# Eureka Acceleration Tool: Grade 4
# Module 5, 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 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:**

**4.NF.B.3** Understand a fraction a/b with a > 1 as a sum of fractions 1/b.

> **a**. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.
>
> **d**. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.

**Topic Overview per the Eureka Curriculum**

Topic D bridges students' understanding of whole number addition and subtraction to fractions. Everything that they know to be true of addition and subtraction with whole numbers now applies to fractions. Addition is finding a total by combining like units. Subtraction is finding an unknown part. Implicitintheequations3+2=5and2=5–3isthe assumption that the numbers are referring to the *same* units.

In Lessons 16 and 17, students generalize familiar facts about whole number addition and subtraction to work with fractions. Just as 3 apples – 2 apples = 1 apple, students note that 3 fourths –2 fourths = 1 fourth. Just as 6 days + 3 days = 9 days = 1 week 2 days, students note that 6/7 + 3/7 = 9/7 = 7/7 + 2/7 = 1 2/7. In Lesson 17, students decompose a whole into a fraction having the same denominator as the subtrahend. For example, 1 – 4 fifths becomes 5 fifths – 4 fifths = 1 fifth, connecting with Topic B skills. They then see that, when solving 1 2/5 – 4/5, they have a choice of subtracting 4/5 from 7/5 or from 1 (as pictured ~~to the right~~). Students model with tape diagrams and number lines to understand and then verify their numerical work.

In Lesson 18, students add more than two fractions and see sums of more than one whole, such as 2/8 + 5/8 + 7/8 = 14/8. As students move into problem solving in Lesson 19, they create tape diagrams or number lines to represent and solve fraction addition and subtraction word problems (see the example below). These problems bridge students into work with mixed numbers, which follows the Mid-Module Assessment.

In Lessons 20 and 21, students add fractions with related units, where one denominator is a multiple (or factor) of the other. To add such fractions, a decomposition is necessary. Decomposing one unit into another is familiar territory: Students have had ample practice composing and decomposing in Topics A and B when working with place value units, converting units of measurement, and using the distributive property. For example, they have converted between equivalent measurement units (e.g., 100 cm = 1 m), and they have used such conversions to do arithmetic (e.g., 1 meter – 54 centimeters). With fractions, the concept is the same. To find the sum of ½ and ¼ one simply

renames (converts, decomposes) ½ as 2/4 and adds: 2/4 + ¼ = ¾. All numerical work is accompanied by visual models that allow students to use and apply their known skills and understandings. The addition of fractions with related units is also foundational to decimal work when adding tenths and hundredths in Module 6. Please note that addition of fractions with related denominators is not assessed.

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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. 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: 2.OA.A.1

1. Lisa ran 24 laps in the first week of track practice and 32 laps in the second week of practice. How many total laps did she run in the two weeks? Use a tape diagram or equation with a symbol for the unknown number to represent the problem.

2. Darrick received 50 dollars for his birthday. He spent 27 dollars and saved the rest. How much money did he save? Use a tape diagram or equation with a symbol for the unknown number to represent the problem.

3. Lindsey worked 32 math problems, and Jason worked 47 math problems. How many more math problems did Jason work than Lindsey? Use a tape diagram or equation with a symbol for the unknown number to represent the problem.

Part B: 3.NF.A.1

4. What fraction of the model is shaded? Explain your thinking.

5. Lilla cuts her pancake into 8 equal size pieces and eats 6 of the pieces. What fraction of her pancake did Lilla eat? Use a visual fraction model to support your answer.

6. Evangeline is painting stripes on one wall in her bedroom. She divides the wall into 5 equal size parts and paints three of the parts yellow. What fraction of the wall is not yellow? Use a visual fraction model to support your answer.

Solutions:

1. 56
2. 23
3. 15
4. $\frac{3}{6}$ or $\frac{1}{2}$
5. $\frac{6}{8}$ or $\frac{3}{4}$
6. $\frac{2}{5}$

**Part A Focus: 2.OA.A.1.** Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

<table>
<tr><td colspan="3">Why this is important for current grade level work:<br>This standard is the last standard dedicated to solving word problems using only addition and subtraction. In Grade 4 students begin to add and subtract fractions (with like denominators), extending the work in Lesson 19 to solving word problems involving addition and subtraction of fractions. These items will show which students can easily engage with context and use math to model a real-world situation. Look for students who struggle to get started and/or students who use the incorrect operation to solve the problem as this will highlight a gap in a student’s ability to assess the reasonableness of his/her answer. Students should feel comfortable using a visual model and/or equation to model the situation and aid them in solving the problem.</td><td rowspan="2">Acceleration Resources for Targeted Instruction:<br><br><u>2nd Grade, Module 4, Topic A, Lesson 5</u><br><br>Use the Concept Development portion of the Lesson and a sampling of problems from the Problem Set focused on application.</td></tr>
<tr><td colspan="3">Using the Diagnostic Assessment to identify gaps:</td></tr>
<tr><td>Problem 1:<br>Look for students who get the correct total but are unable to model the situation. Such a student may struggle as the word problems and arithmetic become more complex.</td><td>Problem 2:<br>A student may make a calculation error and still be considered ready for the target standard. Look for the accuracy of their model.</td><td>Problem 3:<br>Look for students who add instead of subtracting, associating the word “more” with addition. Other students may associate the word “more” with a comparison, not realizing the problem is calling for subtraction.</td></tr>
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**Part B Focus: 3.NF.A.1.**Understand a fraction 1/*b*, with denominators 2, 3, 4, 6, and 8, as the quantity formed by 1 part when a whole is partitioned into *b* equal parts; understand a fraction *a*/*b* as the quantity formed by *a* parts of size 1/*b*.

**Why this is important for current grade level work:**
This foundational standard focuses on understanding a fraction a/b, where a > 1, as a fraction formed by a parts of size 1/b. This understanding on non-unit fractions will form the basis for students adding and subtracting fractions, combining parts of the same whole. Beginning in Lesson 16, students will use visual models to support their developing understanding of adding and subtracting fractions, moving towards solving word problems involving addition and subtraction of fractions beginning in Lesson 19. Providing problems in and out of context will help identify for which parts of the target topic students are ready.

**Using the Diagnostic Assessment to identify gaps:**

**Problem 4:**
Students can use either 3/6 or ½ and be considered ready for the target standard. Students who cannot correctly identify the shaded portion are likely not ready to begin Lesson 16 and should spend some time in the acceleration lessons prior to beginning the target topic.

**Problem 5:**
Students can use either 6/8 or ¾ and be considered ready for the target standard. Students who struggle with this problem are likely not ready for Lesson 19 and should spend some time in the acceleration lessons, focusing on problems in context, prior to Lesson 19.

**Problem 6:**
Look for students who report the number of yellow sections, not understanding the question is asking for sections that are not yellow. Such students should be considered ready for Lesson 19 but will likely need additional supports while moving through the lesson.

**Acceleration Resources for Targeted Instruction:**

3rd Grade, Module 5, Topic B, Lesson(s) 5 – 7

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