Math Journal notes, and share what they wrote with a partner. SW repeat today's objective, and discuss how it will help them reach their Big Goal in Math. SW actively listen to demonstration. SW calculate the the slope and locate the y-intercept as directed. SW make flashcards for m, b, run, rise and slope. SW work out the practice problems. SW ask/answer a partner a question about the day's lesson.

	Guided Practice: TW give the students practices problems with lines going through the origin, but with different slopes. Problems will be taking an equation and graphing it, and vice versa. **Independent Practice:** TW provide practice problems. TW provide scaffolding and support as needed. **Assessment:** TW use the Independent Assessment to track student mastery of the objective in a data tracker. The teacher will remediate for any student who does not show mastery. **Closure:** TW refer class back to today's objectives, sharing what they learned today. TW assign homework problems graphing lines with varying slopes.	Any student who does not show adequate mastery of this objective will meet with the teacher in a small group setting. SW listen to the homework assignment for the night.
4	**Activation of Prior Knowledge:** TW direct students to review their notes in their Math Journal, and share what they wrote with a partner. **Objective:** SW be able to derive the equation y = mx + b for a line through the y-axis. **INM:** Key Points: If a lines passes through the y-axis, its equation is y = mx + b. 2. If given an equation of the form y = mx +b, then the location of one point on the line is already known, (0, b). **Modeling:** TW draw on the board a line that passes through the y-axis. She asks the students to calculate the slope of the line using the triangle method. She writes the y = mx + b formula, and puts in the slope that students calculate. She asks the students where the line intersects the y-axis, and writes the answer in for b. **Guided Practice:** TW ask students to follow the same process for another line, but this one will pass through the y-axis on the other side of the origin. **Independent Practice:** TW provide problems, both going from equation to graph, and graph to equation. TW provide scaffolding and support as needed. **Assessment:** TW use the Independent Assessment to track student	SW will review their homework. SW read through their Math Journal notes, and share what they wrote with a partner. SW review vocabulary flashcards. SW repeat today's objective, and discuss how it will help them reach their Big Goal in Math. Any student who does not show adequate mastery of this objective will meet with the teacher in a small group setting. SW derive the equation for the line in the slope-intercept form. SW complete problems. SW write and trade review problems with a partner.

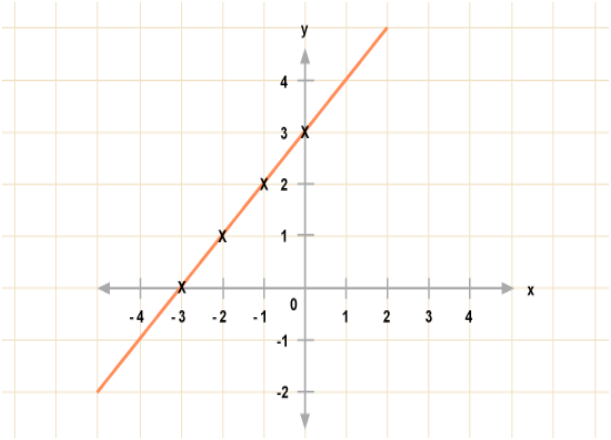
	mastery of the objective in a data tracker. The teacher will remediate for any student who does not show mastery. **Closure:** TW refer class back to today's objective, sharing what they learned today. Homework assignment is to review for the test.	SW plan when and where they will review for the test, and write it in their Math Journal.

Math Unit Summation Assessment

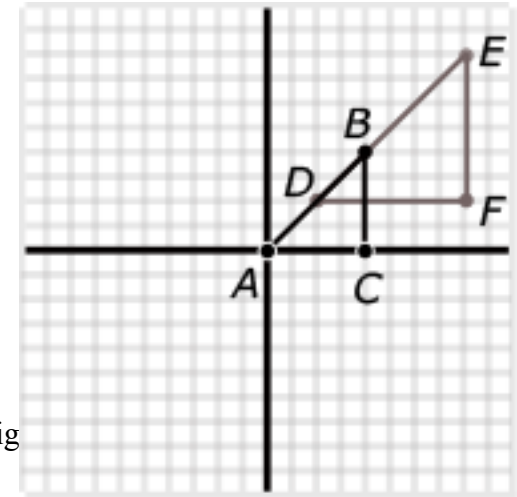
Name: _____

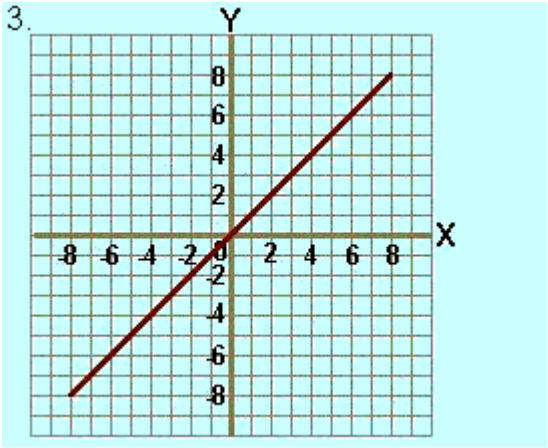
ADE 2010 Math Standard (CCSS):8. Expressions and Equations (EE). 6 Understand the connections between proportional relationships, lines, and linear equations.

1. Write the equation for this line in slope-intercept form.



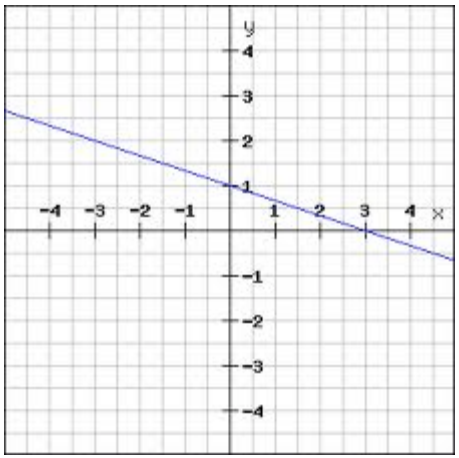
2. Points A, D, B and E are colinear. Show that segments AB and DE have the same slope.





3. Write the equation for the line above, using the slope-intercept formula.
4. Graph the line for the equation y = -1x.
5. Explain how it is possible for similar triangles to not have the same slope.

Use the graph below to answer both questions 6 and 7



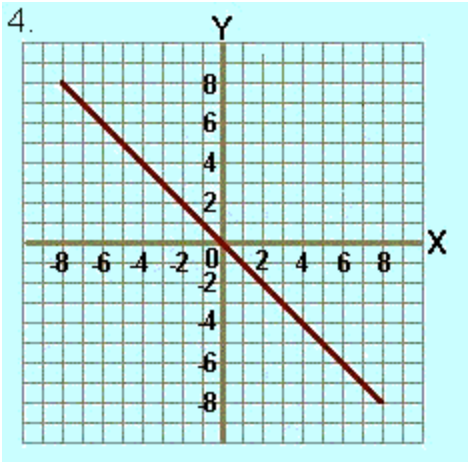
6. What is the y-intercept of the line in the graph?

7. What is the slope of the line in the graph?
8. To find the slope of a line, how many points are needed?
9. If a slope is negative, what is happening to the change in y, compared to the change in x?

Answer Key

1. y = x + 3 OR y = 1x + 3
2. Slope is equal to change in y divided by change in x. For segment AB, change in y = AC = 4 and x = BC = 4, so y/x = 4/4 = 1
   For segment DE, change in y = DF= 6 and x = EF = 6, so y/x = 6/6 = 1. Therefore, the slopes are the same.
3. y = x OR y = 1x OR y = x + 0 OR y = 1x + 0

4.



5. Length can only be positive, so the ratio of the lengths of the two side legs will be positive. However, the slope can be positive or negative. The ratio of the side lengths is the absolute value of the slope.
6. 1
7. -1/3
8. Two
9. y decreases as x increases

Score: _____/9 Grading Scale: 0-5 points= Falls Far Below; 6 points= Approaches; 7-8 points= Meets; 9 points= Exceeds