

Eureka Acceleration Tool: Grade 5

Module 3, Topic B

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:

5.NF.A.1: Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. *For example, $\frac{2}{3} + \frac{5}{4} = \frac{8}{12} + \frac{15}{12} = \frac{23}{12}$. (In general, $\frac{a}{b} + \frac{c}{d} = \frac{ad + bc}{bd}$.)*

5.NF.A.2: Solve word problems involving addition and subtraction of fractions.

- a. Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem.

Topic Overview per the Eureka Curriculum

In Topic B, students use the familiar rectangular fraction model to add and subtract fractions with unlike denominators.

Students make like units for all addends or both minuend and subtrahend. First, they draw a wide rectangle and partition it with vertical lines as they would a tape diagram, representing the first fraction with a bracket and shading. They then partition a second congruent rectangle with horizontal lines to show the second fraction. Next, they partition both rectangles with matching lines to create like units.

This strategy pictorially proves 3 sixths are equal to 1 half and 2 sixths are equal to 1 third. Students practice making these models extensively until they internalize the process of making like units. Students use the same systematic drawing for addition as they do for subtraction. In this manner, students are prepared to generalize with understanding to multiply the numerator and denominator by the same number. The topic closes with a lesson devoted to solving two-step word problems involving addition and subtraction of fractions.

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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

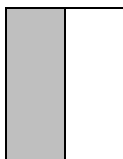
The Acceleration Guidance is designed for teacher use. It is also broken into parts (Part A, Part B, and so on) and correlates to the parts on the diagnostic assessment. Each part contains the following:

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.

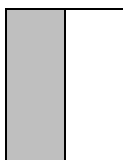
Diagnostic Assessment: Grade 5 Eureka Module 3, Topic B

Part A: 4.NF.A.1

1.



What fraction of the model is shaded? _____



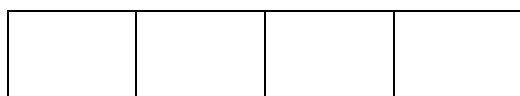
Draw an additional line(s) on the model to create an equivalent fraction.
What fraction did you create? _____

2. The rectangle below is divided into equal parts. Shade some of the parts.



a. What fraction did you create? _____

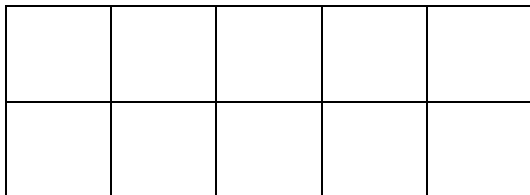
Use the model below to create an equivalent fraction for the fraction you created in 2a.



b. What equivalent fraction did you create? _____

Diagnostic Assessment: Grade 5 Eureka Module 3, Topic B

3. In the figure below, how many small squares need to be shaded so that $\frac{2}{5}$ of the figure is shaded? Illustrate and/or explain your thinking.



Part B: 4.NF.B.3a – Addition

2. Find the sum.

$$\frac{1}{3} + \frac{1}{3} =$$

3. Fill in the blank to complete the equation.

$$\frac{4}{5} = \frac{3}{5} + \underline{\hspace{2cm}}$$

6. Fill in the blank to complete the equation.

$$\frac{5}{4} = \underline{\hspace{2cm}} + \frac{2}{4}$$

Part C: 4.NF.B.3a – Subtraction

7. Find the difference.

$$\frac{3}{4} - \frac{1}{4} = \underline{\hspace{2cm}}$$

8. Fill in the blank to complete the equation.

$$\frac{3}{6} - \underline{\hspace{2cm}} = \frac{2}{6}$$

Diagnostic Assessment: Grade 5 Eureka Module 3, Topic B

9. Fill in the blank to complete the equation.

$$\underline{\hspace{1cm}} - \frac{5}{8} = \frac{4}{8}$$

Part C: 4.NF.B.3c – Addition

10. Find the sum.

$$2\frac{1}{3} + 1\frac{1}{3} =$$

11. Fill in the blank to complete the equation.

$$3\frac{4}{5} = \underline{\hspace{1cm}} + 1\frac{2}{5}$$

12. Fill in the blank to complete the equation.

$$5\frac{1}{4} = \frac{3}{4} + \underline{\hspace{1cm}}$$

Part D: 4.NF.B.3c – Subtraction

13. Find the difference.

$$4\frac{3}{4} - 1\frac{1}{4} = \underline{\hspace{1cm}}$$

14. Fill in the blank to complete the equation.

$$2\frac{3}{6} - \underline{\hspace{1cm}} = \frac{2}{6}$$

15. Fill in the blank to complete the equation.

$$\underline{\hspace{1cm}} - 1\frac{7}{8} = 3\frac{2}{8}$$

Diagnostic Assessment: Grade 5

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Part E: 4.NF.B.3d

16. Your mom baked you and your friends a pan of brownies. You give $\frac{2}{6}$ of the pan of brownies to your friend Becky and $\frac{2}{6}$ of the pan of brownies to your friend Jason. How much of the pan of brownies did you give away in all? Illustrate and/or explain the calculation by using words, an equation, and/or visual models.
17. James had $1\frac{1}{4}$ pizzas left over from his birthday party. He gave his sister $\frac{2}{4}$ of a pizza. How much pizza did he have after sharing with his sister? Illustrate and/or explain the calculation by using words, an equation, and/or visual models.
18. Alejandro and Jackson started a lemonade stand to raise money. They donated $\frac{2}{10}$ of their profits to the local pet shelter, $\frac{3}{10}$ of their profits went to the town library, and they gave $\frac{1}{10}$ of their profits to the local veteran's charity. They saved the rest of the money to buy materials for their next project. What fraction of the money did they keep for materials? Illustrate and/or explain the calculation by using words, an equation, and/or visual models.

Diagnostic Assessment Key: Grade 5 Eureka Module 3, Topic B

1. $\frac{1}{2}$; Answers will vary but must be equivalent to $\frac{1}{2}$.
2. Answers will vary.
3. $\frac{4}{10}$
4. $\frac{2}{3}$
5. $\frac{1}{5}$
6. $\frac{3}{4}$
7. $\frac{2}{4}$ or $\frac{1}{2}$
8. $\frac{1}{6}$
9. $\frac{9}{8}$
10. $3\frac{2}{3}$
11. $2\frac{2}{5}$
12. $4\frac{2}{4}$ or $4\frac{1}{2}$
13. $3\frac{2}{4}$ or $3\frac{1}{2}$
14. $2\frac{1}{6}$
15. $5\frac{1}{8}$
16. $\frac{4}{6}$ or $\frac{2}{3}$
17. $\frac{3}{4}$
18. $\frac{4}{10}$ or $\frac{2}{5}$

Acceleration Guidance: Grade 5 Eureka Module 3, Topic B

Part A Focus: 4.NF.A.1. Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions. (Denominators are limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100.)

Why this is important for current grade level work: This 4 th grade standard does not call for students to use an algorithm for finding equivalent fractions. In Grade 4 students’ experiences focus on fraction models, rather than algorithms. In Grade 5 students will use their understanding of visual fraction models to move into a more procedural method for creating equivalent fractions, leading them to add/subtract fractions with unlike denominators. The topic directly preceding the target topic focuses on creating equivalent fractions, while this topic leverages that skill, beginning in Lesson 3, to help students add and subtract fractions with unlike denominators. The problems scaffold in difficulty.			Acceleration Resources for Targeted Instruction: <u>4th Grade, Module 5, Topic B, Lessons 7 - 11</u> Use the Concept Development portion of each Lesson and a sampling of problems from the Problem Set that focus on conceptual understanding.		
Using the Diagnostic Assessment to identify gaps: <table><tr><td>Problem 1: Students should be able to identify the visual as $\frac{1}{2}$, and then create an equivalent fraction (e.g., $\frac{2}{4}$) by drawing a horizontal line(s). Look for students who do not create equal sized parts. Also, look for students who name the fractions part/part instead of part/whole. (e.g., $\frac{1}{1}$ and $\frac{2}{2}$) These students do not have a fundamental understanding of fractions and should not be considered ready for the target standard.</td><td>Problem 2: This problem scaffolds in difficulty, because the student is now creating the fraction and the equivalent fraction. Students who accurately create an equivalent fraction should be considered ready for the target standard.</td><td>Problem 3: Look for accuracy in the answer for this question. Students who answer this question correctly should be considered ready for the target standard.</td></tr></table>				Problem 1: Students should be able to identify the visual as $\frac{1}{2}$, and then create an equivalent fraction (e.g., $\frac{2}{4}$) by drawing a horizontal line(s). Look for students who do not create equal sized parts. Also, look for students who name the fractions part/part instead of part/whole. (e.g., $\frac{1}{1}$ and $\frac{2}{2}$) These students do not have a fundamental understanding of fractions and should not be considered ready for the target standard.	Problem 2: This problem scaffolds in difficulty, because the student is now creating the fraction and the equivalent fraction. Students who accurately create an equivalent fraction should be considered ready for the target standard.
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Acceleration Guidance: Grade 5 Eureka Module 3, Topic B

Part B Focus: 4.NF.B.3a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. *Example:* $\frac{3}{4} = \frac{1}{4} + \frac{1}{4} + \frac{1}{4}$.

Why this is important for current grade level work: Beginning in the first lesson of the target topic, Lesson 3, students will add fractions with unlike denominators by creating equivalent problems with like denominators. Students must be fluent in finding sums of fractions with like denominators to be able to find sums of fractions with unlike denominators. The most important look-fors here are the accuracy of their answer and the efficiency of their strategy. The problems scaffold in difficulty.			Acceleration Resources for Targeted Instruction: <u>4th Grade, Module 5, Topic D, Lesson(s) 16 - 18</u> Use the Concept Development portion of each Lesson and a sampling of problems from the Problem Set focused on conceptual understanding and/or procedural skill and fluency (addition only).		
Using the Diagnostic Assessment to identify gaps: <table><tr><td>Problem 4: Look for students who believe fractions' numerators and denominators can be treated as separate whole numbers. Students who believe this will answer this question with 2/6 (1+1=2 and 3+3=6). This shows a limited and/or incomplete understanding of fractions.</td><td>Problem 5: Students who answer this question accurately should be considered ready for the target standard.</td><td>Problem 6: Some students may struggle with handling the sum of 5/4, thinking that fractions cannot have a larger numerator than denominator. Use a visual fraction model to help students see that improper fractions simply refer to more than a single whole.</td></tr></table>				Problem 4: Look for students who believe fractions' numerators and denominators can be treated as separate whole numbers. Students who believe this will answer this question with 2/6 (1+1=2 and 3+3=6). This shows a limited and/or incomplete understanding of fractions.	Problem 5: Students who answer this question accurately should be considered ready for the target standard.
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Acceleration Guidance: Grade 5 Eureka Module 3, Topic B

Part C Focus: 4.NF.B.3a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. *Example:* $\frac{3}{4} = \frac{1}{4} + \frac{1}{4} + \frac{1}{4}$.

Why this is important for current grade level work: Beginning in Lesson 5, students will subtract fractions with unlike denominators by creating equivalent problems with like denominators. Students must be fluent in finding differences of fractions with like denominators to be able to find differences of fractions with unlike denominators. The most important look-fors here are the accuracy of their answer and the efficiency of their strategy. The problems scaffold in difficulty.			Acceleration Resources for Targeted Instruction: <u>4th Grade, Module 5, Topic D, Lesson(s) 16 - 18</u> Use the Concept Development portion of each Lesson and a sampling of problems from the Problem Set focused on conceptual understanding and/or procedural skill and fluency (addition only).		
Using the Diagnostic Assessment to identify gaps: <table><tr><td>Problem 7: As with addition, look for students who believe fractions' numerators and denominators can be treated as separate whole numbers. Students who believe this will answer this question with 2/0. (3-1=2 and 4-4=0) This shows a limited and/or incomplete understanding of fractions. Note, 2/4 is an acceptable answer showing readiness for the target standard.</td><td>Problem 8: Students who answer this question accurately should be considered ready for the target standard.</td><td>Problem 9: Some students may struggle with the minuend being an improper fraction, thinking that fractions cannot have a larger numerator than denominator. Use a visual fraction model to help students see that improper fractions simply refer to more than a single whole.</td></tr></table>				Problem 7: As with addition, look for students who believe fractions' numerators and denominators can be treated as separate whole numbers. Students who believe this will answer this question with 2/0. (3-1=2 and 4-4=0) This shows a limited and/or incomplete understanding of fractions. Note, 2/4 is an acceptable answer showing readiness for the target standard.	Problem 8: Students who answer this question accurately should be considered ready for the target standard.
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Acceleration Guidance: Grade 5 Eureka Module 3, Topic B

Part D Focus: 4.NF.B.3c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.

Why this is important for current grade level work: Lesson 4 calls for students to add fractions with sums between 1 and 2, which will include mixed numbers. Students ability to add mixed numbers with common denominators will directly impact their ability to add mixed numbers with unlike denominators. These problems will help you identify which students struggle to appropriately handle the wholes, either by working with them separately or by creating equivalent improper fractions. The most important look-fors here are the accuracy of their answer and the efficiency of their strategy. The problems scaffold in difficulty.			Acceleration Resources for Targeted Instruction: <u>4th Grade, Module 5, Topic F, Lesson(s) 30 - 31</u> Use the Concept Development portion of each Lesson and a sampling of problems from the Problem Set focused on conceptual understanding and/or procedural skill and fluency.		
Using the Diagnostic Assessment to identify gaps: <table><tr><td>Problem 10: Like Part B, look for students who believe fractions' numerators and denominators can be treated as separate whole numbers. Also, look for students who struggle with adding the wholes. This shows a limited and/or incomplete understanding of fractions and/or mixed numbers.</td><td>Problem 11: Students who answer this question accurately should be considered ready for the target standard.</td><td>Problem 12: Some students may struggle to identify the missing addend since the sum requires regrouping to form a new whole. Such students will likely benefit from a visual fraction model.</td></tr></table>				Problem 10: Like Part B, look for students who believe fractions' numerators and denominators can be treated as separate whole numbers. Also, look for students who struggle with adding the wholes. This shows a limited and/or incomplete understanding of fractions and/or mixed numbers.	Problem 11: Students who answer this question accurately should be considered ready for the target standard.
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Acceleration Guidance: Grade 5 Eureka Module 3, Topic B

Part E Focus: 4.NF.B.3c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.

Why this is important for current grade level work:

Lesson 6 calls for students to subtract fractions from numbers between 1 and 2, which will include mixed numbers. Students' ability to subtract mixed numbers with common denominators will directly impact their ability to subtract mixed numbers with unlike denominators. These problems will help you identify which students struggle to appropriately handle the wholes, either by working with them separately or by creating equivalent improper fractions. The most important look-fors here are the accuracy of their answer and the efficiency of their strategy. The problems scaffold in difficulty.

Using the Diagnostic Assessment to identify gaps:

Problem 13:

Like Part C, look for students who believe fractions' numerators and denominators can be treated as separate whole numbers. Also, look for students who struggle with subtracting the wholes. This shows a limited and/or incomplete understanding of fractions and/or mixed numbers.

Problem 14:

Students who answer this question accurately should be considered ready for the target standard.

Problem 15:

Some students may struggle to identify the missing minuend since the problem requires decomposing a whole. Such students will likely benefit from a visual fraction model.

Acceleration Resources for Targeted Instruction:

4th Grade, Module 5, Topic F, Lesson(s) 32 - 34

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

Acceleration Guidance: Grade 5 Eureka Module 3, Topic B

Part F Focus: 4.NF.B.3d. 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.

Why this is important for current grade level work: This standard does not call for the standard algorithm, so students may engage with these problems in a variety of ways. The most important look-fors here are the accuracy of the answer, the efficiency of the strategy, and if students choose the appropriate operation(s) for each problem. The problems scaffold in difficulty.			Acceleration Resources for Targeted Instruction: <u>5th Grade, Module 2, Topic F, Lesson(s) 20 - 23</u> Use the Concept Development portion of each Lesson and a sampling of problems from the Problem Set focused on procedural skill and fluency.		
Using the Diagnostic Assessment to identify gaps: <table><tr><td>Problem 16: Students should recognize the operation of addition is needed to solve this problem. Students who are familiar with simplifying fractions might simplify the 4/6 to 2/3; however, this is not requires to be identified as ready for the target standard.</td><td>Problem 17: Students should recognize that subtraction is needed to solve this problem. Students may need to use a visual fraction model to solve and should still be considered ready for the target standard.</td><td>Problem 18: Look for students who answer 6/10 for this problem. Those students added the fraction of money that was given away correctly, but did not recognize that they needed to subtract that number from 10/10 to get the fraction of the money they kept to buy materials, which is 4/10. Such students should be allowed to engage with Lesson 7 but may need additional support during the lesson.</td></tr></table>				Problem 16: Students should recognize the operation of addition is needed to solve this problem. Students who are familiar with simplifying fractions might simplify the 4/6 to 2/3; however, this is not requires to be identified as ready for the target standard.	Problem 17: Students should recognize that subtraction is needed to solve this problem. Students may need to use a visual fraction model to solve and should still be considered ready for the target standard.
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