Eureka Remediation Tool: Grade 8
Module 4, Topic D

To become mathematically proficient, students **must** access on-grade-level content. This document aims to help teachers who use the Eureka curriculum to target remediation for students needing extra support before and **during** approaching on-grade-level work, creating opportunities for on-time remediation directly connected to the new learning.

About this Topic

Focus Standard:

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 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.*

c. Solve real-world and mathematical problems leading to two linear equations in two variables. *For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.*

Topic Overview per the Eureka Curriculum

Topic D introduces students to systems of linear equations by comparing distance-time graphs to determine which of two objects has greater speed (**8.EE.B.5**, **8.EE.C.8c**). Lessons 25–27 expose students to the possibilities for solutions of a system of linear equations. In Lesson 25, students graph two linear equations on a coordinate plane and identify the point of intersection of the two lines as the solution to the system (**8.EE.C.8a**). Next, students look at systems of equations that graph as parallel lines (**8.EE.C.8b**). In Lesson 26, students learn that a system can have no solutions because parallel lines do not have a point of intersection (**8.EE.C.8b**). Lesson 27 continues this thinking with respect to systems that have infinitely many solutions (**8.EE.C.8b**). In Lesson 28, students learn how to solve a system of equations using computational methods, such as elimination and substitution (**8.EE.C.8b**). In Lesson 29, students must use all of the skills of the module to transcribe written statements into a system of linear equations, find the solution(s) if it exists, and then verify that it is correct. Lesson 30 is an application of what students have learned about linear equations. Students develop a linear equation that represents the conversion between temperatures in Celsius to temperatures in Fahrenheit.

Overview

Eureka Remediation Tools include:

1. a diagnostic assessment to help teachers determine the misunderstandings or gaps in mathematical knowledge related to a specific Topic in the Eureka curriculum
2. guidance for teachers to analyze student work on the diagnostic assessment
3. suggested materials for targeted remedial instruction

Note: The use of this guidance is not intended to delay students' engagement with on-grade-level learning. On-grade-level learning should be the focus of instructional time and be treated as an opportunity for students to "finish" learning previous skills and deepen conceptual understanding.

Diagnostic Assessment

The diagnostic assessment is designed to be administered to targeted students prior to beginning instruction on the given Topic. When appropriate, it is broken into parts (Part A, Part B, and so on); each part addresses a different prerequisite standard and contains three problems. If a student correctly answers at least 2 out of the 3 problems, it can be assumed that he/she is ready to engage with the new content of the Topic with little to no support needed prior to engaging with the Topic. The diagnostic assessment is designed in this way so that teachers can determine the "entry point" to remedial instruction and/or opportunities for unfinished learning within the context of the new learning. The entry points and opportunities for unfinished learning will vary between students.

Guidance for Remediation

The Remediation Guidance is designed for teacher use. It is also broken into parts (Part A, Part B, and so on) and correlates to the parts on the diagnostic assessment. Each part contains the following:

1. **The focus standard**: The focus standards are strategically chosen to address prerequisite skills and are purposefully arranged in the order that students typically master the skills and knowledge.
2. **Why this is important for current grade level work**: This section describes how the work of the prerequisite standard relates to the standard(s) addressed in the Topic of instruction.
3. **Using the diagnostic assessment to identify gaps**: This section identifies common errors students make on the diagnostic assessment items.
4. **Remediation Resources for Targeted Instruction**: The resources pinpoint specific Eureka lessons and parts of lessons for teachers to use to address gaps in mathematical knowledge. Using Eureka materials to address remediation ensures alignment to the standards, consistency in approach to learning, and similarities in strategies for solving problems.

Part A: 6.EE.B.5

Use the set $\left\{0, \frac{1}{2}, \frac{11}{4}, 7.2\right\}$ to determine, by substitution, if any member(s) of the set is a solution to each of the equations below. Show your work and explain your solution.

1. $x + \frac{1}{4} = 3$

2. $11.75 - k = 9$

3. $4x - 11 = 0$

Solutions:

1. $\frac{11}{4}$; explanations will vary but must reference that this value makes the equation true (or satisfies the equation)

2. $\frac{11}{4}$; explanations will vary but must reference that this value makes the equation true (or satisfies the equation)

3. $\frac{11}{4}$; explanations will vary but must reference that this value makes the equation true (or satisfies the equation)

Part A Focus: 6.EE.B.5: Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.

Why this is important for current grade level work: Topic D provides students with their first ever experience with systems of equations, focusing on systems of two linear equations. In Lesson 25 students combine their understanding of the solution to a single-variable equation and the graph of a two-variable equation as the plot of all of the equation's solutions to gain an understanding of the solution to a system of equations as the point of intersection. Students reason that the point of intersection is the ordered pair that satisfies (i.e., makes true) both equations simultaneously. Without a solid understanding of 6.EE.B.5, students will not be able to make this connection, leaving them at a severe disadvantage for the remainder of the target Topic. Students who fail to conceptualize the point of intersection as the solution to a system will likely not understand the methods for solving a system nor the idea that the solution requires two-values, one for each unknown. While the arithmetic skills needed to answer the problems in the set are important, the most important look-for is the students' ability to explain what constitutes a solution to a single-variable equation.	**Remediation Resources for Targeted Instruction:** 6th Grade, Module 4, Topic G, Lesson(s) 23 – 25 Use the Classwork portion of each of the Lessons and a sampling of problems from the Problem Set focused on conceptual understanding.
Using the Diagnostic Assessment to identify gaps: **Problems 1 – 3:** Look for students who use their algebraic skills to solve each equation as opposed to using substitution as the directions indicate. Such students may not fully understand the solution to a single-variable equation but only know some series of steps needed to isolate a variable. While the algebraic skills will serve them well later in the target Topic, lacking the understanding of what makes a solution will negatively impact students as they engage with the new learning of the target Topic.	