Eureka Acceleration Tool: Grade 6
Module 1, Topic C

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

About this Topic

Focus Standards:

6.RP.A.2: Understand the concept of a unit rate a/b associated with a ratio *a*:*b* with $b \neq 0$, and use rate language in the context of a ratio relationship. *For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is 3/4 cup of flour for each cup of sugar." "We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger."*

6.RP.A.3: Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

b. Solve unit rate problems including those involving unit pricing and constant speed. *For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what unit rate were lawns being mowed?*
d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.

Topic Overview per the Eureka Curriculum

In Topic C, students apply their understanding of ratios and the *value of a ratio* as they come to understand that a ratio relationship of 5 *miles to* 2 *hours* corresponds to a rate of 2.5 *miles per hour*, where the unit rate is the numerical part of the rate, 2.5, and miles per hour is the newly formed unit of measurement of the rate (**6.RP.A.2**). Throughout Topic C, students continue to make use of the representations and diagrams of Topics A and B as they investigate the concepts of this topic within the context of real-world rate problems. In Lesson 16, students develop their vocabulary and conceptual understanding of rate as they work through and discuss problems that require expressing simple ratios as rates using phrases such as 'per', 'for each' and 'for every'. In Lesson 17, students reinforce their understanding as they see problems for the first time where the ratio relationship is expressed in rate form. Students are asked to verbalize and depict the underlying ratio relationship as a collection of equivalent ratios.

In Lesson 18, students generalize the process for finding a rate and define the term *unit rate* relating it to the *value of a ratio*. In the remaining lessons of Topic C, students solve unit rate problems involving unit pricing, constant speed, and constant rates of work (**6.RP.A.3b**). They combine their new understanding of rate to connect and revisit concepts of converting among different-sized standard measurement units (**5.MD.A.1**). They then expand upon this background as they learn to manipulate and transform units when multiplying and dividing quantities (**6.RP.A.3d**). In Lessons 19–20, students are conscientious consumers, and comparison shop by comparing unit prices and converting measurement units as needed. For instance, when comparing a 10-ounce bag of salad that sells for $2.25 to a 1-pound bag of salad that retails for $3.50, students recognize that in addition to finding a unit price, they must convert pounds to ounces for an accurate comparison.

In Lessons 21–22, students conduct real-world simulations that generate rates related to speed and work. In doing so, students begin to view math as a tool for solving real-life problems. Topic C concludes with Lesson 23, in which students draw upon their experiences in previous modeling lessons to demonstrate their ability to problem-solve using rates, unit rates, and conversions.

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Overview

Eureka Acceleration 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 Acceleration

The Acceleration 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. **Acceleration 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 acceleration ensures alignment to the standards, consistency in approach to learning, and similarities in strategies for solving problems.

Part A: 5.MD.A.1:
For the following three questions, use a model and/or show or explain how you got your answer.

1. How many meters are in 350 centimeters?

2. If there are 20 quarts in 5 gallons, how many quarts are in 1 gallon?

3. Suzy is making an apple pie and her recipe calls for 40 oz of apples. At the grocery store, apples are sold in pounds. If there are 16 ounces in 1 pound, how many pounds of apples should Suzy buy?

Part B: 5.NF.B.3
4. Write the following fraction as a whole number. Use a division sentence to explain how you determined your answer:

$$\frac{15}{3}$$

5. A landscaper has 120 bags of fertilizer that he will use on building flowerbeds for his customers. If the landscaper has 25 customers, how many bags will he be able to use for each customer?

6. Sarah is making cookies for her school party. The recipe calls for 9 cups of flour to make four batches of cookies. If each batch of cookies uses an equal amount of flour, how many cups of flour should Sarah use for each batch of cookies?

Solutions:

1. $3\frac{1}{2}$
2. 4
3. $2\frac{1}{2}$
4. 5; 15 divided by 3 is 5.
5. $4\frac{20}{25}$ or $4\frac{4}{5}$
6. $\frac{9}{4}$ or $2\frac{1}{4}$

Part A Focus: 5.MD.A.1: Convert among different-sized standard measurement units within a given measurement and use the conversions in solving multi-step, real-world problems (e.g. convert 5 cm to 0.5 m; 9 ft to 108 in).

Why this is important for current grade level work:
When solving ratio and rate problems, students will link their prior knowledge of measurement conversions to equivalent ratios by using ratio tables and tape diagrams to discover the multiplicative relationship between equivalent units. Building upon their understanding of multiplicative comparison as it relates to measurement conversions will help students understand that the value of a ratio is a unit rate. Students should be taught that the unit rate is an expression of all equivalent ratios as it relates to the units and can therefore be applied to convert between the two units when one value is known. For example, using the rate of 12 inches per foot, students will determine the value of the ratio of 12:1 is 12. Furthermore, if there are 12 inches in every 1 foot, then there must be 18 inches in 1 ½ feet because 18 is 1 whole group of 12 and ½ of a group of 12; therefore, 18 divided by 12 is 1 ½ and 18/12 is 1 1/2. It is important that students can connect the relationship between a multiplication expression, division expression and value of the ratio.

Using the Diagnostic Assessment to identify gaps:

Problem 1:
Look to see if students use an additive strategy or a multiplicative strategy to find the equivalent measurement. Students may use a tape diagram to determine equivalence.

Problem 2:
In problem 2, students should divide 20 by 5 to determine that there are 4 quarts in 1 gallon. In sixth grade, this is one strategy for finding the value of the ratio and/or the unit rate. Higher students may use their knowledge from Topic A and B to set up equivalent ratios to find the number of quarts per 1 gallon.

Problem 3:
Look to see how students interpret the remainder. Do they round up to 3 pounds, round down to 2 pounds or do they see the leftover ounces as part of a whole pound. Students should determine that if there are 16 ounces in 1 pound, then 8 ounces must be ½ of a pound. Also take note as to whether students leave the fraction as 8/16 or convert is to ½. ½ of a pound is more relative for the context of this situation.

Acceleration Resources for Targeted Instruction:

5th Grade, Module 2, Topic D, Lesson(s) 13 - 15

Use the Concept Development portion of each Lesson and a sampling of problems from the Problem Set that focus on conceptual understanding and application.

Part B Focus: 5.NF.B.3: Interpret a fraction as division of the numerator by the denominator (a/b = a ÷ b). Solve word problems involving division of whole numbers leading to an answer in the form of fractions or mixed numbers, e.g. by using visual fraction models or equations to represent the problem.

Why this is important for current grade level work:
In Topic C students move from ratios to rates to unit rates, leveraging their understanding of fractions to compute unit rates (i.e., the value of a ratio a:b expressed as a/b). Given that ratios require quantities which require context students should be comfortable solving word problems involving division. The three problems presented here are foundational to the problems presented to students in this Topic.

** NOTE: This standard is also a foundation standard for Module 1, Topic A. While there are some differences in the questions and the importance for grade level work as it relates to Topic C, It may not be necessary to identify gaps for this standard if you have already done so.

Using the Diagnostic Assessment to identify gaps:

Problem 4:
Pay attention to the model and the explanation. On-level students will use division or informal proportional reasoning. For example, if there are 15-thirds and every 3/3 is 1 whole then 15/3 is 5 wholes. If students use division, take note as to whether it is due to conceptual understanding (similar to example stated above) or because they are following a rule for converting between fractions greater than St1 and whole numbers.

Problem 5:
Students should interpret the remainder as a fraction of a bag per customer. Students may simplify the fraction to 4 4/5 or leave it as 4 20/25.

Problem 6:
Students should determine that nine cups of flour need to be divided into four equal groups. Students may leave the answer as 9/4 = 2 ¼ cup of flour while others may divide 9 by 4 and get 2 ¼.

Acceleration Resources for Targeted Instruction:

5th Grade, Module 4, Topic B, Lesson(s) 2 - 5

Use the Concept Development portion of each Lesson and a sampling of problems from the Problem Set focused on conceptual understanding and application. Lesson 5 is solely devoted to application, using items analogous to items 4-6 on the diagnostic.