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MISSISSIPPI
EXEMPLAR
Units & Lessons
MATHEMATICS

Grade 5

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MISSISSIPPI DEPARTMENT OF EDUCATION

P.O. Box 771 | Jackson, MS | 39205-0771
Tel (601) 359-2586
www.mde.k12.ms.us
Twitter: @MissDeptEd

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Director, Office of Human Resources

MISSISSIPPI DEPARTMENT OF EDUCATION

359 North West Street, Suite 203

Jackson, Mississippi 39201

(601) 359-3511

Acknowledgements

Mississippi Exemplar Units and Lessons Project Leads

The Mississippi Department of Education gratefully acknowledges the following individuals for their leadership in the development of the Mississippi Exemplar Units and Lessons.

Dr. Nathan Oakley
Chief Academic Officer

Devin Boone
Office of Professional Development Program Manager

Barbara Bowen
ELA Professional Development Coordinator

Elise Brown
Math Professional Development Coordinator

Wendy Clemons
Office of Professional Development Executive Director

Dana Danis
Office of Secondary Education ELA Curriculum Specialist

Dr. Marla Davis
Office of Secondary Education Bureau Director

Joyce Greer
Office of Early Childhood Instructional Specialist

Kristi Higginbotham
Special Education Professional Development Coordinator

Dr. Felicia Jackson-Stewart
ELA Professional Development Coordinator

Ashley Kazery
ELA Professional Development Coordinator

Kristina Livingston
Professional Development Coordinator Director

Celeste Maugh
Math Professional Development Coordinator

Tanjanikia McKinney
Science Professional Development Coordinator

Jennifer Nance
Office of Secondary Education Office Director II

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Mississippi Exemplar Units and Lessons Developers and Contributors

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Kimberlee Alexander
Greenville Public School District

Teresa Amacker
Ocean Springs School District

Terwinda T. Banks
Canton Public School District

Ebony Bealer
Harrison County School District

Kate Boteler
Madison County School District

Lydia Boutwell
MDE Early Childhood Consultant

Jeannie Brock
Benton County School District

Elisa Bryant
Lafayette County School District

Melissa Buck
MDE Literacy Coach

Leigh Ann Cheeseman
MDE Literacy Coach

Cindy Christian
Rankin County School District

Nicole Cockrell
Madison County School District

Angela Davis
MDE Literacy Coach

Samantha Edwards
South Panola School District

Beverly Farr
DeSoto County School District

Lisa Hamrick
Pascagoula – Gautier School District

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Mississippi Exemplar Units and Lessons Developers and Contributors

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Roxanne Harper
Brookhaven School District

Jessica Holyfield
Rankin County School District

Melanie Irby
Pearl Public School District

Lisa Lairy
West Point Consolidated School District

Shirley Massey
MDE Literacy Coach

Catrice Mitchell
Hinds County School District

Brenda Nelson
Gulfport School District

Cyndi Parker
Harrison County School District

Allison Ruhl
Madison County School District

Rebecca Russell
Rankin County School District

Kelly Smith
MDE Literacy Coach

Leigh Ann Smith
Lauderdale County School District

Nicole Smith
Jones County School District

Lori Stringer
MDE Literacy Coach

Katie Szabo
Lafayette County School District

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Mississippi Exemplar Units and Lessons Developers and Contributors

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Lydia Boutwell
MDE Early Childhood Consultant

Courtney D. Brown
Jackson Public School District

Ashley Boyd
DeSoto County School District

Toni Canizaro
Clinton Public School District

Tracy Catchings
Vicksburg-Warren School District

Susan Craddieth
Columbus Municipal School District

Alesheia Cunningham
DeSoto County School District

Savannah Evans
Lamar County School District

Fanchon Freeman
Clarksdale Municipal School District

Beth Fulmer
Math Curriculum Consultant

Jennifer Gaston
Coffeeville School District

Kathleen Hamilton
Marshall County School District

Rachael Hayes-Magee
Biloxi Public School District

Caroline Heblich
DeSoto County School District

Susan Jarvis
Ocean Springs School District

Veronica Jefferies
Vicksburg-Warren School District

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Mississippi Exemplar Units and Lessons Developers and Contributors

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Jeyakumar Jeyaraj
East Jasper Consolidated School District

Melissa Lowe
Lauderdale County School District

Lucy Ann Martin
Jackson Public School District

Lynda Mathieu
George County School District

Bonnie Maready
DeSoto County School District

Kimberly B. McKinney
West Point Consolidated School District

Hertensia V. Mixon
DeSoto County School District

Shalaan Oliver-Hendricks
Columbus Municipal School District

Amy Shelly
Special Education Professional Development Coordinator

TaShara Smith-Shoemaker
Hattiesburg Public School District

Mariella Simons
MDE Consultant

Ashleigh Syverson
Harrison County School District

David H. Taylor II
Laurel School District

Jennifer C. Wilson
Rankin County School District

Introduction

Mission Statement

The Mississippi Department of Education (MDE) is dedicated to student success, including the improvement of student achievement in English Language Arts (ELA) and mathematics in order to produce citizens who are capable of making complex decisions, solving complex problems, and communicating fluently in a global society. The Mississippi College- and Career-Readiness Standards (MS CCRS) provide a consistent, clear understanding of what students are expected to know and be able to do by the end of each grade level or course. The standards are designed to be robust and relevant to the real world, reflecting the knowledge and skills that students need for success in college and careers and to compete in the global economy. The goal of the MDE is to provide educators with the training and resources to understand and implement the MS CCRS effectively.

Purpose

In efforts to facilitate implementation and promote understanding of the MS CCRS for ELA and mathematics, the W. K. Kellogg Foundation generously awarded the MDE a grant to secure a cadre of effective educators to develop the MS CCRS Exemplar Units for teachers. Specifically, a group of highly-effective Mississippi educators developed exemplar instructional units and lessons aligned to the MS CCRS for ELA and mathematics. The MS CCRS Exemplar Units address difficult-to-teach standards as determined by teachers and are designed to serve as exemplar models for instructional units, lessons, and resources. The MS CCRS Exemplar Units have been vetted through nationally renowned vendors to ensure exemplar quality.

Design Overview

The MS CCRS Exemplar Units for ELA and mathematics address grade-level specific standards for Pre-Kindergarten-8th grade, as well as for Algebra, English I, and English II. The overall unit plan is described in the first section of the ELA and math units. This section includes the unit title, a suggested time frame, the grade level MS CCRS addressed and assessed, a unit overview with essential questions and a summary of lesson tasks, and the culminating/performance task description and rubric.

Though the math and ELA overall unit plan designs are very similar, some design aspects differ in order to accommodate the respective requirements of each content area. For mathematics, the first section also provides a segment designated for the Standards for Mathematical Practices (SMPs) addressed in the unit. For ELA, the first section also includes a text set with links to texts (if in the public domain) and a fresh/cold-read task.

The second section of each unit includes lesson plans. Within the lesson plans, provided are lesson-specific MS CCRS, suggested time frames, learning targets, guiding questions, required resources and materials, vocabulary terms and instructional strategies, teacher directions, instructional supports for students, enrichment activities, student handouts, assessments (formative, summative, pre-, and self-), and additional resources to aid in the implementation of the lessons.

Implementation

The intention of the MS CCRS Exemplar Units for ELA and mathematics is to provide educators with resources to understand and implement the MS CCRS effectively. The implementation of the MS CCRS Exemplar Units for ELA and mathematics is voluntary. Additionally, the MDE will provide ongoing support for implementation of the MS CCRS Exemplar Units with initial regional trainings followed by site-specific support through our regional service delivery model. For regional and site-specific training, please contact the MDE Office of Professional Development.

Grade Level	Unit Title	Duration
Grade 5	Let's Add and Subtract Unlike Fractions and Mixed Numbers!	10 days

Mississippi College- and Career-Readiness Standards for Mathematics	Standards for Mathematical Practice
Focus: **5.NF.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, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd).* **5.NF.2** 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. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. *For example, recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < 1/2.*	**SMP.1** Make sense of problems and persevere in solving them. **SMP.2** Reason abstractly and quantitatively **SMP.3** Construct viable arguments and critique the reasoning of others. **SMP.4** Model with mathematics **SMP.5** Use appropriate tools strategically. **SMP.6** Attend to precision. **SMP.7** Look for and make use of structure. **SMP.8** Look for and express regularity in repeated reasoning.

Unit Overview

This unit will introduce students to applying their existing knowledge of equivalent fractions to finding common denominators in order to add and subtract fractions. Students will conduct hands-on investigations using math tools and manipulatives to uncover the problems that arise when trying to add and subtract fractions with unlike denominators. The discoveries made in the investigations will support the class in devising a method that will lead to finding fractions with common denominators. Real-world application problems will keep the lessons connected to students' lives. Mathematically proficient students communicate precisely by engaging in discussion about their reasoning using appropriate mathematical language.

Essential Questions:

- How can understanding fractions make your life easier?
- How can looking at patterns help with adding and subtracting fractions?

Lesson Tasks

Lesson 1: Adding Like Fractions and Mixed Numbers
Students will recall prior knowledge about adding like fractions, including mixed numbers. Students will also review academic vocabulary and create charts of equivalent fractions that they will continue to revise and reference throughout the unit.

Lesson 2: Adding Unlike Fractions
Students will determine ways fractions with unlike denominators can be added. Students will collaborate to find different methods of adding unlike fractions, referring to models and manipulatives, and creating guidelines for adding unlike fractions.

Lesson 3: Using Benchmark Fractions
Students will use benchmark fractions to determine if a sum is reasonable for a given equation. Students will use knowledge of fractions to round each fraction to the nearest zero, half, or whole.

Lesson 4: Finding Equivalent Fractions
Students will use the Identity Property of Multiplication to generate equivalent fractions. Students will be required to use the information in the equation or word problem to determine the required denominator.

Lesson 5: Practice Stations
Students will rotate through four stations to demonstrate understanding of the content for formative assessment. Stations will include writing using content vocabulary to solve a word problem, solving an equation using multiple models, exploring equivalent fractions through computer models, and analyzing approaches to problem solving.

Lesson 6: Subtracting Unlike Fractions
Students will use various strategies to apply knowledge of adding fractions to subtracting fractions. Students will collaborate in small groups and as a class to generate an approach to subtracting fractions and assessing the reasonableness of the difference.

Lesson 7: Adding and Subtracting Mixed Numbers with Unlike Denominators
Students will use regrouping to add and subtract mixed numbers. Students will use the identity property of multiplication to find equivalent fractions and add mixed numbers on a number line. Students will understand that improper fractions are just another way of writing an equivalent fraction.

Lesson 8: Performance Task – Schedule for Success
Students will complete a performance task containing fractions and mixed numbers with unlike denominators. They will use number lines, decomposing fractions and finding equivalent fractions. Students will use a rubric to score their work.

Performance Task

Schedule for Success

The principal reaches out to the fifth-grade class for help resolving scheduling issues. Students will use addition and subtraction of fractions and mixed numbers with unlike denominators to help the principal create a schedule that contains all the elements required. Students will use number lines, decomposing fractions, and finding equivalent fractions to add three more periods to the five already scheduled and stay within the seven-hour framework. They will use a rubric to score their work. This performance-based assessment will give evidence of students' perseverance, abstract reasoning, modeling, attendance to precision, and finding structure and making use of it. Students' work should exhibit evidence of repeated mathematical reasoning and use of structure.

Standards Assessed: 5.NF.1, 5.NF.2

Rubric for Performance/Culminating Task:

Level	Mastery Level	**Calculations** (Add/Subtract Unlike Fractions, Mixed Numbers, Fractions Greater than 1)	**Visual Representation** (Fractional Model & Labels of Time Spent in Each Area)	**Persuasive Letter** (Explanation of Mathematical Findings and Calculations)	**Presentation of Product**
4	Exemplifying Mastery	Calculations were correct and had a schedule of exactly 7 hours in the day.	VR accurately match the calculations and are labeled correctly.	A clear position is taken and supported with well-chosen evidence and examples.	Project shows diligent effort and ample time were put forth.
3	Approaching Mastery	Calculations were mostly correct, and schedule had 7 hours in the day.	VR mostly matched calculations and/or most labels are correct.	A clear position is supported with some relevant reasons and/or examples.	Project shows that some effort and time were put forth.
2	Developing Mastery (Bronze Medal)	Calculations were mostly incorrect, resulting in more or less than 7 hours in the day.	VR were mostly incorrect (did not match calculations). Some labeling is incorrect.	A position is taken and provided with uneven support.	Project shows that little effort and time were put forth.
1	Not Representing Mastery	Calculations were attempted or were incomplete and the schedule did not have 7 hours.	Visual representations were attempted but did not match the calculations	A weak position is suggested but lacks any convincing support.	Project shows that minimal effort and time were put forth.
0	No Evidence of Mastery	Both calculations and schedule were missing or illegible.	No visual representations or labels included.	No position is taken to convince principal.	Project was incomplete or not submitted.

Lesson 1: Adding Like Fractions and Mixed Numbers

Focus Standard: 5.NF.1

Additional Standard: 5.NF.2

Standards for Mathematical Practice: SMP.2, SMP.3, SMP.4, SMP.5

Estimated Time: 60 minutes

Resources and Materials:

- Fraction tiles/bars
- Index cards or half sheets of recycled paper
- Interactive board/projector/document camera
- Paper for graphic organizers
- Regular size Hershey Bar (or other candy that is easily broken in half)
- Snack-size Hershey Bars (or other candy that is easily broken in half)
- Tape
- Jigsaw Method: https://www.youtube.com/watch?v=euhtXUgBEts
- My Favorite No: https://www.teachingchannel.org/videos/class-warm-up-routine

Lesson Targets:

- Students will fluently add fractions and mixed numbers with like denominators.
- Students will solve word problems with mixed numbers with like denominators.

Guiding Questions:

- Is the size of the whole important when adding fractions?
- Why is it important to simplify fractions?
- How is adding like fractions similar to adding whole numbers?

Vocabulary

Academic Vocabulary:

- add
- denominator
- fraction
- improper fraction
- like fraction
- mixed number
- model
- numerator
- proper fraction
- simplify
- sum

Instructional Strategies for Academic Vocabulary:

- ☐ Introduce words with student-friendly definition and pictures
- ☐ Model how to use the words in discussion
- ☐ Read and discuss the meaning of word in a mathematical context
- ☐ Write/discuss using the words
- ☐ Act out the words or attach movements to words.

Symbol	Type of Text and Interpretation of Symbol
	Instructional support and/or extension suggestions for students who are EL, have disabilities, or perform well below grade level and/or for students who perform well above grade level
✓	Assessment (Pre-assessment, Formative, Self, or Summative)

Instructional Plan

Understanding Lesson Purpose and Student Outcomes:
Students will recall prior knowledge of adding and subtracting fractions and mixed numbers with like denominators, solving word problems involving fractions and mixed numbers with like denominators, and recognizing and generating equivalent fractions.

Anticipatory Set/Introduction to the Lesson: Do You Want Half?
Remind students that when talking about fractions, it is important to understand that fractions can only be compared when they are parts of the same size whole.
Take out a bag of snack sized candy bars where students can see them but have a full- or king-sized candy bar of the same kind hidden from sight.

T: Would you like a whole candy bar or a half? If you would like a whole candy bar, raise your hand. (Most if not all students will raise their hand for a whole candy bar)

Pass out a whole candy bar to the students with their hands raised.

T: I'm trying to watch how much candy I eat so I think I will just have a half candy bar.

Take out the full-sized candy bar, break it in half, and eat it. When students make statements such as "That's not fair!" or "You didn't tell us there was a big candy bar!", begin a class discussion about the importance of the size of the whole (SMP.2).

Prompting Questions:

- Why isn't it fair?
- What assumptions did you make?
- How can you apply this experience to working with fractions?

Note: The conclusion should be that when talking about or comparing fractions, it is important to refer to the same size whole.

Activity 1: My Favorite No

Students solve addition and subtraction problems using "My Favorite No" as a strategy to correct mistakes and to encourage recall.

Note: Before beginning this lesson, if you are not familiar with this strategy, watch the video "My Favorite No".

Display/write these two problems:

$$\frac{1}{6} + \frac{4}{6} = \qquad 2\frac{3}{4} + 3\frac{2}{4} =$$

Pass out index cards to each student and give them two minutes to work the problems.

For students who are EL, have disabilities, or perform well below grade level:

- Teacher will read aloud the problems and questions to students with accommodations.
- When doing "My Favorite No," give students fraction tiles to compare answers.

Note: Students who have mastered this skill will do the first problem quickly but may struggle with the second problem since adding the fractions gives an improper fraction and they must decompose the fraction.

Go through the "No" stack looking for misconceptions such as the following:

1. Believing that fraction numerators and denominators can be treated as separate whole numbers
   $\frac{1}{6}+\frac{4}{6}=\frac{5}{12}$

2. Leaving the sum of the second equation in the form of an improper fraction
   $2\frac{3}{4}+3\frac{2}{4}=5\frac{5}{4}$

3. Multiplying, ignoring, or doing something else incorrect with the whole numbers in the second equation.

Smile when you find cards with common misconceptions and say encouraging statements such as, "Oh, I'm so glad someone did this so we can learn from it!" or "So many people make this mistake, but we can learn how to do it correctly!" Show the incorrect work for the first problem. Do not fix it. Students should speak freely (open discussion) about why the work is not correct. Any student who says the work or answer you displayed is incorrect must offer a reason why it is incorrect and how to correct it (SMP.3). Students may choose manipulatives such as fraction tiles or circles to justify their arguments (SMP.5).
Repeat the analysis with the second problem.

Note: When using the word "numerator," touch your hands to your head. When using the word "denominator," touch your hands to your hips or thighs. Encourage students to do the same. This helps students connect the word to the placement above or below the fraction bar.

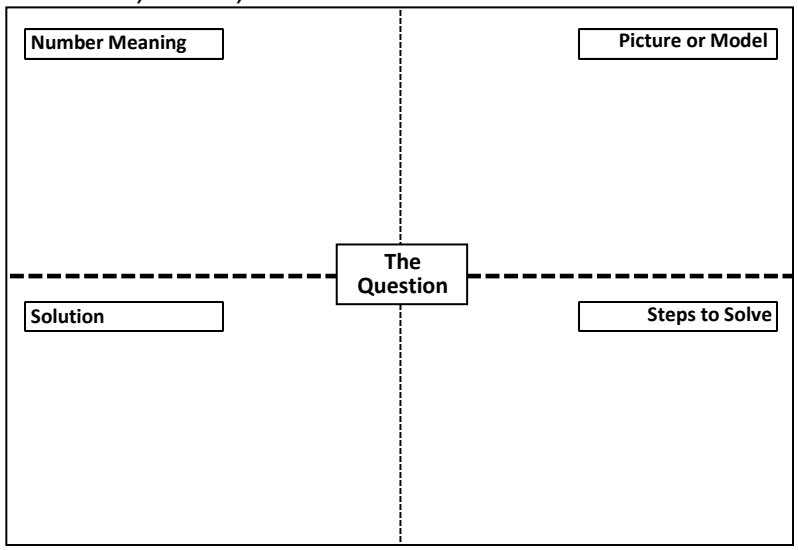
Activity 2: Jigsaw with a Word Problem
Students use the Jigsaw strategy to solve word problems with addition of like fractions and mixed numbers.

Note: If you are not familiar with the Jigsaw method, watch the video found at: https://www.youtube.com/watch?v=euhtXUgBEts

Divide students into heterogeneous family groups and assigns each student a role in the family:

- Number Meaning: What do the numbers represent?
- Picture or Model: What does this story look like?
- Steps to Solve: Use words not numbers.
- Solution: Clear and precise calculations.

Instruct students to fold a piece of paper in fourths, unfold, and label as shown below:



For students who are EL, have disabilities, or perform well below the grade-level text band:

- Teacher will assist students with accommodations in folding paper and assign Picture or Model to the student to complete that section of the graphic organize
- Students will be working in heterogeneous groups and peer coaching will be available.

Extensions for students with high interest or working above grade level:

- Students will be given the task of writing the steps for solving the problem without the use of digits or word numbers.

Explain the role of each member of the family:

- Number Meaning: write every number from the story (they may be in any form or may be inferred numbers) and what they describe.

- Picture or Model: draw and label a picture showing the meaning of the situation (SMP.4).
- Steps to Solve: list the chronological order for solving the problem without using numbers but using the words that describe what the numbers stand for (e.g., multiply the number of students by the number of books).
- Solution: use precise calculations to solve.

Display this word problem on the board and have students copy it in their math notebooks:

> "Ben's dad told Ben he can play video games for $8\frac{1}{2}$ hours this week. On Monday he played for $1\frac{1}{2}$ hours, and on Tuesday he played for 2 hours. On Wednesday Ben played for twice as long as he'd played on Monday. How much time does Ben have left to play video games this week?"

In family groups, students read the story, identify the question, and write the question in the box in the center of their paper. Students move to their expert groups based on their assigned roles. In the expert groups, students discuss and complete their assigned part of the graphic organizer. It is not important that all students agree, but each student must be able to justify their reasoning and critique the reasoning of others (SMP.3).

Signal when students should return to their family group. Students return to their family group and teach their assignment to the rest of their family.

- ✓ Monitor student discussion, listening for students communicating and defending their mathematical reasoning and critiquing the reasoning of others. Probe students to think further about their answers and guiding students through misunderstandings shared by the group (SMP.3).

Prompting Questions:

- Number Meaning: I see that you have $8\frac{1}{2}$ hours, $1\frac{1}{2}$ hours, 2 hours, and 3 hours. Where did you find 1 hour in the problem?
- Picture or Model: What made you choose to use_____to model the problem?
- Steps to Solve: I see that you chose to solve the problem using_____(operation). Can you think of another operation you could have used? (subtraction or missing addend)
- Solution: How did you use the information shared by the other members of the family to solve the problem?

Each family will have a delegate present one organizer to the class.

Reflection and Closing:

- ✓ Ask students to reflect on the most important things to remember from today's lesson.
  Prompting Questions:
  - Why does the size of the whole matter when we talk about fraction?
  - When we add fractional parts, what does the sum look like?
  - When might you need to add fractions in the real world?

Homework

Students should look for instances in the real world where adding fractions is helpful or necessary. Findings can be added to a graffiti wall in the classroom daily.

Lesson 2: Adding Unlike Fractions

Focus Standards: 5.NF.1, 5.NF.2

Standards for Mathematical Practice: SMP.5, SMP.6, SMP.7

Estimated Time: 60 minutes

Resources and Materials:

- Cuisenaire rods
- Fraction bars
- Number lines
- Pattern blocks
- Handout 2.1: Fraction Bars
- Handout 2.2: Cuisenaire Rods
- Handout 2.3: Pattern Blocks
- Handout 2.4: Number Lines
- Handout 2.5: Modeling Addition of Unlike Fractions

Lesson Targets:

- Students will model addition of fractions with unlike denominators
- Students will add unlike fractions with denominators 2, 4, and 8 with a sum less than 1.

Guiding Questions:

- Is the size of the “whole” important when adding and subtracting fractions?
- How can we use models and math tools to add unlike fractions?
- What challenges arise when we add fractions with unlike denominators?

Vocabulary

Academic Vocabulary:

- add
- addends
- denominator
- fraction
- improper fraction
- like fraction
- mixed number
- model
- numerator
- sum

Instructional Strategies for Academic Vocabulary:

- ☐ Introduce words with student-friendly definition and pictures
- ☐ Model how to use the words in discussion
- ☐ Read and discuss the meaning of word in a mathematical context
- ☐ Students write/discuss using the words

Symbol	Type of Text and Interpretation of Symbol
	Instructional support and/or extension suggestions for students who are EL, have disabilities, or perform well below grade level and/or for students who perform well above grade level
✓	Assessment (Pre-assessment, Formative, Self, or Summative)

Instructional Plan

Understanding Lesson Purpose and Student Outcomes:
Students will explore adding fractions with unlike denominators using manipulatives and models. Students will make connections between the numerators of the addends and the numerator of the sum.

Anticipatory Set/Introduction to the Lesson:
Display the following question:

"Ben and Jason have jobs as busboys, cleaning tables in a restaurant after school. Jason cleaned $\frac{1}{4}$ of the tables, and Ben cleaned $\frac{1}{2}$ of the tables. What fraction of the tables have they cleaned? What fraction of the restaurant do they still need to clean?"

Provide students with an array of manipulatives. Fraction bars, Cuisenaire rods, square tiles, number lines, and linking cubes are recommended, but students could also use two-color counters, base-10 blocks (units), pattern blocks, and pan balances. **Handout 2.1: Fraction Bars, Handout 2.2: Cuisenaire Rods, Handout 2.3: Pattern Blocks, and Handout 2.4: Number Lines** may be printed if manipulatives are not available (SMP.5).

Prompting Questions:

- What tool did you choose to help you model the problem?
- What made you choose this one?
- Was it helpful?
- Is there another tool that might be more helpful?
- How are $\frac{1}{2}$, $\frac{1}{4}$, and $\frac{3}{4}$ related?
- Could you have added $\frac{1}{2}$ and $\frac{1}{4}$ without manipulatives?

For students who are EL, have disabilities, or perform well below grade level:

- Provide the fraction bars to solve the problem (SMP.5).
- Read the question aloud.
- Give picture definitions of $\frac{1}{2}$ and $\frac{1}{4}$.

Extensions for students with high interest or working above grade level:

- Have students solve the problem using multiple models.

Note: Ensure that students attend to precision by including the units for each fraction sum. (SMP.6).

Activity 1: Adding Unlike Fractions with Models

Distribute **Handout 2.5: Modeling Addition of Unlike Fractions**. Distribute fraction tiles, number lines, pattern blocks, and Cuisenaire Rods. Tell students they will solve a word problem that includes adding fractions with unlike denominators using manipulatives (SMP.5). Explain that the problem will indicate which manipulative to use.

Model the following: $\frac{1}{2} + \frac{1}{3}$ using pattern blocks.

To solve using pattern blocks, the yellow hexagon is the whole, red trapezoids represent $\frac{1}{2}$, the blue rhombi represent $\frac{1}{3}$, and the green triangles represent $\frac{1}{6}$. Attempt to layer one trapezoid and one rhombus over a hexagon. It's clear now that the sum of these two fractions is smaller than one whole, but the exact amount is unclear. Have students cover the rhombus and trapezoid (still atop the hexagon) with

green triangles. Students should see that two triangles (or 2 of $\frac{1}{6}$) will cover a rhombus, and three triangles (or 3 of $\frac{1}{6}$) will cover a trapezoid. In all, it takes five triangles, or 5 of $\frac{1}{6}$, to cover a trapezoid and a rhombus together. Students should be able to count unit fractions to know that 5 of $\frac{1}{6}$ is $\frac{5}{6}$.

Demonstrate the same equation using fraction tiles and Cuisenaire rods. Explain to students that not all manipulatives are appropriate for all problems. Tell students they will work individually to solve each of the four problems and they will show all their work on the paper. Once students have completed their work, have them exchange papers with their elbow buddy and check each other's work. Call on students to share their calculations, answer any questions and clarify any misconceptions.

Note: Question 4 requires students to choose the manipulative that would work best to solve the equation. Students are required to reason that with denominators of 4 and 8, pattern blocks would not be useful. Cuisenaire rods could be used, but the whole would have to be the brown rod. Students would most likely find success using the fraction bars. Students who solve #4 quickly could be encouraged to find another method using a different manipulative.

For students who are EL, have disabilities, or perform well below grade level:

- Read the question aloud.
- Guide students as they use the manipulatives.

Extensions for students with high interest or working above grade level:

- Have students solve the problem using multiple models.

Guide students to make connections within the equations about the denominator and realize the sum will often have the same denominator as the smallest addend (SMP.7).

✓ Actively monitor student understanding, providing support through questioning. Prompting Questions:

- How does the denominator affect what manipulative you choose?
- Does the denominator change as you add the parts?
- Can you find a pattern for when and how the denominator changes?
- Focusing on question 3, how can you explain the times when the denominator changes in a different way?

Reflection and Closing: Making Predictions Based on Patterns

Display the following equations on the board:

$\frac{1}{3}+\frac{3}{6}=$ $\frac{3}{10}+\frac{3}{5}=$ $\frac{1}{4}+\frac{5}{12}=$ $\frac{3}{8}+\frac{1}{6}=$ $\frac{2}{5}+\frac{1}{4}=$

✓ Ask students to consider these equations. What do they predict the denominator of the sum will be? This can be an oral discussion or a journal entry. Students will revisit their predictions in Lesson 3.

Prompting Questions:

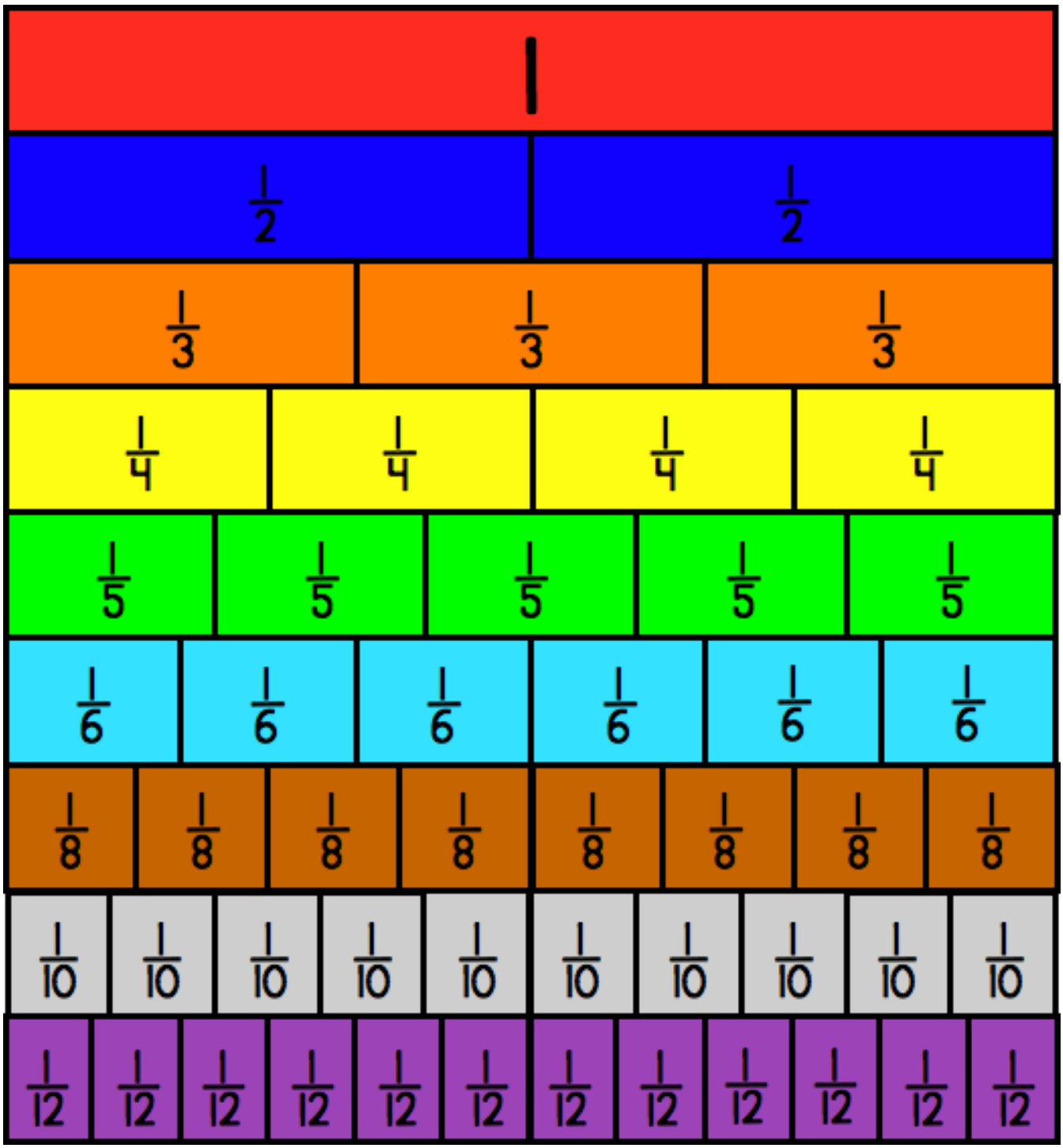
- Why did you predict this value for the denominator?
- What rule or pattern did you use to come up with your prediction?
- Will this rule or pattern work with every pair of addends on the board?
- Why can't we add fractions with unlike denominators as they are (without using models or equivalent fractions)?

Homework

Students should look for instances in the real world where adding fractions is helpful or necessary. Findings can be added to a graffiti wall in the classroom daily.

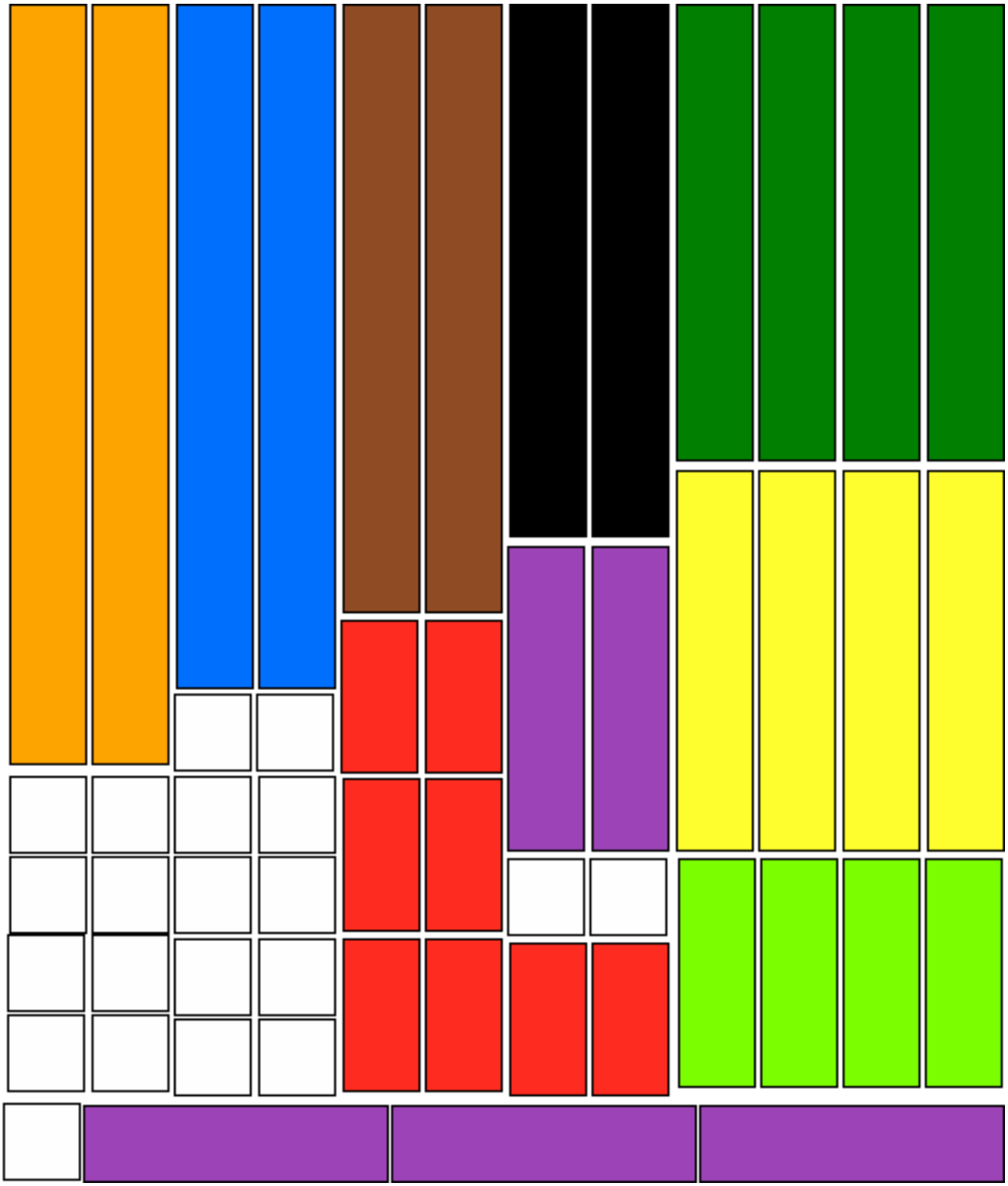
Handout 2.1: Fraction Bars

Name: _____



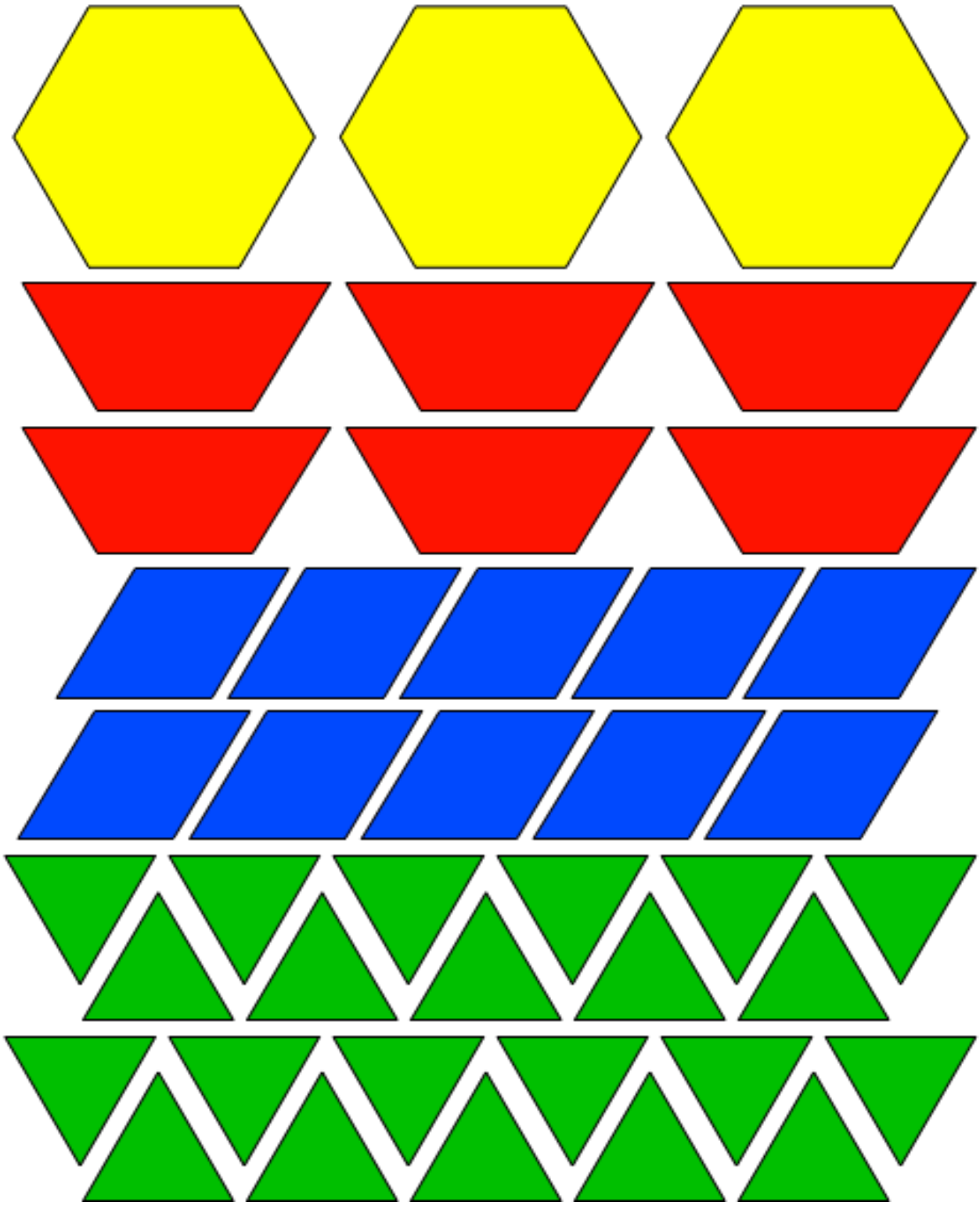
Handout 2.2: Cuisenaire Rods

Name: _____



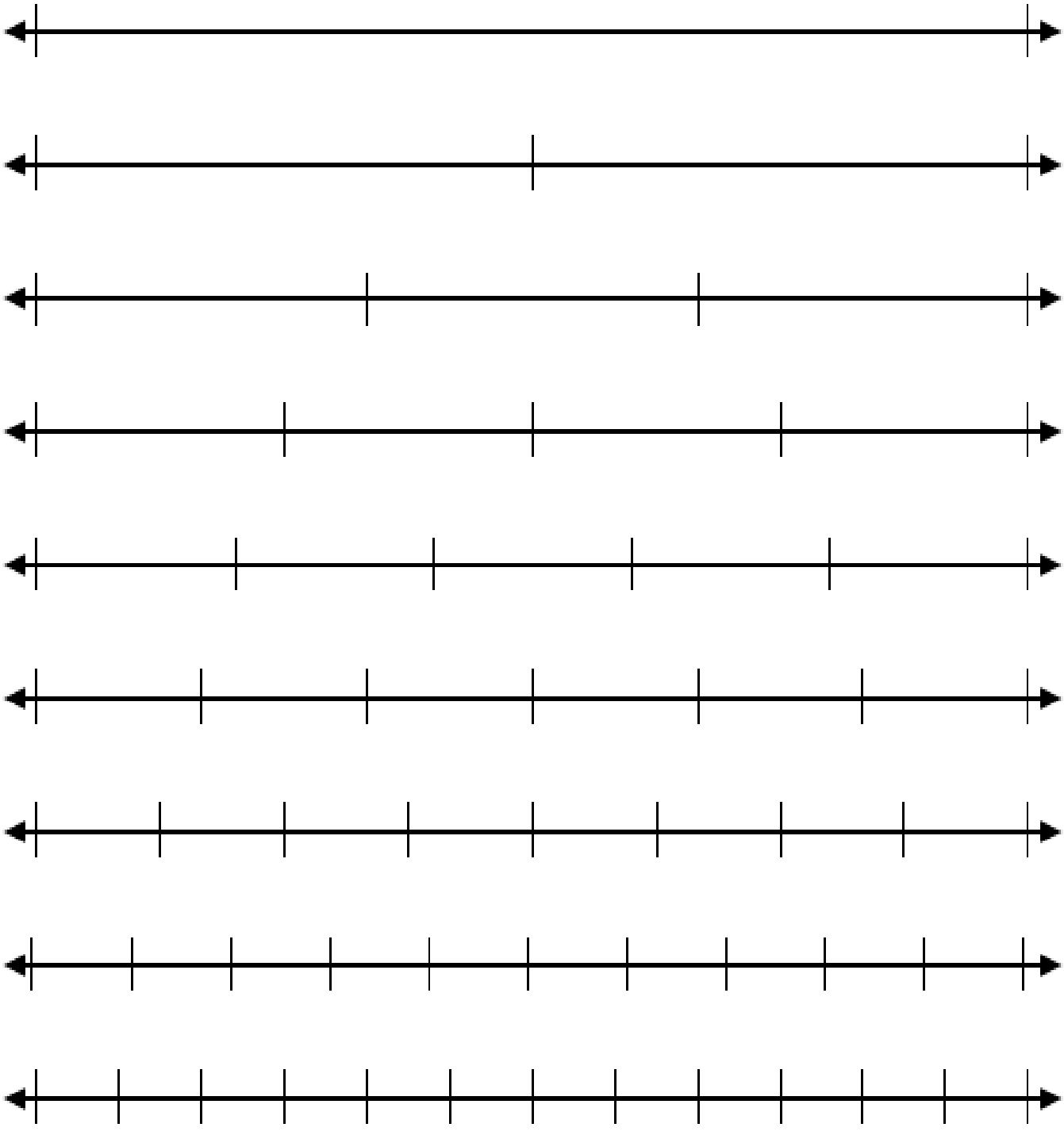
Handout 2.3: Pattern Blocks

Name: _____



Handout 2.4: Number Lines

Name: _____



Handout 2.5: Modeling Addition of Unlike Fractions

Name: _____

1. Jasmine finished reading $\frac{1}{3}$ of *The Lightning Thief*. Her best friend Jacqueline has read $\frac{2}{6}$ of *The Lightning Thief*. How much of *The Lightning Thief* have the girls read in all?

Use **pattern blocks** to model and solve the problem.

2. In Ms. Mason's class, $\frac{1}{5}$ of the students have blonde hair. Another $\frac{7}{10}$ have brown hair. What fraction of Ms. Mason's class has blonde or brown hair?

Use a **number line** to model and solve the problem.

3. The boys' basketball team has played $\frac{1}{4}$ of the games on their schedule. The girls' team has played of $\frac{2}{6}$ their games. What fraction of their games have the basketball teams played so far?

Use **fraction bars** to model and solve the problem.

4. On the most recent report cards, $\frac{1}{8}$ of the fifth graders made the all-A honor roll. Another $\frac{1}{4}$ of the fifth graders made the all-A and B honor roll. What fraction of the fifth graders made the honor roll?

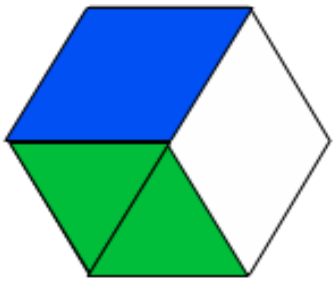
Use **your choice** of manipulatives to model and solve the problem.

Handout 2.5: Modeling Addition of Unlike Fractions - Key

Name: _____

1. Jasmine finished reading $\frac{1}{3}$ of *The Lightning Thief*. Her best friend Jacqueline has read $\frac{2}{6}$ of *The Lightning Thief*. How much of *The Lightning Thief* have the girls read in all?

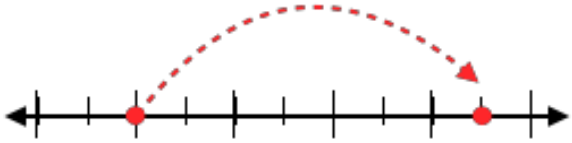
Use **pattern blocks** to model and solve the problem.



Jasmine and Jacqueline have read $\frac{4}{6}$ or $\frac{2}{3}$ of *The Lightning Thief*.

2. In Ms. Mason's class, $\frac{1}{5}$ of the students have blonde hair. Another $\frac{7}{10}$ have brown hair. What fraction of Ms. Mason's class has blonde or brown hair?

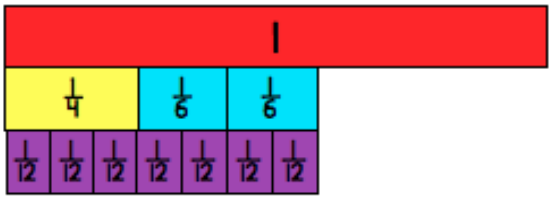
Use a **number line** to model and solve the problem.



$\frac{9}{10}$ of the students have brown or blonde hair

3. The boys' basketball team has played $\frac{1}{4}$ of the games on their schedule. The girls' team has played of $\frac{2}{6}$ their games. What fraction of their games have the basketball teams played so far?

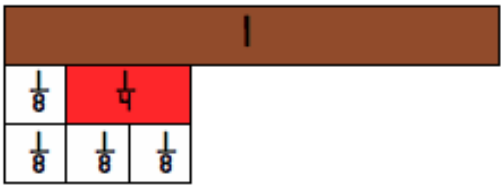
Use **fraction bars** to model and solve the problem.



$\frac{7}{12}$ of the basketball games have been played

4. On the most recent report cards, $\frac{1}{8}$ of the fifth graders made the all As honor roll. Another $\frac{1}{4}$ of the fifth graders made the all As and Bs honor roll. What fraction of the fifth graders made the honor roll?

Use **your choice** of manipulatives to model and solve the problem.



$\frac{3}{8}$ of the fifth graders made the honor roll.

Lesson 3: Using Benchmark Fractions

Focus Standards: 5.NF.1, 5.NF.2

Standards for Mathematical Practice: SMP.1, SMP.2, SMP.3, SMP.4, SMP.6

Estimated Time: 60 minutes

Resources and Materials:

- Tape
- Handout 3.1: Fractions Picture Cards
- Handout 3.2: Mixed Number Picture Cards
- Handout 3.3: Benchmark Number Line
- Handout 3.4: Operating with Benchmark Fractions
- Handout 3.5: Remediation Task Cards
- Handout 3.6: Operating with Benchmark Fractions Homework

Lesson Targets:

- Students will find the benchmark fraction for a given fraction.
- Students will use benchmark fractions to assess the reasonableness of a sum or difference

Guiding Questions:

- Why is using benchmark fractions useful when operating with fractions?
- When might you use benchmark fractions in the real world?

Vocabulary

Academic Vocabulary:

- add
- addends
- benchmark fractions
- denominator
- fraction
- mixed number
- model
- numerator
- sum

Instructional Strategies for Academic Vocabulary:

- ☐ Introduce words with student-friendly definition and pictures
- ☐ Model how to use the words in discussion
- ☐ Students write/discuss using the words.
- ☐ Read and discuss the meaning of word in a mathematical context

Symbol	Type of Text and Interpretation of Symbol
	Instructional support and/or extension suggestions for students who are EL, have disabilities, or perform well below grade level and/or for students who perform well above grade level
✓	Assessment (Pre-assessment, Formative, Self, or Summative)

Instructional Plan

Understanding Lesson Purpose and Student Outcomes:

Students will activate prior knowledge of the estimation strategy of benchmarking and the connection to rounding to the nearest quarter (coin). The students will expand their understanding of benchmarking to include finding the nearest benchmark fraction, 0, $\frac{1}{2}$, 1, and on, to perform mental computations using fractions.

Note: Benchmark fractions may be taught in conjunction with rounding decimals (5.NBT.4). If benchmark fractions have already been taught, the teacher may choose to skip to **Activity 2: Operating with Benchmark Fractions.**

Anticipatory Set/Introduction to the Lesson:

Post a number line on the board showing the visual representation of the benchmark fractions 0, $\frac{1}{2}$, or 1.

Distribute **Handout 3.1: Fraction Picture Cards**. Have each student tape their fraction beneath the nearest benchmark fraction.

For students who are EL, have disabilities, or perform well below grade level:

- Provide the fractions closest to the benchmark fractions on page 1 of **Handout 3.1: Fraction Picture Cards**.

Extensions for students with high interest or working above grade level:

- Provide students fractions for which an argument could be made for two different benchmark fractions on page 4 of **Handout 3.1: Fraction Picture Cards**.

Note: The fractions on page 4 of **Handout 3.1: Fraction Picture Cards** are the fractions about which students may disagree on placement on the number line. The teacher may choose to print that page on an alternate color paper to distinguish those fractions and encourage class discussion.

Prompting Questions:

- What do you use to determine the nearest benchmark fraction?
- Can a fraction less than one half have one half as a benchmark fraction?
- Can a fraction greater than one half have a benchmark fraction of one half?
- What should you do with fractions that fall right in the middle of zero and one half (or one half and one)?
- Is there a generalization from rounding whole numbers that could help in these situations?

Discuss as a class the fractions on the number line. Encourage students to explain fractions they think are benchmarked incorrectly, providing evidence for why they think a fraction is incorrect (SMP.3).

Activity 1: Benchmarking Mixed Numbers
Extend the number line from the Anticipatory Set activity past one.

Ask students to discuss how to continue marking this number line. When students come to the consensus that we would continue marking it as 1, $1\frac{1}{2}$, 2, $2\frac{1}{2}$, 3, $3\frac{1}{2}$, and so on, explain that these fractions are also benchmark fractions. Extend the number line through 5. Remind students that when they benchmark whole numbers that they round them to the nearest 0, 25, 50, 75, or 100, and that the patterns continue to include all numbers that have 00, 25, 50, or 75 in the tens place and the ones place. We relate this to money by rounding to the nearest quarter. When we benchmark fractions, we use the same strategy, but we only use the nearest whole number or half (50¢). Students may also make the connection to markings on a ruler.

Distribute **Handout 3.2: Mixed Number Picture Cards**. Give students two minutes to discuss within their groups where each of the group's fractions should go on the extended number line (SMP.4).

✓ Actively monitor groups, providing support through questioning.

For students who are EL, have disabilities, or perform well below grade level:

- Provide the fractions closest to the benchmark fractions (on page 1 of **Handout 3.2: Mixed Number Picture Cards**).

Extensions for students with high interest or working above grade level:

- Provide students fractions for which an argument could be made for two different benchmark fractions on page 4 of **Handout 3.2: Mixed Number Picture Cards**.

Note: The fractions on page 4 of **Handout 3.2: Mixed Number Picture Cards** are the fractions about which students may disagree on placement on the number line. The teacher may choose to print that page on an alternate color paper to distinguish those fractions and encourage class discussion.

Prompting Questions:

- Can a fraction less than two have two as a benchmark fraction?
- What should you do with fractions that fall right in the middle of zero and one half (or one half and one)?
- What generalizations can you make from rounding whole numbers?
- Can you relate to finding benchmark fractions to something you may do in the real world?

Activity 2: Operating with Benchmark Fractions

Ask students to add mentally $2\frac{5}{8} + 3\frac{4}{7}$. Students may complain that this is too difficult to calculate mentally. Next ask them to find the benchmark fractions for $2\frac{5}{8}$ and $3\frac{4}{7}$. Students should find $2\frac{1}{2}$ and $3\frac{1}{2}$. Ask the students to find the sum of these two fractions (SMP.2).

For students who are EL, have disabilities, or perform well below grade level:

- Help students to use manipulatives or draw models of $2\frac{5}{8}$ and $3\frac{4}{7}$ to find the benchmark fractions.
- Allow students to keep a number line showing the numerical and visual representations of the benchmark fractions at their seats for reference. **Handout 3.3: Benchmark Number Line** can be used for this and subsequent activities.

Note: If students struggle to find benchmark fractions mentally, it may be beneficial to list equivalent benchmark fractions on the number line in the front of the room.

Provide students with three problems to solve using benchmark fractions.

$2\frac{1}{7} - \frac{2}{3} =$ $2\frac{2}{5} + 2\frac{4}{6} =$ $3\frac{1}{4} + 1\frac{6}{8} =$

Prompting Questions:

- Is using benchmark fractions a good strategy to find the precise sum or difference?
- Do benchmark fractions provide a reasonable estimate of the sum or difference?
- Can you relate this to something you may do in the real world?

✓ Monitor student work to assess understanding of benchmarking mixed numbers to this point.

Activity 3: Operating with Benchmark Fractions – Independent Practice

Distribute **Handout 3.4: Operating with Benchmark Fractions** for students to complete as independent practice (SMP.1). Remind students to attend to precision by using models or the number line to determine an answer's reasonableness (SMP.6).

If there are students who struggled with Activity 2, pull students to a small group to practice on **Handout 3.5: Remediation Task Cards**.

✓ Assess student understanding using student work and solutions on **Handout 3.4: Operating with Benchmark Fractions**.

For students who are EL, have disabilities, or perform well below grade level:

- Work with students in a small group to practice using **Handout 3.5: Remediation Task Cards**.

Extensions for students with high interest or working above grade level:

- Replace questions 1-2 on **Handout 3.4: Operating with Benchmark Fractions** with the tasks of writing and solving a word problem using real world examples of times when one would want to add or subtract fractions using benchmark fractions.

Reflection and Closing: Making Predictions Based on Patterns

Brainstorm a list of ways using benchmark fractions is helpful, including to find reasonable estimates to fraction equations mentally, assess reasonableness of a sum or difference using fractions and mixed numbers, and applications with money, using the dollar value as the whole number and the cents as a fraction of 100. Leave the list posted for the duration of the unit.

Prompting Questions:

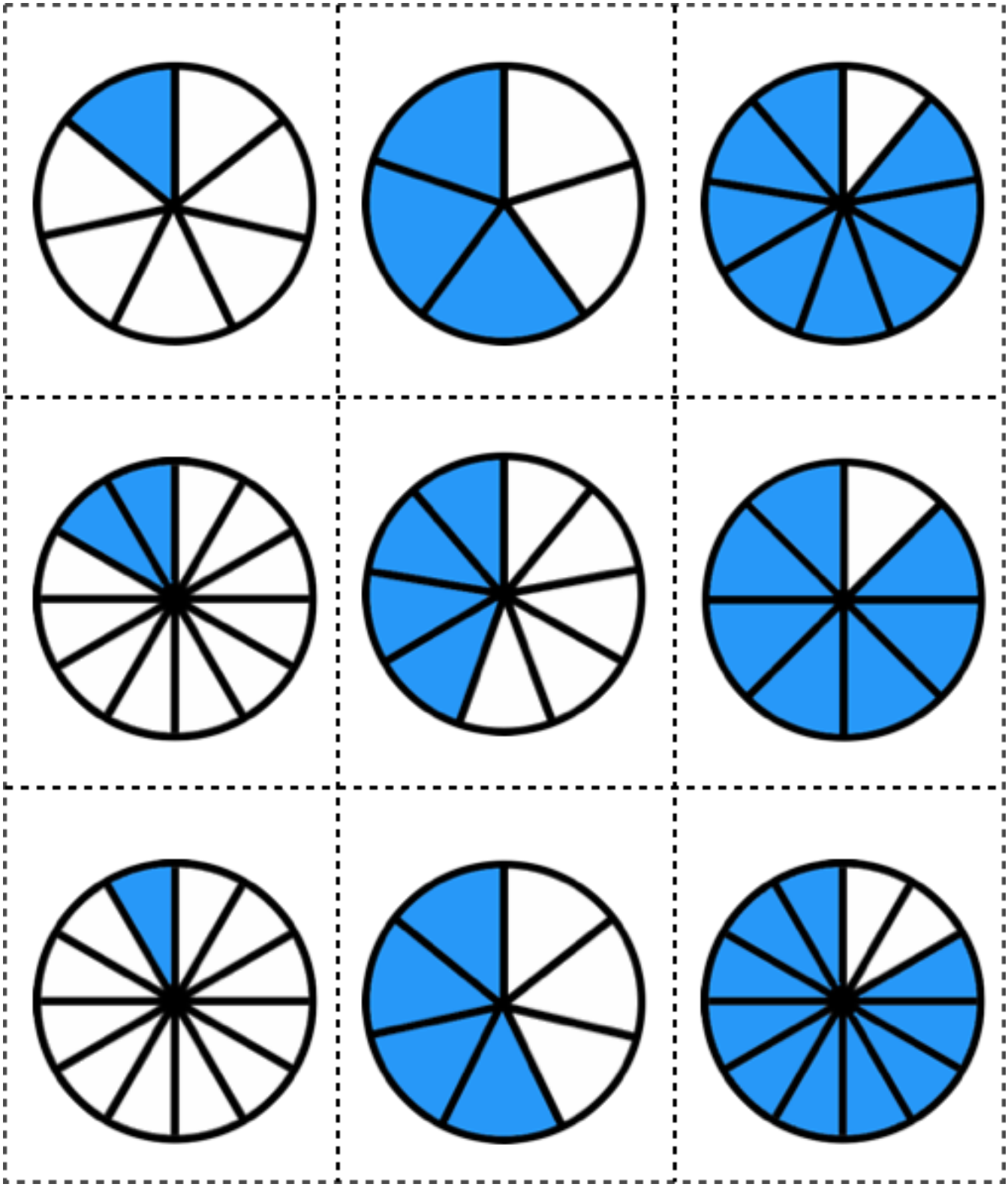
- How is using benchmark fractions useful in the real world?

Homework

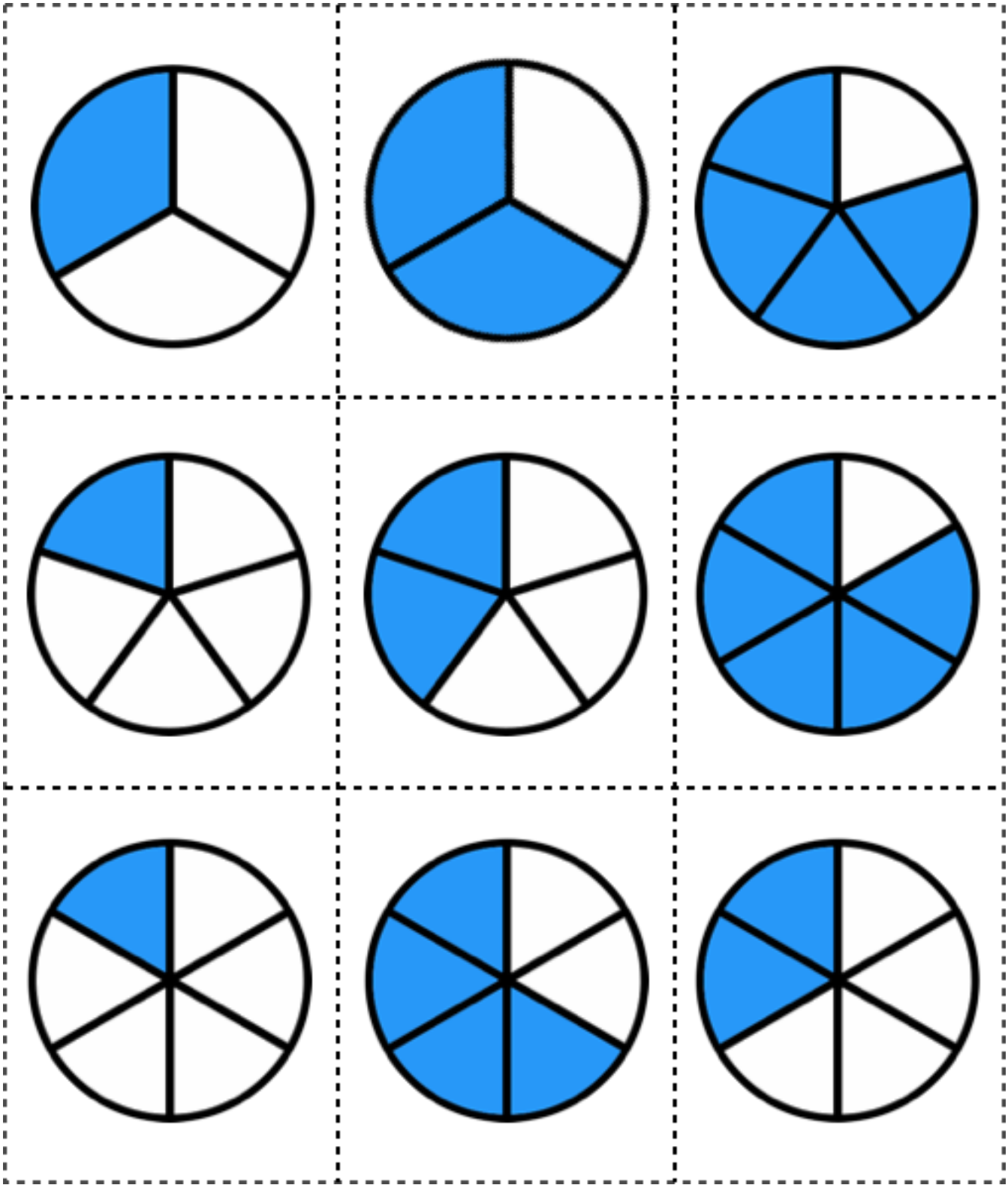
Students will complete **Handout 3.6: Operating with Benchmark Fractions – Homework.**

Handout 3.1: Fraction Picture Cards

Print on cardstock and cut.



Handout 3.1: Fraction Picture Cards



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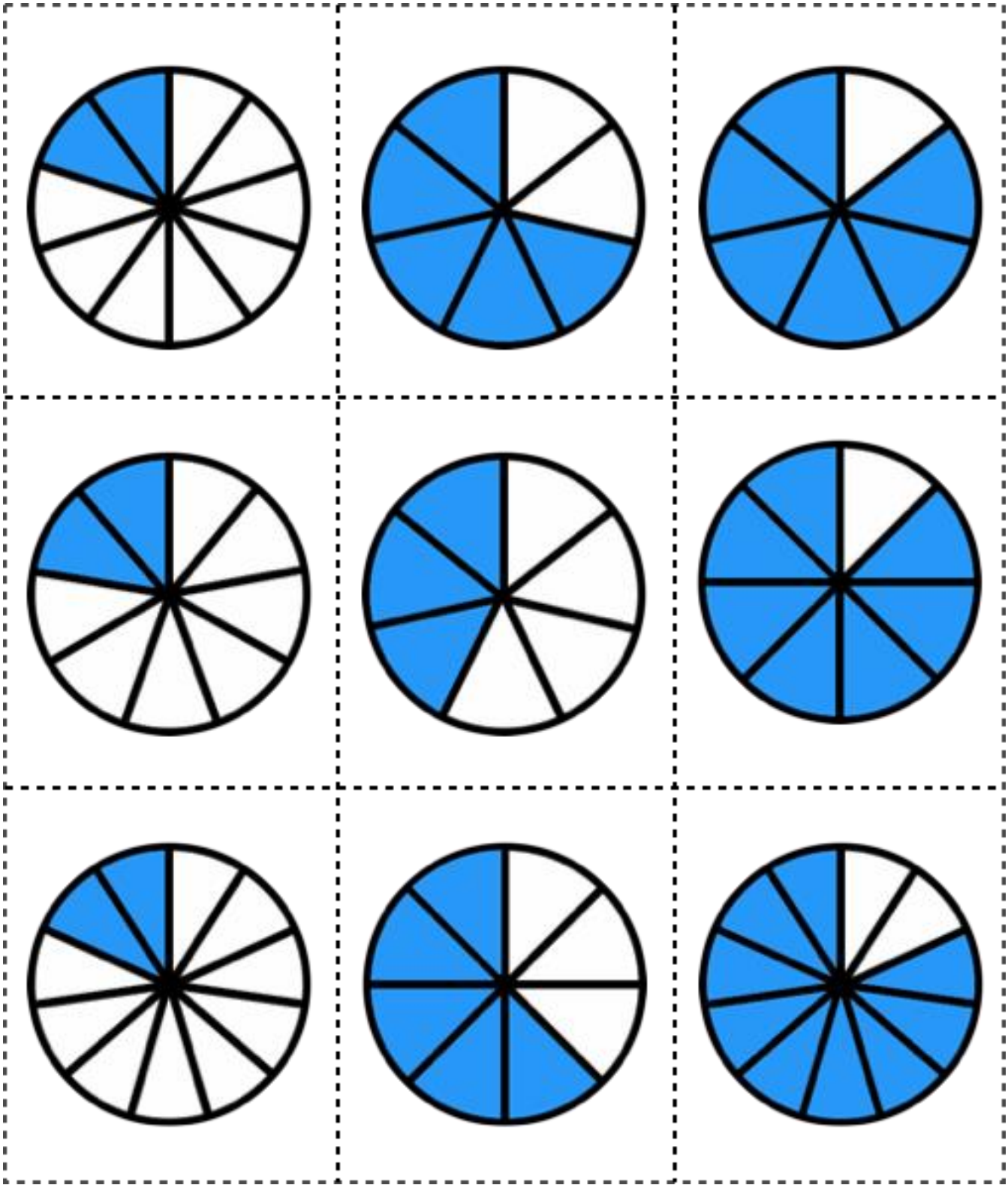
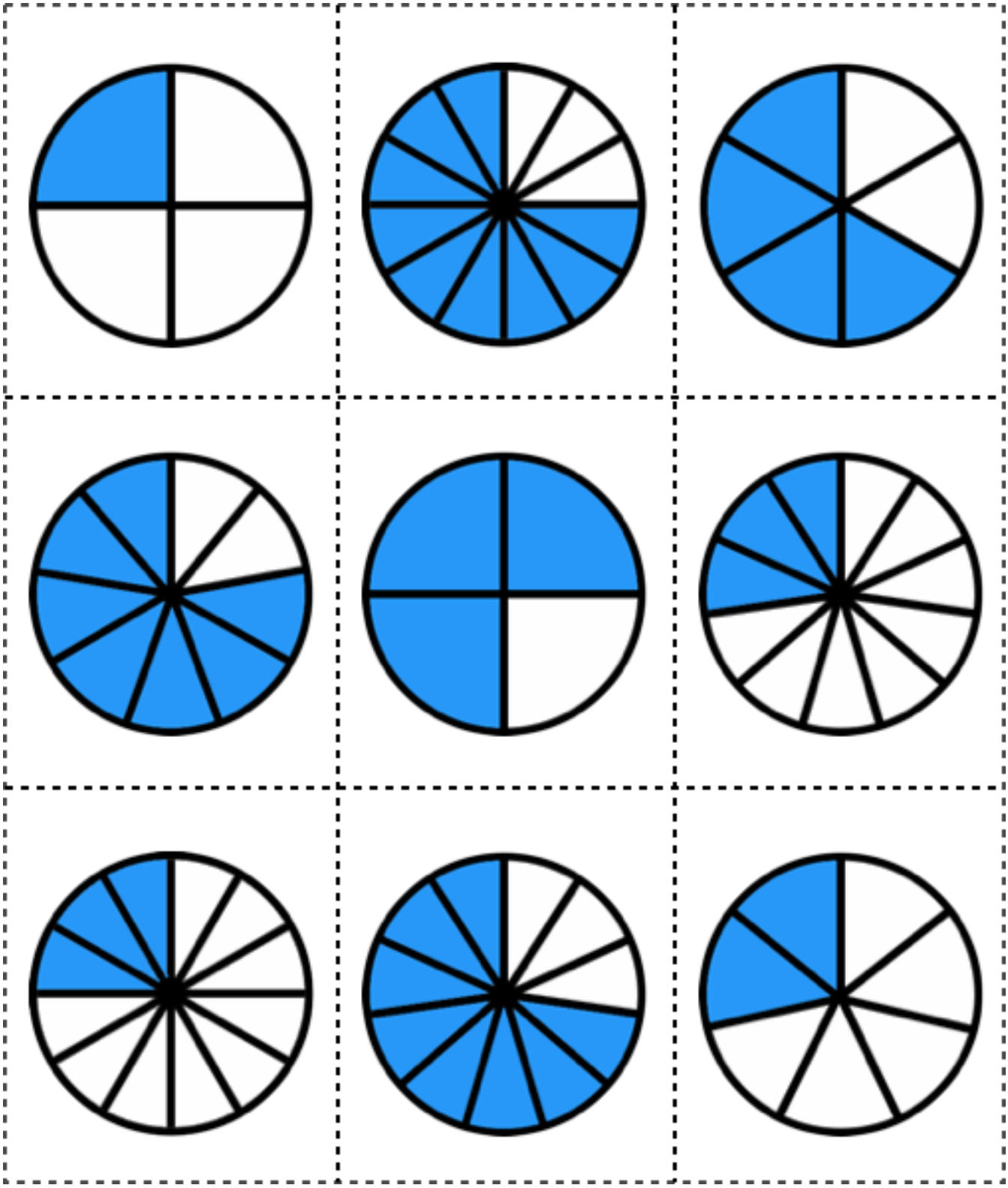
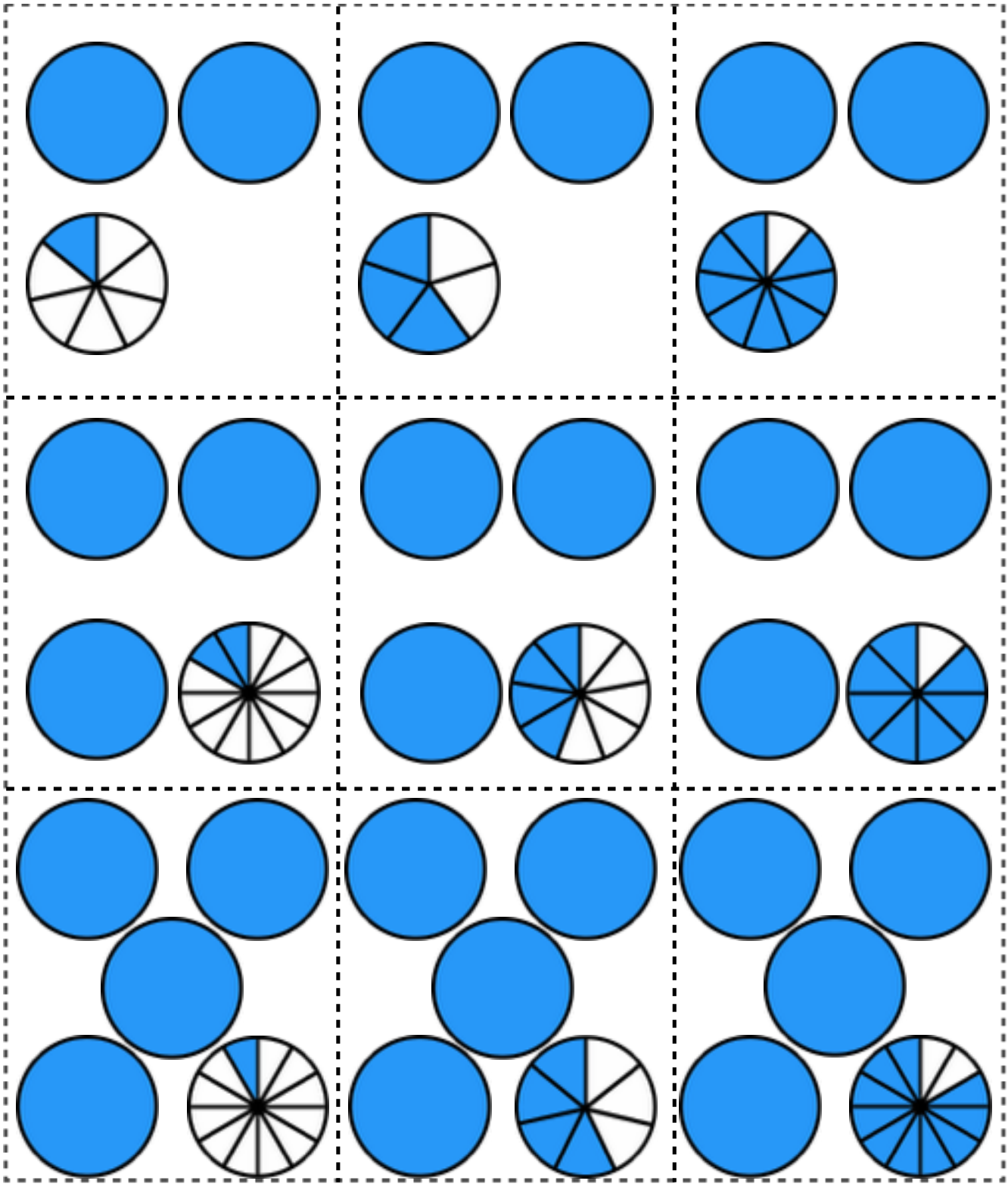


Handout 3.1: Fraction Picture Cards

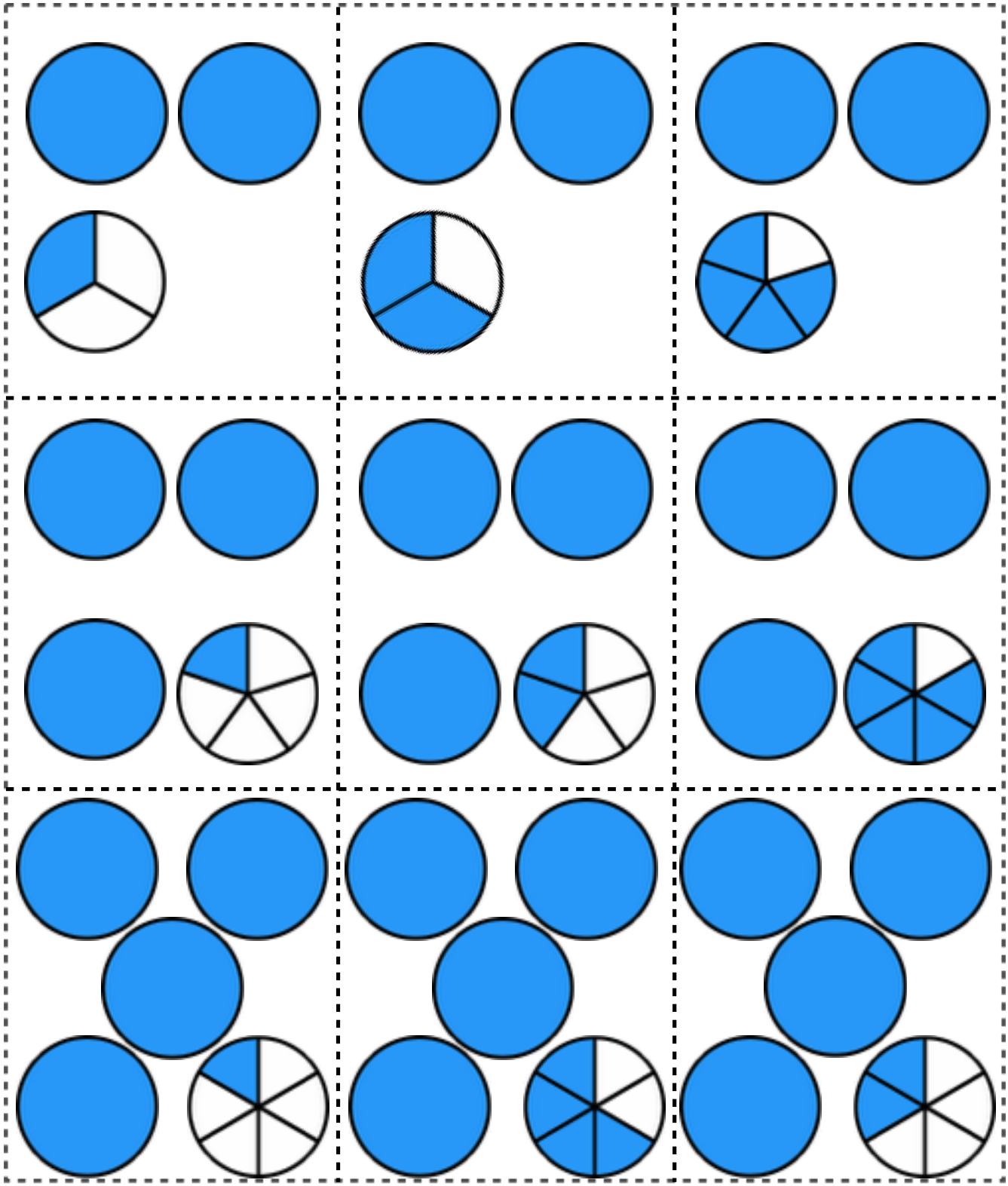


Handout 3.2: Mixed Number Picture Cards

Print on cardstock and cut.



Handout 3.2: Mixed Number Picture Cards



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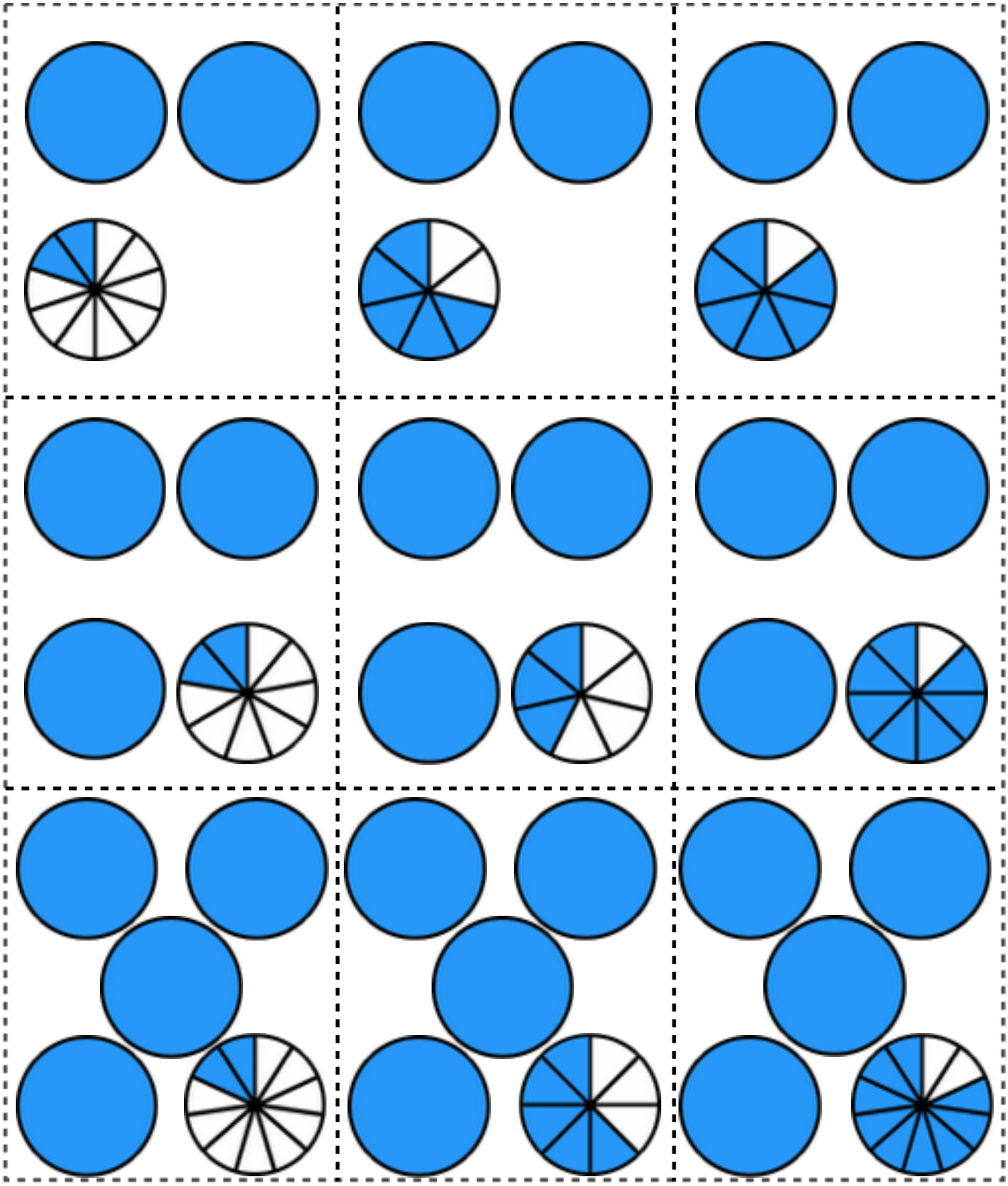
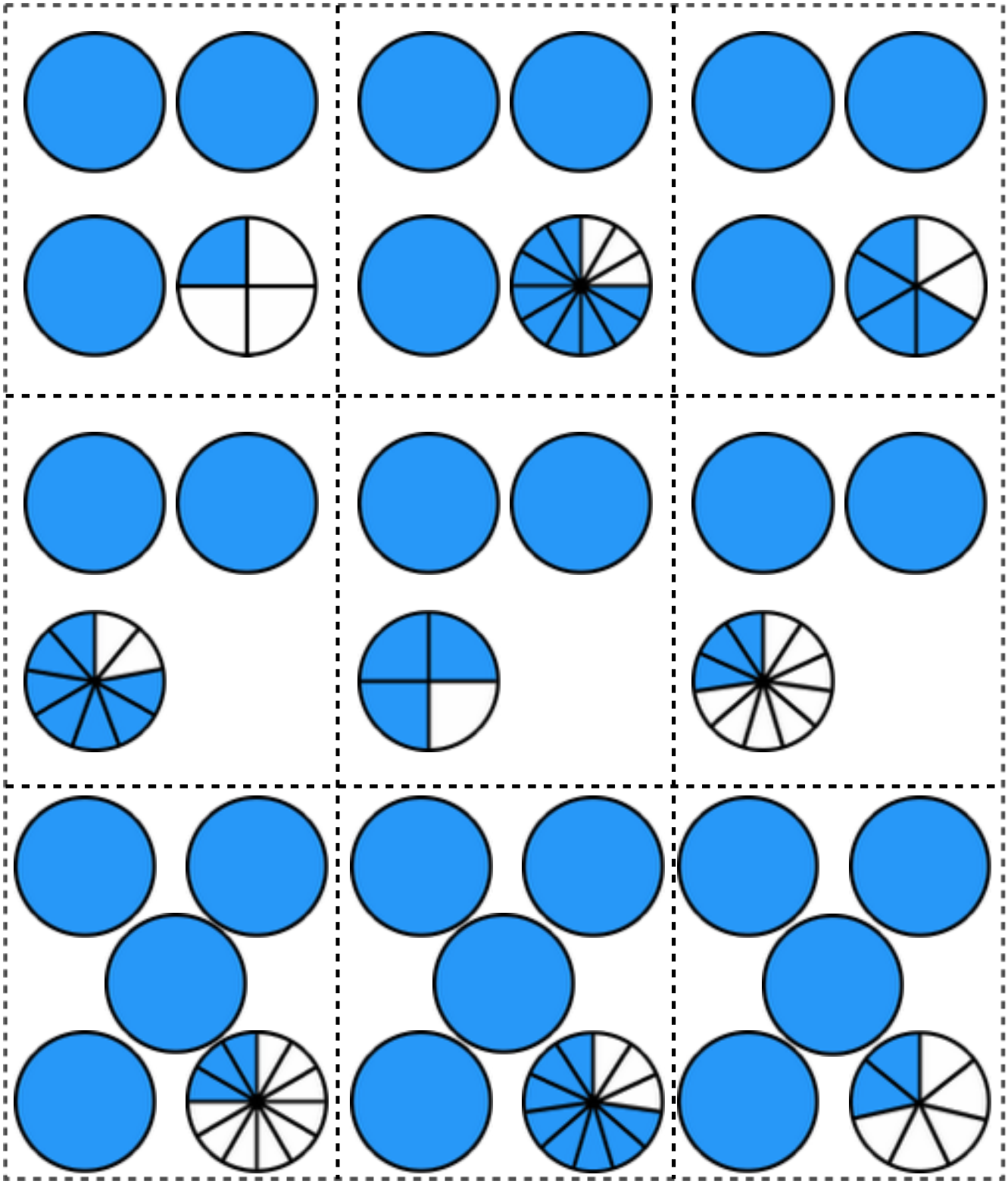
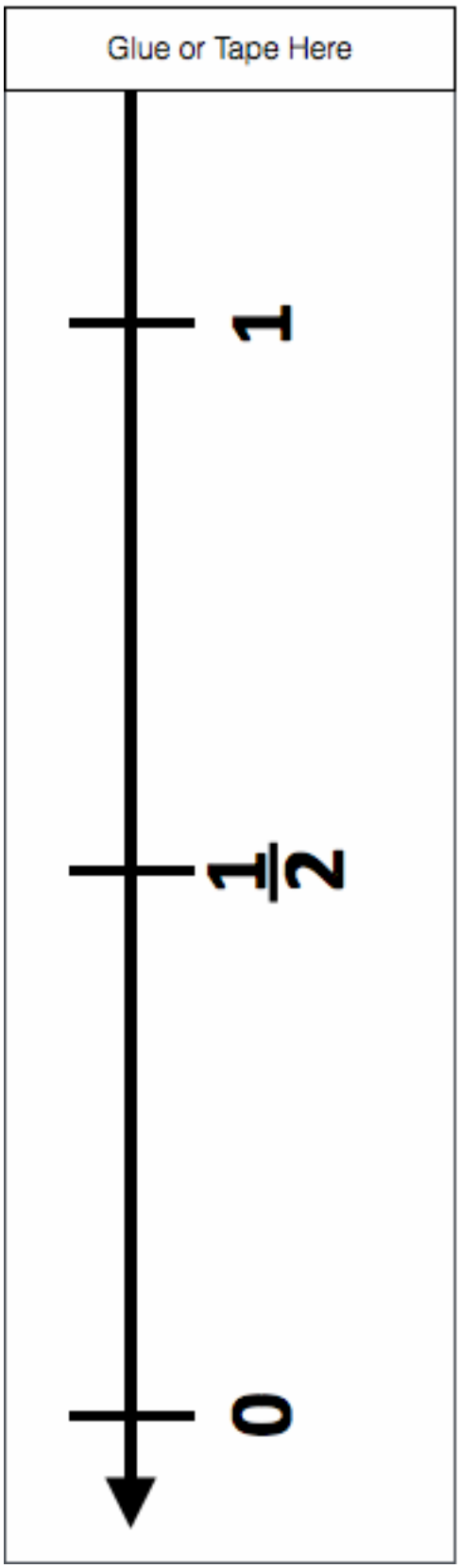
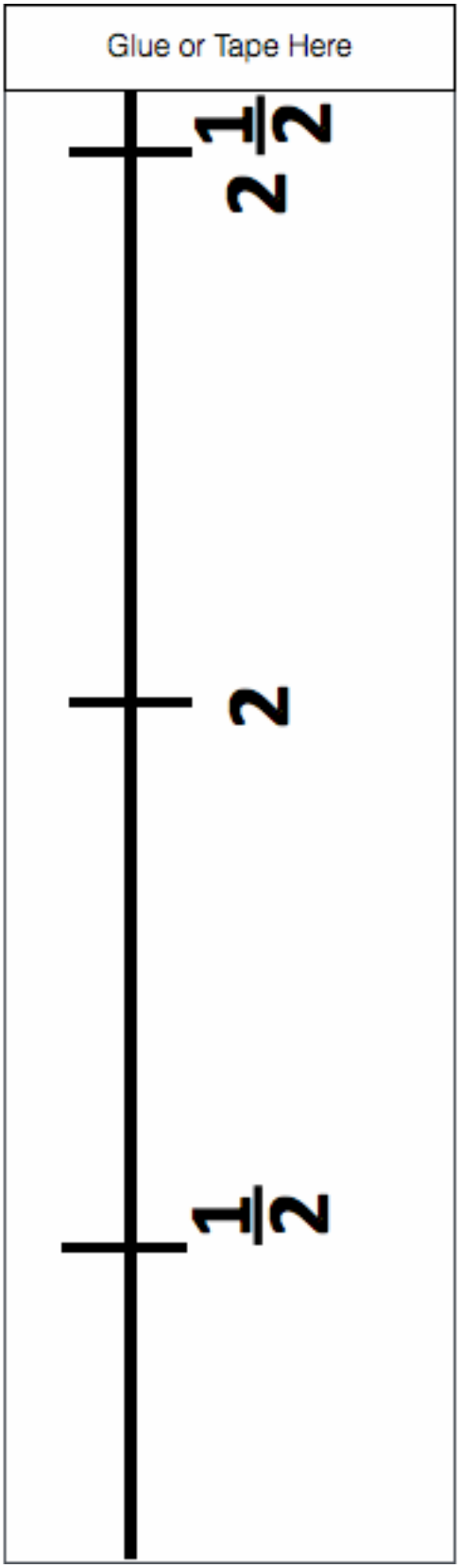


Handout 3.2: Mixed Number Picture Cards



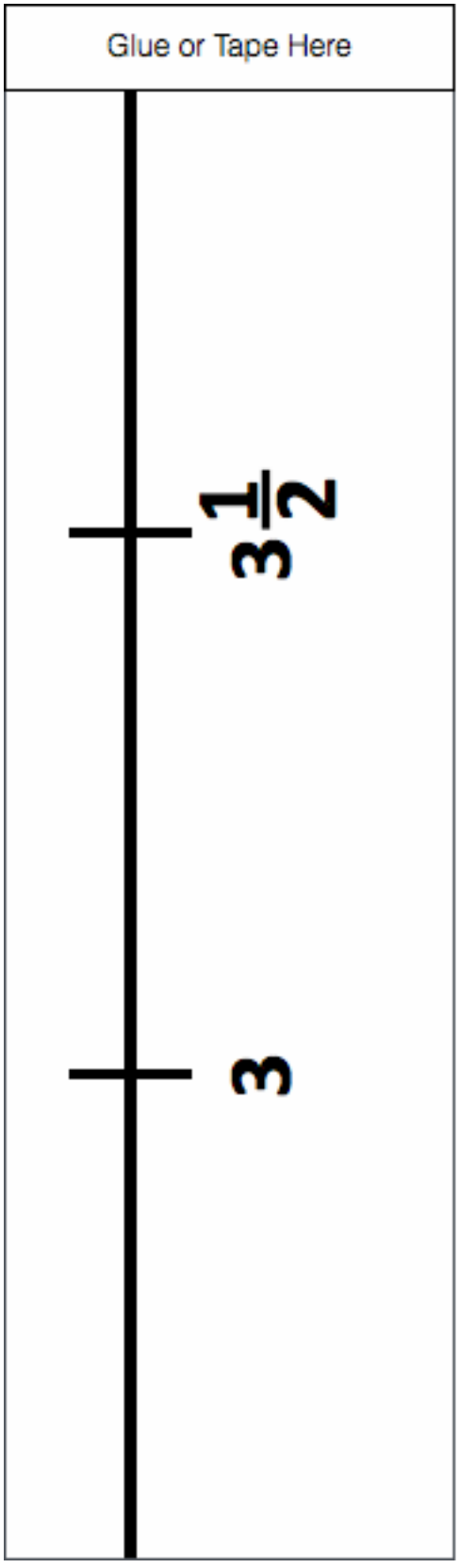
Handout 3.3: Benchmark Fraction Number Lines Print and cut out. Laminate if desired.

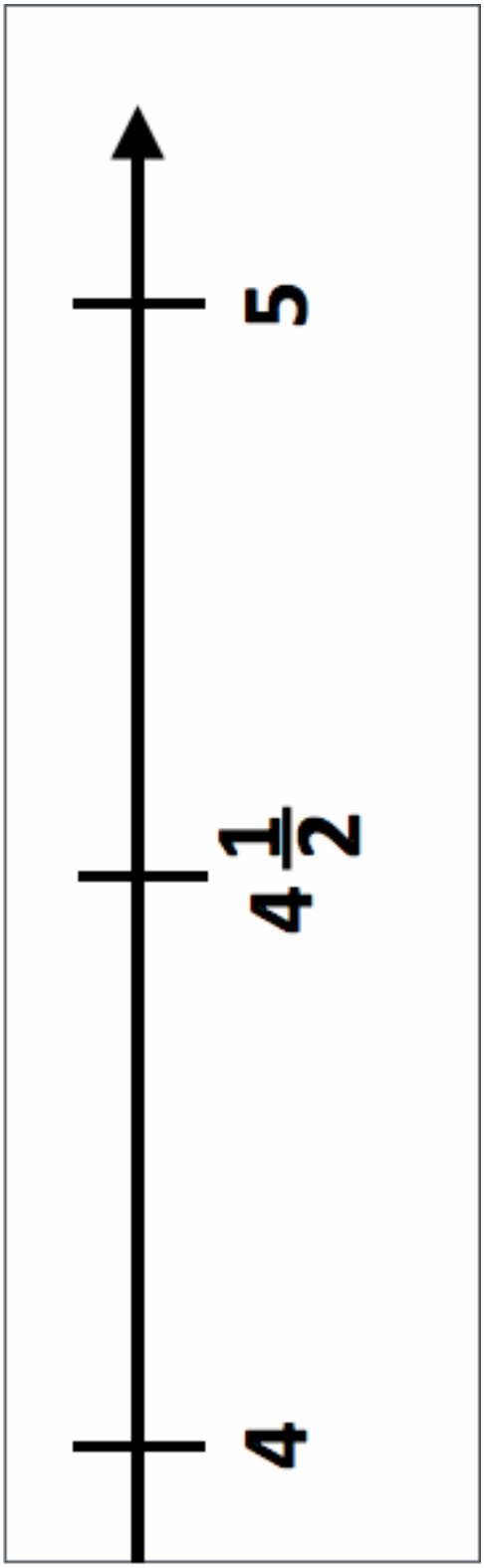




Note: To assemble the Benchmark Fraction Number Line, cut out each strip. Adhere the strips together using glue or tape on the indicated spaces. For increased durability and to allow writing on the number line, laminate the strips before using.

Handout 3.3: Benchmark Fraction Number Lines





Handout 3.4: Operating with Benchmark Fractions

Name: _____

Use benchmark fractions to find a reasonable estimate:

1. $\frac{1}{3} + \frac{5}{7} =$

2. $\frac{7}{9} - \frac{3}{8} =$

3. Ginny, Amari, and Jolie were selling candy bars to raise money to go to the state soccer tournament. Ginny sold $\frac{4}{7}$ of her box, Amari sold $\frac{3}{5}$ of her box, and Jolie sold $\frac{5}{6}$ of her box. About how many boxes did the girls sell in all? Use benchmark fractions to estimate.

4. Mr. Woodward assigned his class a 5 page project about the rock cycle to be turned in Friday. Ryan finished $1\frac{1}{3}$ of his pages on Monday and $1\frac{2}{5}$ of his pages on Tuesday. On Thursdays Ryan has lacrosse practice. About how much of his project is finished? About how many pages does Ryan need to finish on Wednesday if he wants to turn his project in on time?

Handout 3.4: Operating with Benchmark Fractions - Key

Name: _____

Use benchmark fractions to find a reasonable estimate:

1. $\frac{1}{3} + \frac{5}{7} =$

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

2. $\frac{7}{9} - \frac{3}{8} =$

$1 - \frac{1}{2} = \frac{1}{2}$

3. Ginny, Amari, and Jolie were selling candy bars to raise money to go to the state soccer tournament. Ginny sold $\frac{4}{7}$ of her box, Amari sold $\frac{3}{5}$ of her box, and Jolie sold $\frac{5}{6}$ of her box. About how many boxes did the girls sell in all? Use benchmark fractions to estimate.

$\frac{1}{2}$ box + $\frac{1}{2}$ box + 1 box = 2 boxes

4. Mr. Woodward assigned his class a 5 page project about the rock cycle to be turned in Friday. Ryan finished $1\frac{2}{3}$ of his pages on Monday and $1\frac{2}{5}$ of his pages on Tuesday. On Thursdays Ryan has lacrosse practice. About how much of his project is finished? About how many pages does Ryan need to finish on Wednesday if he wants to turn his project in on time?

$1\frac{1}{2}$ page + $1\frac{1}{2}$ page = 3 pages complete

5 pages - 3 pages = 2 pages left

Handout 3.5: Remediation Task Cards

Find the nearest benchmark fraction to the fraction below using models, patterns, or a number line:

$\frac{1}{6}$

1

Lesson 3: Remediation Task Cards

Find the nearest benchmark fraction to the fraction below using models, patterns, or a number line:

$\frac{3}{8}$

2

Lesson 3: Remediation Task Cards

Find the nearest benchmark fraction to the fraction below using models, patterns, or a number line:

$\frac{8}{9}$

1

2

3

Lesson 3: Remediation Task Cards

Find the nearest benchmark fraction to the fraction below using models, patterns, or a number line:

$\frac{7}{10}$

1

2

3

4

Lesson 3: Remediation Task Cards

Find the nearest benchmark fraction to the fraction below using models, patterns, or a number line:

$\frac{5}{6}$

1

Lesson 3: Remediation Task Cards

Find the nearest benchmark fraction to the fraction below using models, patterns, or a number line:

$\frac{3}{7}$

2

Lesson 3: Remediation Task Cards

Find the nearest benchmark fraction to the fraction below using models, patterns, or a number line:

$\frac{5}{12}$

7

Lesson 3: Remediation Task Cards

Find the nearest benchmark fraction to the fraction below using models, patterns, or a number line:

$\frac{3}{4}$

8

Lesson 3: Remediation Task Cards

Find the nearest benchmark fraction to the fraction below using models, patterns, or a number line:

$\frac{6}{10}$

Lesson 3: Remediation Task Cards

9

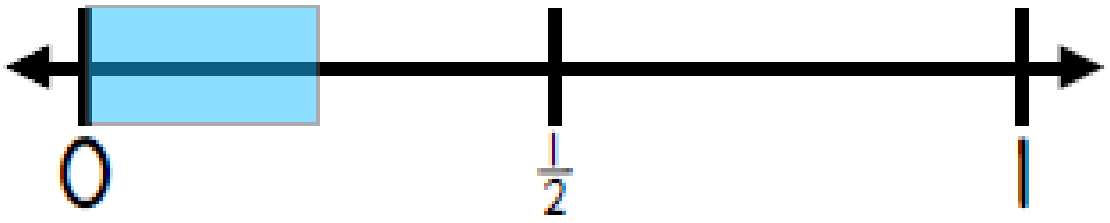
Find the nearest benchmark fraction to the fraction below using models, patterns, or a number line:

$\frac{6}{8}$

Lesson 3: Remediation Task Cards

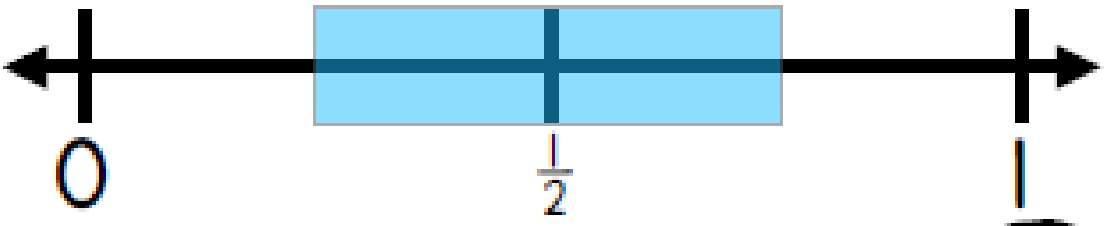
10

Fractions between 0 and $\frac{1}{4}$ round to benchmark fraction 0. What fractions can you think of that are between 0 and $\frac{1}{4}$?



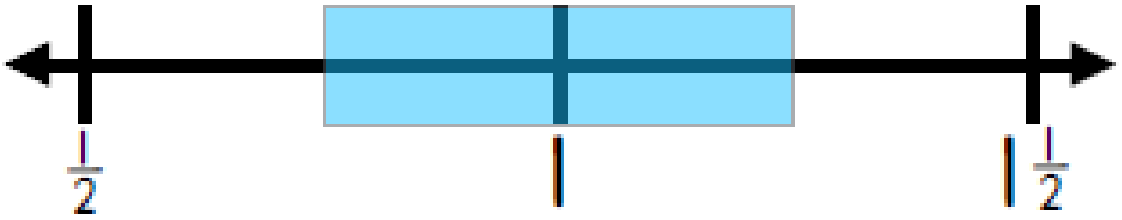
Lesson 3: Remediation Task Cards

Fractions greater than or equal to $\frac{1}{4}$ and less than $\frac{3}{4}$ round to benchmark fraction $\frac{1}{2}$. What fractions can you think of that are between $\frac{1}{4}$ and $\frac{3}{4}$?



Lesson 3: Remediation Task Cards

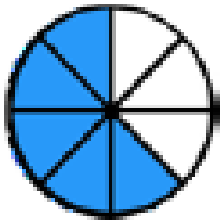
Fractions greater than or equal to $\frac{3}{4}$ and less than $1\frac{1}{4}$ round to benchmark fraction 1. What fractions can you think of that are between $\frac{3}{4}$ and $1\frac{1}{4}$?

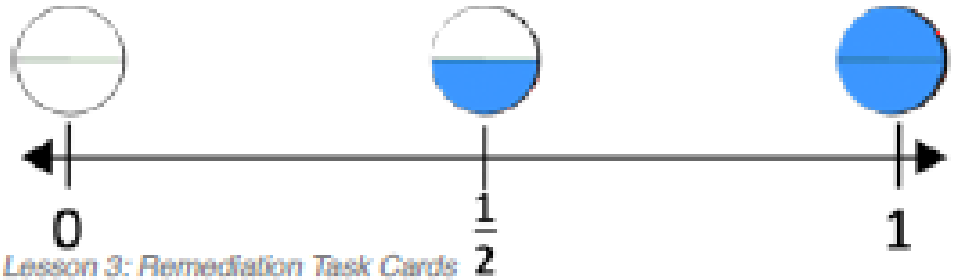


Lesson 3: Remediation Task Cards

13

Levi has $\frac{5}{8}$ of a pizza left over from his party. About how much pizza does Levi have left?

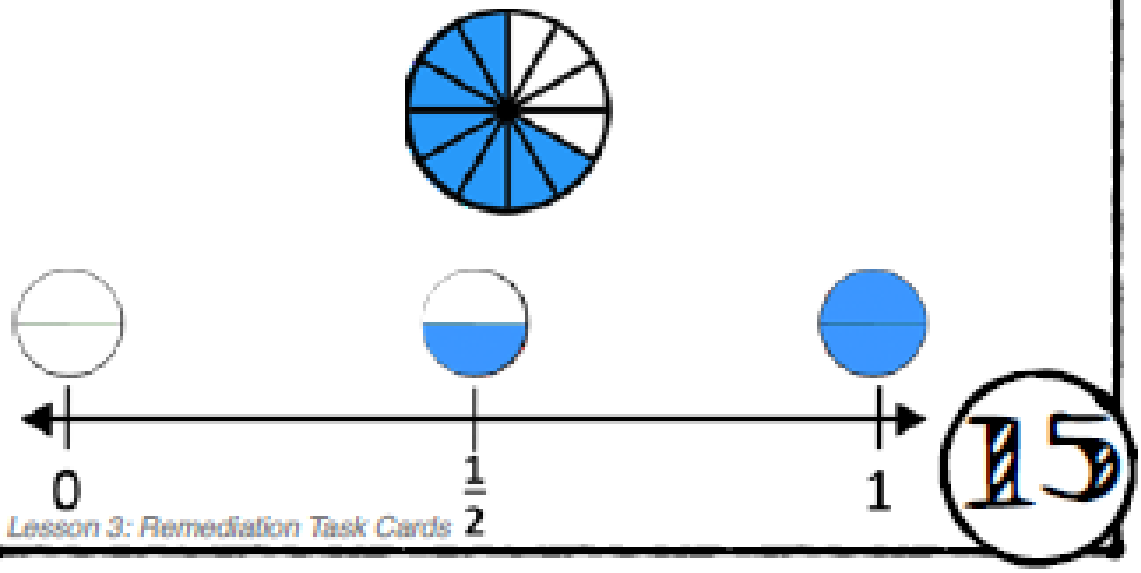




Lesson 3: Remediation Task Cards

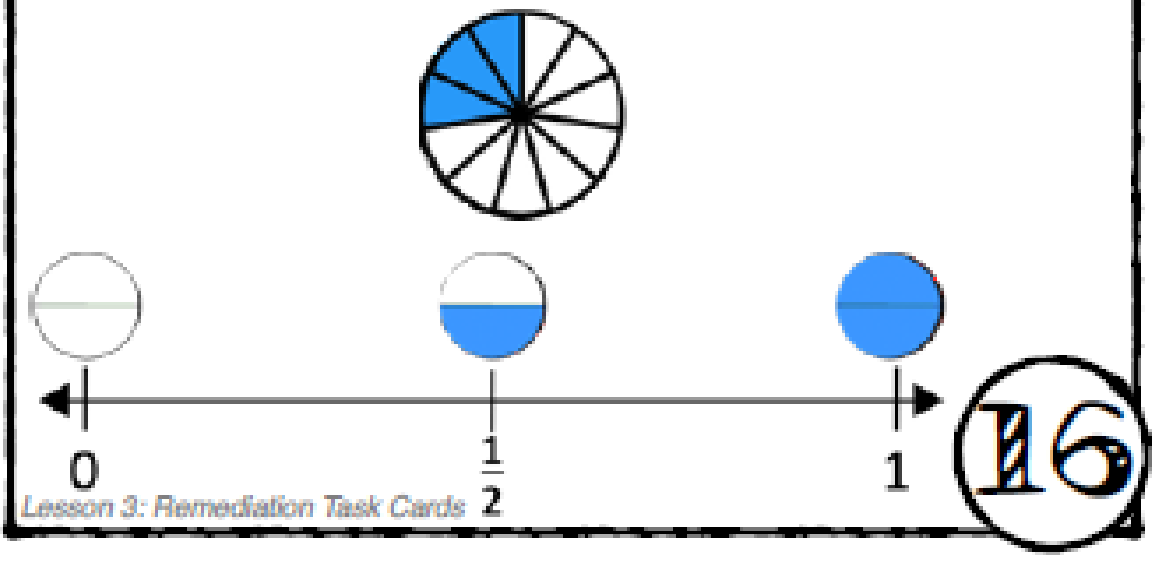
14

Evelyn has finished 8 out of her 12 math homework problems. About how much of her math homework has she finished?



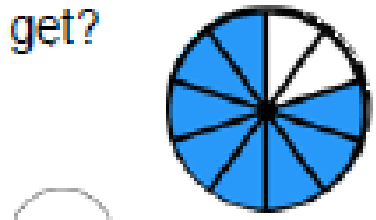
Lesson 3: Remediation Task Cards

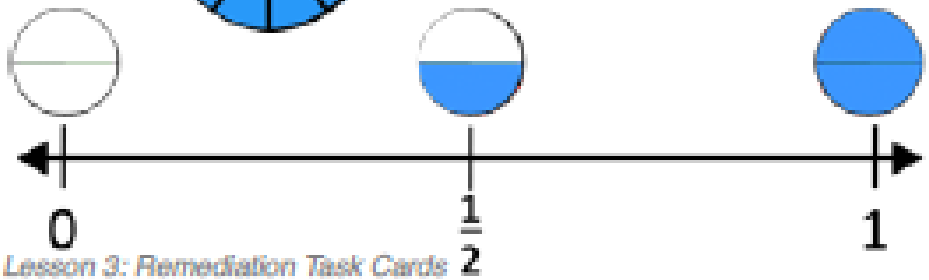
There are eleven chapters in Selena's book. She has read 3 chapters so far. About how much of the book has Selena read?



Lesson 3: Remediation Task Cards

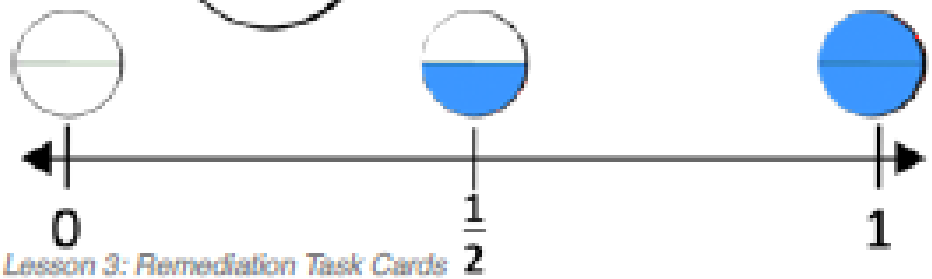
Coach Jankowski was measuring how far his players could run in 15 seconds. Jana made it $\frac{8}{10}$ across the field before he blew the whistle to stop running. About how far across the field did Jana get?





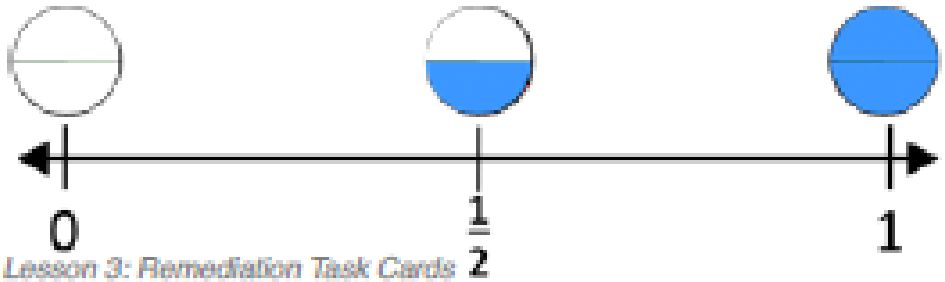
Lesson 3: Remediation Task Cards 17

Jasmine needs to wash 3 loads of laundry. After she does one load, she tells her mom she's just about finished. Jasmine rounded $\frac{1}{3}$ to benchmark fraction 1. Do you agree with her estimate?



Lesson 3: Remediation Task Cards 18

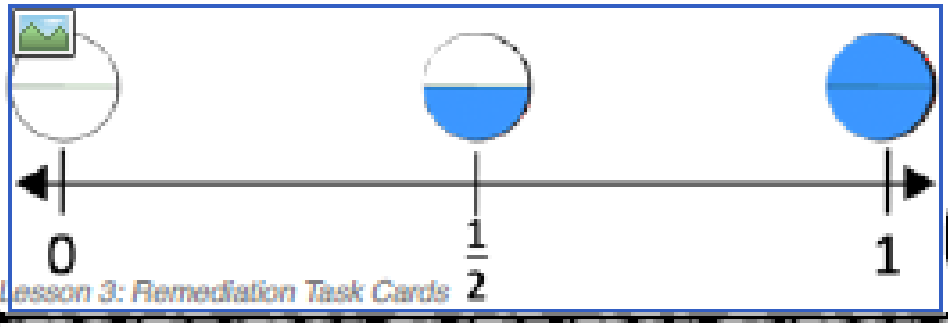
Laurel is trying to memorize the capitals of the 50 states. She has learned 31 of them so far. About what fraction of the state capitals has Laurel learned so far?



Lesson 3: Remediation Task Cards

19

Mr. Scott's class is painting a mural on the wall near the playground. The mural will be 8 feet long, and the have finished 2 feet. About how much of the mural is completed?



Lesson 3: Remediation Task Cards

20

Handout 3.6: Operating with Benchmark Fractions Homework

Name: _____

Use benchmark fractions to find a reasonable estimate:

1. $\frac{1}{8} + \frac{4}{10} =$

2. $\frac{4}{6} - \frac{1}{10} =$

3. The robotics team is building a new robot that will pass pencils around the classroom. The robot requires 20 parts to be assembled to make the entire robot. So far Megan and Brooklyn have assembled 13 of the parts. About what fraction of the robot is already assembled? About what fraction remains to be put together?

4. Jeremiah's mom's car has about $\frac{3}{5}$ of gas in the tank. Taylor's dad's car has $\frac{2}{8}$ of a tank of gas left. Both cars have the same size gas tanks. Taylor says her dad has more gas, but Jeremiah says his mom has more. Use benchmark fractions, models, and words to help Jeremiah and Taylor understand which car has the most gas.

Handout 3.6: Operating with Benchmark Fractions Homework - Key

Name: _____

Use benchmark fractions to find a reasonable estimate:

1. $\frac{1}{8} + \frac{4}{10} =$

$0 + \frac{1}{2} = \frac{1}{2}$

2. $\frac{4}{6} - \frac{1}{10} =$

$\frac{1}{2} - 0 =$

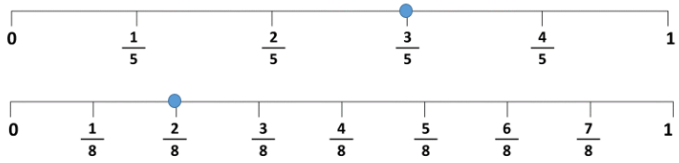
3. The robotics team is building a new robot that will pass pencils around the classroom. The robot requires 20 parts to be assembled to make the entire robot. So far Megan and Brooklyn have assembled 13 of the parts. About what fraction of the robot is already assembled? About what fraction remains to be put together?

about $\frac{1}{2}$ is assembled

about $\frac{1}{2}$ is waiting to be put together

4. Jeremiah's mom's car has about $\frac{3}{5}$ of gas in the tank. Taylor's dad's car has $\frac{2}{8}$ of a tank of gas left. Both cars have the same size gas tanks. Taylor says her dad has more gas, but Jeremiah says his mom has more. Use benchmark fractions, models, and words to help Jeremiah and Taylor understand which car has the most gas.

Answers will vary but one possibility is:
Jeremiah is right. His mom's car has more gas because $\frac{3}{5}$ is more than ½ . Taylor's dad's car has $\frac{2}{8}$ of a tank of gas left and that is less than ½ . Another possibility is to compare number lines:



Lesson 4: Finding Equivalent Fractions

Focus Standard: 5.NF.1

Additional Standard: 5.NF.2

Standards for Mathematical Practice: SMP.1, SMP.2, SMP.3, SMP.6, SMP.7, SMP.8

Estimated Time: 60 minutes

Resources and Materials:

- Anchor chart or poster paper
- Index cards
- Markers
- Tape
- Handout 4.1: Multiply by 1 Cards
- Handout 4:2: Finding Equivalent Fractions Homework
- Using the Giant One tutorial video: https://www.youtube.com/watch?v=Lsa2BIbNFI4
- Using the Giant One tutorial video: http://www.teachertube.com/video/using-big-one-to-find-equivalent-fractions-331478

Lesson Targets:

- Students will find equivalent fractions by multiplying by fractions equal to one.
- Students will determine the needed denominator by using clues in an equation or word problem.

Guiding Questions:

- Why is using benchmark fractions useful when operating with fractions?
- When might you use benchmark fractions in the real world?

Vocabulary

Academic Vocabulary:

- denominator
- equivalent
- fraction
- Identity Property of Multiplication
- model
- numerator

Instructional Strategies for Academic Vocabulary:

- ☐ Introduce words with student-friendly definition and pictures
- ☐ Model how to use the words in discussion
- ☐ Read and discuss the meaning of word in a mathematical context
- ☐ Students write/discuss using the words

Symbol	Type of Text and Interpretation of Symbol
	Instructional support and/or extension suggestions for students who are EL, have disabilities, or perform well below grade level and/or for students who perform well above grade level
✓	Assessment (Pre-assessment, Formative, Self, or Summative)

Instructional Plan

Understanding Lesson Purpose and Student Outcomes:
Students will use the Identity Property of Multiplication to find common denominators to add and subtract fractions. Students will determine the needed denominator by analyzing patterns of factors or by analyzing the equation or word problem. Students will then use the fractions with common denominators to add and subtract with the fractions.

Anticipatory Set/Introduction to the Lesson: Walk and Share
Tell students to make a list of all the ways people use fractions in everyday life. Give two sticky notes to each student and instruct them to write two different items from their list, one on each sticky note. Tell students to walk around the room, trading sticky notes for ones they don't have so that they have two new ways to use fractions in everyday life. Tell students to return to their seats and add the new ideas to their list.

✓ Monitor the activity and observe any misconceptions. Misconceptions should be clarified and dispelled during or at the end of the activity or in small group time with the teacher.

Some suggestions to get the students thinking include

- measurement (parts of inches, feet, miles, pounds, etc.)
- directions ("Go one and a half blocks north," etc.)
- cooking (cups, ounces, sticks of butter, etc.)
- referring to time (making schedules, dividing hours, etc.)
- anything with decimals
- sharing food or materials
- budgeting or spending money
- estimating
- nutrition (servings of food groups)

Remind students that they may think of ways they use fractions during any point of the day. When a teacher asks the class to read from the bottom half of page 324 to the middle of 326, they are using fractions! When students are counting the number of minutes until the final bell rings, they are looking at sixtieths of an hour! Fractions are all around us!

Activity 1: Introducing Equivalent Fractions

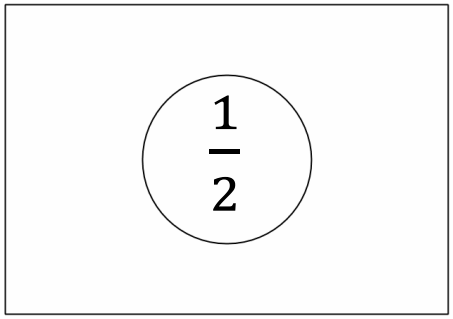
Ask: "What do we mean when we say two numbers are equal?" Students should make suggestions and discuss one another's suggestions. You may choose to draw a balance to remind students that values don't have to look the same to be equal.

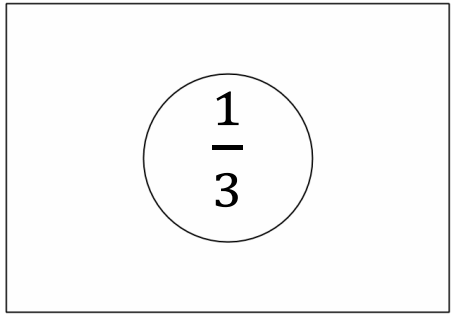
Prompting Questions:

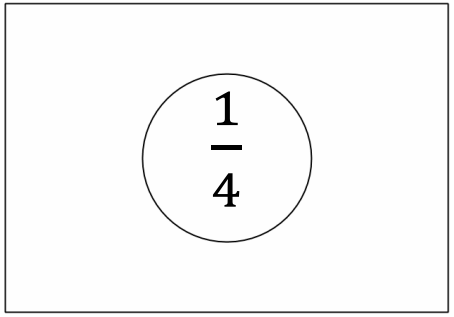
- How can an expression be equal to a number?
- How can a model be equal to a number?
- How can a fraction be equal to a number? (Think: $\frac{8}{4} = 2$, as in eight quarters is equal to two dollars.)

Introduce the word *equivalent*, pointing out the morphology of the root *equi-* meaning equal. Ask students if there are other words with the same root. (*equilateral*, *equidistant*, *equiangular*, and *equivocal,* also *equator* and *equinox*)

Divide the students into groups and give each group plain paper to make graphic organizers. Tell students to draw a circle in the center of each page and put one unit fraction in the center of each circle. Use these unit fractions: $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$. Tell students to work as a team to make as many numerical and pictorial representation of each of the unit fractions. Place the representations in the space outside of the circle.







For students who are EL, have disabilities, or perform well below grade level:

- Assign fractions that are simpler to visualize or are more common (half, fourth)
- Assign students a graphic organizer with 1 in the center. Allow them to generate as many fractions that equal one as they can, and allow these students to be the experts as you teach The Giant One activity.

Extensions for students with high interest or working above grade level:

- Assign more difficult fractions to visualize (fifths, sevenths, twelfths) to challenge the students' ability to conceptualize the value and equivalence.

Prompting Questions:

- What tools can you use to find fractions that are equivalent?
- Is there a way to prove fractions are equivalent?
- Are there patterns you notice among equivalent fractions?
- *If students have found a pattern:* Can you use a pattern to generate more equivalent fractions without using models?

✓ Circulate through the groups, asking students about the strategies they are using and questioning misconceptions they display. If several students share the same misconceptions, clarify the misconception through small group or whole class instruction.

Post students' graphic organizers in a highly visible and accessible location. Students will be adding to and referring to the charts over the next several days.

Activity 2: Using the Giant One to Find Equivalent Fractions

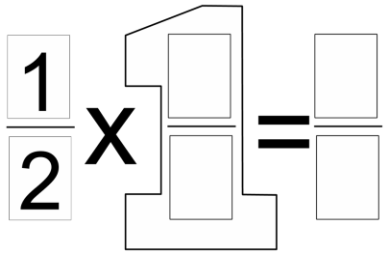
Ask students "What happens when we multiply or divide a number by 1?" Discuss their responses leading them to recall that any fraction with a numerator and denominator that has the same digit is equal to 1.

Note: Students may be familiar with the Identity Property of Multiplication. The concept is taught in 3rd grade (3.OA.5, 3.OA9) but the term "Identity Property of Multiplication" is not required.

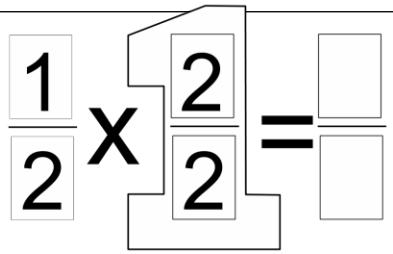
Place one card from **Handout 4.1: Multiply by 1 Cards** face down on each student's desk. Tell students not to turn their card over until it is their turn. Tell students to take turns standing up, reading their problem and giving the product of their multiplication expression. They do this quickly. After each has had a turn, ask students what they predict would happen if we were to multiply a fraction by the number one. Students should know that the value stays the same.

Ask, "How can we write the number 1 as a fraction?" Students should reply that the numerator and denominator would be the same. Students may initially respond that the numerator and the denominator would be one. This would be an opportune time to bring in the expert group from Activity 1 (the intervention group) to explain that all fractions with a numerator and a denominator that are the same equal one.

Tell students that we can find fractions that are equivalent by using the Giant One. Display the following equation:



Students will know from the previous discussion that $\frac{1}{4}$ x 1 will equal $\frac{1}{4}$. Add the fraction $\frac{2}{2}$ to the Giant One.



Ask, "What is the value of $\frac{2}{2}$?" If any students still provide incorrect answers, call on the experts again to remind students that fractions with a numerator and denominator that are equal are always equal to 1. Now prompt students to multiply $\frac{1}{2} \times \frac{2}{2}$. We know from the Identity Property of Multiplication that any number multiplied by 1 does not change its value. This means 1, $\frac{1}{1}$ and $\frac{2}{2}$ are equivalent. We can use models to confirm or justify this. (Have students draw models either on the board, document camera or at their desks to show that $\frac{1}{2} = \frac{2}{4}$. If is not on the poster of fractions equivalent to $\frac{1}{2}$, have a student add it.

For students who are EL, have disabilities, or perform well below the grade-level text band:

- Have students find fractions equivalent to unit fractions (numerator equals 1)
- Allow students to use a multiplication chart or other manipulative to find products

Extensions for students with high interest or working above grade level:

- Assign students a less concrete fraction (i.e., 3/17) to find an equivalent fraction
- Assign students a mixed number or an improper fraction to find an equivalent fraction

Repeat this several more times using $\frac{3}{3}$, $\frac{4}{4}$, $\frac{5}{5}$, and $\frac{6}{6}$ in the Giant One.

Prompting Questions:

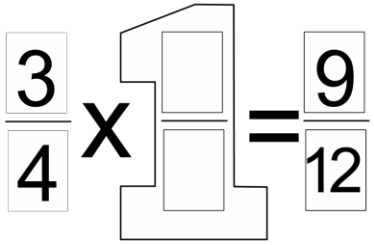
- What patterns do you see?
- Can you predict fractions equivalent to $\frac{1}{2}$ using that pattern (SMP.8)?

By looking for patterns in the sequence of products, students begin to see that when the numerator and denominator are multiplied by the same value, the resulting fraction is equivalent to the original fraction. Students see the progression of the numbers in the resulting products as compared to the other two fractions and make the connection to multiplication facts (SMP.7)

Have students work with a partner to find equivalent fractions using the Giant One. Each student is given an index card. Each partner writes a fraction (any fraction) on their index card. Partners exchange index cards. Students use the Giant One strategy to find 3 equivalent fractions showing their work on the index card. When both are finished, check and compare each other's work. If partners disagree, they should use models to justify their conclusions. Students use also models to attend to precision and calculate accurately (SMP.3 &SMP.6).

Activity 3: Using the Giant One to Find Fractions with Common Denominators

Explain that sometimes we need to find an equivalent fraction with a certain number denominator to carry out an operation. Suppose that we need to find a fraction equivalent to $\frac{3}{4}$ with a denominator of 12. We can use the Giant One for this! Display the following equation:

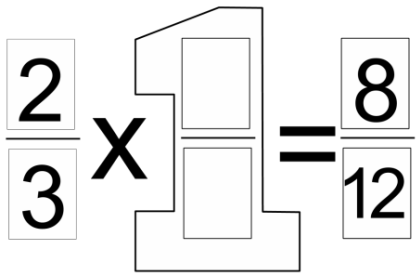


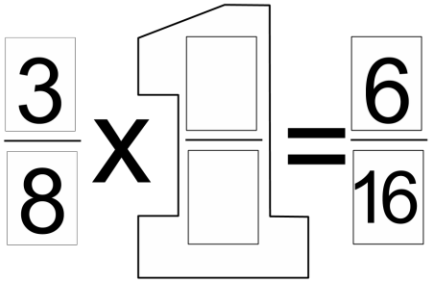
Now I must ask myself a question: Self, how can I determine the numerator and denominator of the fraction inside the Giant One?

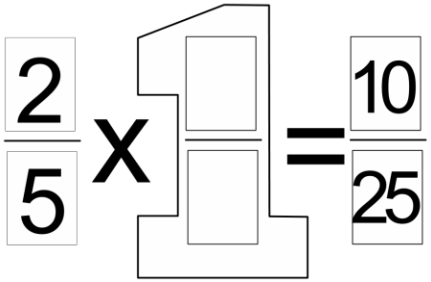
Model the steps required:

- Looking at my numerators, I see 4 times something equals 12. I know that 4 times 3 equals 12. I also know that 12 divided by 4 equals 3, so I am confident that 3 is the numerator in the Giant One.
- Looking at my denominators, I see 3 times something equals 9. I know that 3 times 3 equals 9. I also know that 9 divided by 3 equals 3, so I am certain that 3 is the denominator in the Giant One.
- I need to check my work. Now I see that $\frac{3}{3}$ is the fraction inside the Giant One. 3 x 3 = 9, 4 x 3 = 12. That all looks correct. Also, $\frac{3}{3}$ is equal to 1 because the numerator and the denominator are equal.

Repeat modeling with other examples, gradually releasing the steps to the students.







Students work with a partner to find the missing factor using the Giant One. Each student is given an index card. Each partner writes 3 equivalent fraction expressions on their index card, omitting the fraction in the Giant One. Partners exchange index cards. Students use division to find the missing factor fractions showing their work on the index card. When both are finished, check and compare each other's work. If partners disagree, use words and models to justify. Students use models to attend to precision and calculate accurately (SMP.3 & SMP.6).

✓ Actively monitor students, checking for accuracy and probing students about the process of finding equivalent fractions

Prompting Questions:

- How did you decide what numbers to put inside the Giant One?
- Did your partner find fractions equivalent to the fraction you provided him/her?
- Could you find a fraction equivalent to $\frac{1}{2}$ with an odd number in the denominator? (Students could answer in several ways. Students may say that no, you cannot divide an odd number in half equally, or no, any number multiplied by two will have an even product, or they may say yes, you can. Have students who are unsure experiment with the numbers to find an answer.)

For students who are EL, have disabilities, or read well below the grade-level text band:

- Allow students to use a multiplication chart or other manipulative to find products
- Have students match pictorial representations of equivalent fractions

Extensions for students with high interest or working above grade level:

- Require students to justify their equivalent fractions by plotting the fractions on a number line
- Assign students a less concrete fraction (i.e., $\frac{3}{17}$) to find an equivalent fraction

Activity 4: Using the Giant One to Find Missing Factors with Common Denominators

Display the following equation:

$$\frac{\square}{\square} \times \frac{7}{7} = \frac{14}{21}$$

Ask students "How can we determine the numerator and denominator of the missing factor?"

Model the steps of finding the missing factor.

- Divide the numerator in the product by the numerator in the factor inside the Giant One. 14 ÷ 4 = 2
- Divide the denominator in the product by the denominator in the factor inside the Giant One. 21 ÷ 7 = 3
- The first factor is the fraction $\frac{2}{3}$.

Note: Students may point out that the position of the missing factor is irrelevant due to the Commutative Property of Multiplication. Encourage that insight, but continue modeling for students who have not yet made that connection. Students who seem to be arriving at solutions or connections quickly can be challenged to create another problem for the teacher to model. This requires students to think through the steps of finding an equivalent fraction numerically and provides added ownership of the class discussion (SMP.1 & SMP.2).

Repeat modeling, gradually releasing the steps to the students. Students work with a partner to find the missing factor using the Giant One. Each student is given an index card. Each partner writes 3 equivalent fraction expressions on their index card omitting the first factor fraction. Partners exchange index cards. Students use division to find the missing factor fractions showing their work on the index card. When both are finished, check and compare each other's work. If partners disagree, use models to justify. Students use models to attend to precision and calculate accurately (SMP.3 & SMP.6).

Activity #5 - Exit Ticket

1. Write 3 fractions that are equivalent to $\frac{3}{5}$ _____
2. Write 3 fractions that are equivalent to $\frac{9}{20}$ _____

✓ Assess student work for accuracy and understanding of the day's concepts. If many students demonstrate the same misconceptions, note the students who require re-teaching in a small group.

Reflection and Closing: Making Predictions Based on Patterns

✓ Remind students that we must find common denominators to add and subtract fractions, and we use equivalent fractions to find common denominators.

Prompting Questions:

- What fraction equal to one could you use to find denominators equal to 10, 25, and 50?
- What fraction equal to one might you use to find denominators equal to 6, 8, and 10?

Self-Assessment

Have students rate them understand of using the Giant One by raising their hands showing:
5 fingers – Got it! Let's keep going!
3 fingers – I'm with you, but let's keep practicing!
1 finger – I'm lost! Help me!

Homework

Homework Assignment:

Distribute **Handout 4:2 Finding Equivalent Fractions**

Homework. **Parent Resources:**

5th Grade Family Guide Book page 30 - equivalent fractions

http://www.mde.k12.ms.us/docs/elementary-education-and-reading-library/fgss_5th-grade_print-view.pdf?sfvrsn=2

YouTube video (short)

Teacher Tube video (long)

Handout 4.1: Multiply by 1 Cards

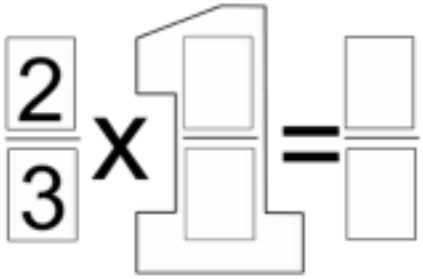
Print on card stock and cut out.

6 x 1	2 x 1	3 x 1	5 x 1	9 x 1
15 x 1	66 x 1	36 x 1	53 x 1	45 x 1
516 x 1	354 x 1	225 x 1	736 x 1	815 x 1
60 x 1	21 x 1	92 x 1	49 x 1	84 x 1
237 x 1	502 x 1	912 x 1	608 x 1	858 x 1
874 x 1	751 x 1	330 x 1	413 x 1	650 x 1
$\frac{1}{3}$ x 1	$\frac{2}{5}$ x 1	$\frac{9}{18}$ x 1	$\frac{12}{17}$ x 1	$\frac{10}{33}$ x 1

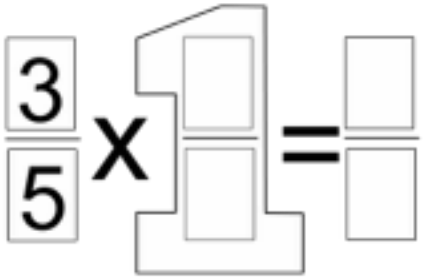
Handout 4.2: Finding Equivalent Fractions Homework

Name: _____

1. Use the Giant One to find the six fractions equivalent to $\frac{2}{3}$.



2. Use the Giant One to find the four fractions equivalent to $\frac{3}{5}$.



3. If you were asked to solve the expression $\frac{2}{3} + \frac{1}{6}$, what fraction from your list in #1 could help you solve the problem? Why did you choose this fraction?

_____

_____

4. If you were asked to solve the expression $\frac{3}{5} + \frac{1}{10}$, what fraction from your list in #2 could help you solve the problem? Why did you choose this fraction?

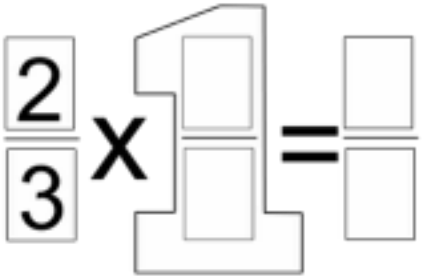
_____

_____

Handout 4.2: Finding Equivalent Fractions Homework - Key

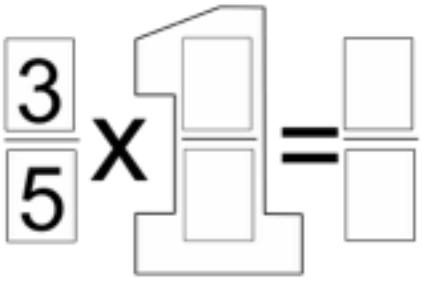
Name: _____

1. Use the Giant One to find the six fractions equivalent to $\frac{2}{3}$.



list could include, but is not limited to:
$\frac{4}{6}, \frac{6}{9}, \frac{8}{12}, \frac{10}{15}, \frac{12}{18}, \frac{14}{21}, \frac{16}{24}, \frac{18}{27}, \frac{20}{30}, \frac{22}{33}, \frac{24}{36}$

2. Use the Giant One to find the four fractions equivalent to $\frac{3}{5}$.



list could include, but is not limited to:
$\frac{6}{10}, \frac{9}{15}, \frac{12}{20}, \frac{15}{25}, \frac{18}{30}, \frac{21}{35}, \frac{24}{40}, \frac{27}{45}, \frac{30}{50}, \frac{36}{55}, \frac{39}{60}$

3. If you were asked to solve the expression $\frac{2}{3} + \frac{1}{6}$, what fraction from your list in #1 could help you solve the problem? Why did you choose this fraction?

Students should select $\frac{4}{6}$ and provide some rationale to show that they understand that having like denominators allows us to add.

4. If you were asked to solve the expression $\frac{3}{5} + \frac{1}{10}$, what fraction from your list in #2 could help you solve the problem? Why did you choose this fraction?

Students should select $\frac{6}{10}$ and provide some rationale to show that they understand that having like denominators allows us to add.

Lesson 5: Fraction Scoot

Focus Standards: 5.NF.1, 5.NF.2

Standards for Mathematical Practice: SMP.5, SMP.7

Estimated Time: 60 minutes

Resources and Materials:

- Handout 5.1: Fraction Scoot Cards
- Handout 5.2: Fraction Scoot Answer Sheet
- Handout 5.3: Phone a Friend Cards

Lesson Target:

- Students will demonstrate understandings of adding fractions using models, using benchmark fractions to determine reasonableness, and finding equivalent fractions.

Guiding Questions:

- How do benchmark fractions help determine reasonableness?
- How do we find equivalent fractions?

Vocabulary

Academic Vocabulary:	Instructional Strategies for Academic Vocabulary:
● denominator ● difference ● equivalent ● fraction ● mixed number ● model ● numerator ● reasonable ● sum	☐ Students write/discuss using the words

Symbol	Type of Text and Interpretation of Symbol
	Instructional support and/or extension suggestions for students who are EL, have disabilities, or perform well below grade level and/or for students who perform well above grade level
✓	Assessment (Pre-assessment, Formative, Self, or Summative)

Instructional Plan

Understanding Lesson Purpose and Student Outcomes:
Students will complete a Scoot activity to demonstrate understanding of adding fractions using models, using benchmark fractions to determine reasonableness, and finding equivalent fractions. The tasks are designed to guide students into adding and subtracting fractions using common denominators.

Anticipatory Set/Introduction to the Lesson: Review the graphic organizers of equivalent fractions from the previous lesson. Add at least one equivalent fraction to each poster and review rules for using the Giant One.

Activity 1: Fraction Task Cards Scoot Activity
The task cards are designed to be completed as a Scoot activity. In a Scoot, students move from one task card to another to answer all of the questions by the end of the class period. Cards can be placed on desks, with students scooting from seat to seat, or on the walls around the room, with students scooting from location to location. An alternative to having the students move is moving the cards. Students remain in their seats and scoot the cards in a predetermined order, so that each student receives every card by the end of the period.

Distribute **Handout 5.2: Fraction Scoot Answer Sheet** to each student. Give each student one Phone a Friend card from **Handout 5.3: Phone a Friend Cards.** Explain how the game will be played based on whether the students will move or the Scoot cards will move. Tell students they will write their answers on the answer sheet. Remind students to look for patterns (SMP.7). Distribute fraction tiles, pattern blocks, number lines, and fraction circles for students to use when solving (SMP.5).
Note: If you elect to scoot the cards instead of the students, make sure students understand exactly the direction the cards should move to eliminate potential confusion.

For students who are EL, have disabilities, or perform well below the grade-level text band:

- Allow students to work with partners to complete the tasks
- Shorten the assignment to only the even-numbered cards, or only the first twelve cards.

Reflection and Closing:

- ✓ Review the skills practiced in today's Scoot activity (adding and subtracting with benchmark fractions, using benchmark fractions to determine reasonableness, adding and subtracting with manipulatives, and finding equivalent fractions).

Homework

Homework Assignment: No homework today.

Handout 5.1: Fraction Scoot Cards

Use manipulatives to find the sum:

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

1

Lesson 5: Fraction Scoot

Taniyah is reading a book with 12 chapters. She has read $\frac{1}{4}$ of the chapters. Use the Giant One to figure out how many of the 12 chapters she has finished.

$$\frac{1}{4} \times \frac{\square}{\square} = \frac{?}{12}$$

2

Lesson 5: Fraction Scoot

Use benchmark fractions to determine if the sum is reasonable:

$$2\frac{3}{8} + 1\frac{2}{10} \approx 4$$

Write *reasonable* or *unreasonable*.

3

Lesson 5: Fraction Scoot

Raven and Jacob are collecting names for their petition to build a new track at their school. Raven has already gotten $\frac{3}{10}$ of the signatures they need, and Jacob has gotten $\frac{2}{3}$ of the signatures they need. Use benchmark fractions to determine about how many signatures they have in all.

4

Lesson 5: Fraction Scoot

Use manipulatives to find the sum:

$$\frac{3}{4} + 2\frac{1}{8} =$$

5

Lesson 5: Fraction Scoot

Emily and Estefany are making jewelry to give their friends. One necklace is $\frac{2}{8}$ red beads, $\frac{5}{12}$ yellow beads, and $\frac{1}{3}$ pink beads. Use the Giant One to find many **twelfths** of the necklace are pink.

$$\frac{1}{3} \times \frac{\square}{\square} = \frac{?}{12}$$

6

Lesson 5: Fraction Scoot

Use benchmark fractions to determine if the sum is reasonable or unreasonable.

$$5\frac{4}{6} + 2\frac{4}{9} \approx 8$$

Write *reasonable* or *unreasonable*.

7

Lesson 5: Fraction Scoot

Aniya played $1\frac{2}{5}$ hours of a video game on Thursday, $\frac{7}{8}$ hours of the game on Friday, and $3\frac{2}{9}$ hours of the game on Saturday. Use benchmark fractions to estimate about how many hours of the game Aniya has played.

8

Lesson 5: Fraction Scoot

Use benchmark fractions to determine if the sum is reasonable or unreasonable.

$$1\frac{6}{8} + 1\frac{4}{6} \approx 3\frac{1}{2}$$

Write *reasonable* or *unreasonable*.

Lesson 5: Fraction Scoot

9

Use manipulatives to find the sum:

$$2\frac{4}{5} + 3\frac{1}{10} =$$

Lesson 5: Fraction Scoot

10

Chance volunteers at the Humane Society after school and on the weekends. He needs to find a common denominator so that he can add up all his times that he has worked.

Saturday	$\frac{1}{2}$ hour
Monday	$\frac{7}{10}$ hour
Tuesday	$\frac{5}{15}$ hour
Friday	$\frac{2}{6}$ hour

Use the Giant One to find the amount of time Chance worked with a denominator of 30.

Lesson 5: Fraction Scoot

11

The Lakewood Elementary School art class is painting a mural in their cafeteria. The 5th graders completed $4\frac{1}{5}$ sections of the mural, the 4th graders completed $5\frac{5}{8}$ sections of the mural, and the 3rd graders completed $2\frac{4}{6}$ sections of the mural. Use benchmark fractions to determine about how many sections of the mural are completed.

Lesson 5: Fraction Scoot

12

Use manipulatives to find the sum:

$4\frac{1}{3} + 3\frac{2}{9} =$

Lesson 5: Fraction Scoot

Jabari runs every day after school. Look at the table. Use benchmark fractions to find about how many miles Jabari ran in all this week.

Monday	$1\frac{4}{6}$ miles
Tuesday	$2\frac{2}{5}$ miles
Wednesday	$1\frac{2}{9}$ miles
Thursday	$3\frac{4}{10}$ miles

Lesson 5: Fraction Scoot

Use benchmark fractions to determine if the difference is reasonable or unreasonable.

$$3\frac{7}{12} - 1\frac{3}{14} \approx 2\frac{1}{2}$$

Write *reasonable* or *unreasonable*.

15

Lesson 5: Fraction Scoot

Lana was trying to find out how far her class had come toward raising 60 boxes of food for the food pantry. She knows she has 24 of the 60 boxes filled. Use the Giant One to figure out how many **fifths** of the way toward the goal Lana's class is.

$$\frac{?}{5} \times \frac{\square}{\square} = \frac{24}{60}$$

16

Lesson 5: Fraction Scoot

Use benchmark fractions to determine if the difference is reasonable or unreasonable.

$$7\frac{12}{14} - 4\frac{2}{6} \approx 4\frac{1}{2}$$

Write *reasonable* or *unreasonable*.

Lesson 5: Fraction Scoot

17

Alison wants to find a common denominator so that she can put these fractions in order from greatest to least. Use the Giant One to rewrite these fractions with the denominator **20**.

$$\frac{3}{10},\ \frac{4}{5},\ \frac{1}{2},\ \frac{3}{4}$$

Lesson 5: Fraction Scoot

18

Use manipulatives to find the sum:

$\frac{3}{4} + 2\frac{1}{8} =$

19

Lesson 5: Fraction Scoot

Use manipulatives to find the sum:

$5\frac{1}{10} + 1\frac{1}{2} =$

20

Lesson 5: Fraction Scoot

Hannah says that if she completes $\frac{2}{10}$ of her reading tonight and $\frac{3}{7}$ of her reading tomorrow night, she'll have about all of it finished. Jeremy disagrees. He says she'll only have about $\frac{1}{2}$ of it complete. Using benchmark fractions, who is correct?

Lesson 5: Fraction Scoot

21

Use benchmark fractions to determine if the sum is reasonable or unreasonable.

$$3\frac{3}{10} + 2\frac{2}{6} \approx 6$$

Write *reasonable* or *unreasonable*.

Lesson 5: Fraction Scoot

22

Della collects books by R.L Stine. $\frac{1}{2}$ of her collection are new books she bought with her own money. Another $\frac{3}{8}$ of her collection were birthday gifts. If Della has 40 books, how many books were birthday gifts? Use the Giant One to solve.

$$\frac{3}{8} \times \frac{\square}{\square} = \frac{?}{40}$$

23

Lesson 5: Fraction Scoot

Use manipulatives to find the sum:

$$2\frac{1}{3} + 2\frac{1}{4} =$$

$2\frac{7}{12}$

Lesson 5: Fraction Scoot

Handout 5.2 Fraction Scoot Answer Sheet

Name: _____

1.	2.	3.	4.
5.	6.	7.	8.
9.	10.	11.	12.
13.	14.	15.	16.
17.	18.	19.	20.
21.	22.	23.	24.

Handout 5.2 Fraction Scoot Answer Sheet - Key

Name: _____

Handout 5.3 Phone a Friend Cards

Print on card stock and cut out.

Lesson 6: Adding and Subtracting Unlike Fractions

Focus Standards: 5.NF.1, 5.NF.2

Standards for Mathematical Practice: SMP.1, SMP.2, SMP.6, SMP.7, SMP.8

Estimated Time: 60 minutes

Resources and Materials:

- Handout 6.1: Guided Practice
- Handout 6.2: Climbing the Mountain Student Record Sheet
- Handout 6.3: Climbing the Mountain Question Cards
- Handout 6.4: Adding and Subtracting Unlike Fractions Homework
- Adding Fractions with Unlike Denominators video: https://www.khanacademy.org/math/arithmetic/fraction-arithmetic/arith-review- add-sub-fractions/v/adding-small-fractions-with-unlike-denominators
- Using QR Codes for Student Self-Assessment http://www.toolsforgreatteachers.com/use-qr-codes-for-quick-and-easy-self-check-assignments or https://www.qr-code-generator.com/a1/?PID=1624&gclid=EAIaIQobChMIisHHm_io2wIVU1mGCh3VngD_EAEYASAAEgIr7PD_BwE

Lesson Targets:

- Students will select the least common denominator for two fractions.
- Students will look for and identify patterns in common denominators.

Guiding Questions:

- How do we determine what denominator we need to use to add or subtract fractions?
- When do we change both denominators, and when do we just change one denominator?

Vocabulary

Academic Vocabulary:

- add
- addends
- common denominator
- denominator
- difference
- factor
- fraction
- least common multiple
- minuend
- model
- numerator
- subtract
- subtrahend
- sum

Instructional Strategies for Academic Vocabulary:

- ☐ Introduce words with student-friendly definition and pictures
- ☐ Model how to use the words in discussion
- ☐ Read and discuss the meaning of word in a mathematical context
- ☐ Students write/discuss using the words

Symbol	Type of Text and Interpretation of Symbol
	Instructional support and/or extension suggestions for students who are EL, have disabilities, or perform well below grade level and/or for students who perform well above grade level
✓	Assessment (Pre-assessment, Formative, Self, or Summative)

Instructional Plan

Understanding Lesson Purpose and Student Outcomes:
Students will first understand why we must use common denominators to add and subtract with fractions. Students will be able to generate a list of possible denominators for a fraction and choose the best denominator for the addends or minuend and subtrahend.

Anticipatory Set/Introduction to the Lesson: Adding Apples and Oranges or Dogs and Cats
Consider students' interests and choose a pair of objects that belong to the same broad category to use for this example (trucks and cars, dirt bikes and four-wheelers, boots and sneakers, cats and dogs…). Tell students that you have 12 cats and 6 dogs at your house. Ask, "How many do I have in all?" When students respond with "18," press them to provide a unit. Ask, "18 what? 18 dogs? 18 cats?" Allow student discussion that leads to a broader unit, like pets or animals. Ask students how adding dogs and cats is like adding fractions with

different denominators? After discussion, tell students that fractions with different denominators cannot be added in the same way as adding whole numbers. Explain that we must find a broader way to describe them, so that all the values refer to the same units.

Activity 1: Modeling Finding Common Denominators

Display the following word problem:

> "Kenya is organizing the items being sold at the Riverdale Elementary School bake sale. Of the items students brought to sell, $\frac{2}{5}$ are homemade, $\frac{3}{7}$ are bought from the store, and Kenya's culinary arts class made the rest. What fraction of the items are homemade and bought from the store?"

Model the steps for solving a word problem, providing "think time" before engaging the class for a response.

- What are we being asking to find? ("What fraction of the items were homemade and store bought?")
- What information will we use to solve the problem? ($\frac{2}{5}$ are homemade, $\frac{3}{7}$ are store-bought)
- What operation do we need to use to solve the problem? (addition, $\frac{2}{5} + \frac{3}{7}$)

Say: "Now that we have our expression to solve, let's think about it. (pause for students to reflect). "I cannot add , $\frac{2}{5} + \frac{3}{7}$ as they are, because I only know how to add fractions with the same denominator. The only way to add these two fractions is to make the denominators the same by finding equivalent fractions."

Note: It is important to model this thinking for students at least the first time (likely more often depending on the students) so that each student can get an idea of the cognitive process of solving a problem with unlike denominators.

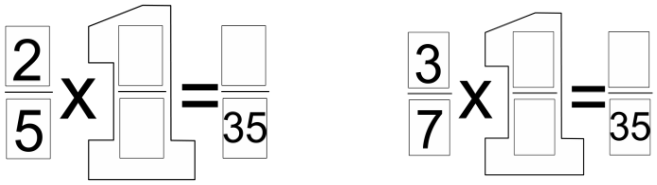
Demonstrate how to find a common denominator for both fractions by listing the factors of the denominators. Model using a chart to list the multiples of the denominators like this:

	x1	x2	x3	x4	x5	x6	x7	x8
5	5	10	15	20	25	30	35	40
7	7	14	21	28	35	42	49	56

Demonstrate how to find the common denominator by choosing the first multiple that appears in both lists.

	x1	x2	x3	x4	x5	x6	x7	x8
5	5	10	15	20	25	30	35	40
7	7	14	21	28	35	42	49	56

Demonstrate how to use the Giant One to find equivalent fractions with a denominator of 35 by multiplying $\frac{2}{5}$ by $\frac{7}{7}$ to get $\frac{14}{35}$ and multiplying $\frac{3}{7}$ by $\frac{5}{5}$ to get $\frac{15}{35}$.



Explain that the new expression is $\frac{14}{35} + \frac{15}{35}$, and since the fractions have the same denominator, the parts can be added by combining the numerators: $\frac{14}{35} + \frac{15}{35} = \frac{29}{35}$. $\frac{29}{35}$ of the items in the bake sale were either homemade or store bought. Draw a connection between the sum and the discussion in the anticipatory set. 14 describes the number of parts that were homemade, and 15 describes the number of parts that were store-bought. Together, they make up 29 parts of the whole. Explain that when we talk about these parts with the same denominator, 35, we can see that they are both parts of a whole group.

Note: Depending on how the class is doing (overwhelmed or engaged), the teacher may decide to model how to find the fraction of the baked goods that were made by Kenya's culinary arts class. This additional piece will be included in the next examples, but students may need a brain break before continuing.

$\frac{35}{35}$ total baked goods - $\frac{29}{35}$ homemade and store-bought baked goods = the baked goods made by Kenya's culinary arts class. $\frac{35}{35} - \frac{29}{35} = \frac{6}{35}$

Activity 2: Guided Practice

Distribute **Handout 6.1: Guided Practice**. Display the following problem on the interactive white board or document camera to allow students to follow your modeling as needed.

"Anna was planning the Garden Club's summer garden. She knew that the students love strawberries, tomatoes, and carrots. She also wanted to plant some onions, because their smell helps keep pests off the other plants. Anna thought she could plant $\frac{1}{3}$ of the garden with tomatoes, $\frac{1}{4}$ of the garden with tomatoes, and $\frac{1}{6}$ with onions. The leftover space would be for carrots. What fraction of the garden would hold carrots?"

For students who are EL, have disabilities, or perform well below the grade-level text band:

- Continue modeling, prompting students to fill in their **Handout 6.1: Guided Practice** as needed.

Extensions for students with high interest or working above grade level:

- Provide students with the word problem to solve without prompting questions.
- Have students solve the same word problem using 24 as the denominator. Compare the answer to the solution with 12 as the denominator.

Students will attend to precision by calculating carefully and by including units with fractions to keep their information organized (SMP.6).

✓Monitor students' understanding during the gradual release of ownership of this skill using questioning and observation of work.

Prompting Questions:

- Is it necessary to list ten factors of a denominator to find the common denominator (SMP.8)?
- Both 12 and 24 are common multiples of 3, 4, and 6. Why did we choose 12? Would the answer change if we chose 24 (SMP.2)?
- Consider the common denominator of 35 for fractions with 5 and 7 in the denominator. Consider the common denominator 12 for fractions with 3 and 4 in the denominator. Do you observe any connections or patterns (SMP.7)?
- How does the size of the common denominator (the fraction size, not the digit's value) compare to the addends or to the subtrahend and minuend (SMP.7)?

Activity 3: Climbing the Mountain

Students will practice adding and subtracting unlike fractions in an activity called Climbing the Mountain. The activity can be completed individually or in pairs. The Foundation Skills must come first, so students must answer questions correctly showing that they can find a common denominator for groups of unlike fractions. When students complete the Foundation Skills, the will move to Climbing Skills questions. Students will find equivalent fractions with common denominators for unlike fractions. Finally, students will answer Summit Skills questions, one in which they will add unlike fractions and one in which they will subtract unlike fractions (SMP.1).

Note: Print and cut out **Handout 6.3: Climbing Mountain Question Cards**.

✓ Distribute **Handout 6.2: Climbing the Mountain Student Record Sheet** and **Handout 6.3: Climbing the Mountain Question Cards** to each student or partner group. Tell students to complete a row of skills and bring their answer sheet to you to have their answers checked. Explain that they must have 5 correct Foundation Skills answered correctly to progress to Climbing Skills. Explain that once all the Climbing Skills questions are answered, they will bring those answers to be checked. When they have 3 correct Climbing Skills questions answered correctly, they will move on to the two Summit Skills questions. When students have all 10 practice questions complete and correct, they can earn an incentive or become the checker.

Note: A QR code can be used to provide students a way to check their work on the computer. Use this link for information on using https://www.qr-code-generator.com/a1/?PID=1624&gclid=EAIaIQobChMIisHHm_io2wIVU1mGCh3VngD_EAEYASAAEgIr7PD_BwE for this activity.

For students who are EL, have disabilities, or perform well below the grade-level text band:

- Provide written, oral, or graphic prompts as needed.
- Shorten the assignment as needed.

Extensions for students with high interest or working above grade level:

- Allow students to teach a partner who is struggling.
- Provide more challenging fractions (odd number and two-digit denominators).

Reflection and Closing

✓ Review the lesson by discussing skills and asking questions.

Prompting questions:

- How do we determine what denominator we need to use to add or subtract fractions?
- When do we change both denominators, and when do we just change one denominator?

Homework

Homework Assignment:

Students will complete **Handout 6.4: Adding and Subtracting with Unlike Denominators Homework**. **Parent Resources:**

Adding Fractions with Unlike Denominators video

Handout 6.1: Guided Practice

Name: _____

1. Antoinette was planning the Garden Club's summer garden. She knew that the students love strawberries, tomatoes, and carrots. She also wanted to plant some onions, because their smell helps keep pests off the other plants.

Antoinette thought she could plant $\frac{1}{3}$ of the garden with tomatoes, $\frac{1}{4}$ of the garden with tomatoes, and $\frac{1}{6}$ with onions. The leftover space would be for carrots. What fraction of the garden would hold carrots?"

a. What are you being asked to find?

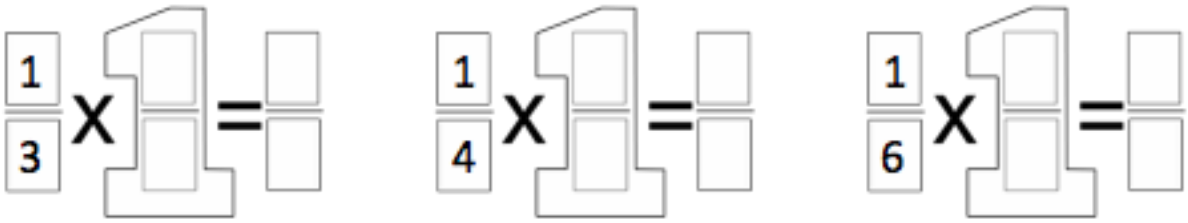
b. What information will you use from the problem?

c. What steps will you follow to solve the problem?

d. Find common denominators for $\frac{1}{3}$, $\frac{1}{4}$, and $\frac{1}{6}$.

	x1	x2	x3	x4	x5	x6	x7	x8	x9	x10

e. Find equivalent fractions for $\frac{1}{3}$, $\frac{1}{4}$, and $\frac{1}{6}$.



f. Find the sum of the equivalent fractions for $\frac{1}{3}$, $\frac{1}{4}$, and $\frac{1}{6}$ from Part E.

g. Find the difference of the whole garden and the parts of the garden being used for strawberries, tomatoes, and carrots.

h. Complete the chart with the fraction of the garden each plant represents. Use fractions with a common denominator.

Plants	Fraction of the Garden
carrots	
tomatoes	
onions	
strawberries	

i. What fraction of the garden would hold carrots?

Handout 6.1: Guided Practice - Key

Name: _____

1. Antoinette was planning the Garden Club's summer garden. She knew that the students love strawberries, tomatoes, and carrots. She also wanted to plant some onions, because their smell helps keep pests off the other plants.

Antoinette thought she could plant $\frac{1}{3}$ of the garden with strawberries, $\frac{1}{4}$ of the garden with tomatoes, and $\frac{1}{6}$ with onions. The leftover space would be for carrots. What fraction of the garden would hold carrots?"

a. What are you being asked to find?

I need to find what fraction of the garden will be left over to hold carrots.

b. What information will you use from the problem?

I will use the fractions $\frac{1}{3}$ (strawberries), $\frac{1}{4}$ (tomatoes), and $\frac{1}{6}$ (onions) to find out how much of the garden is used up.

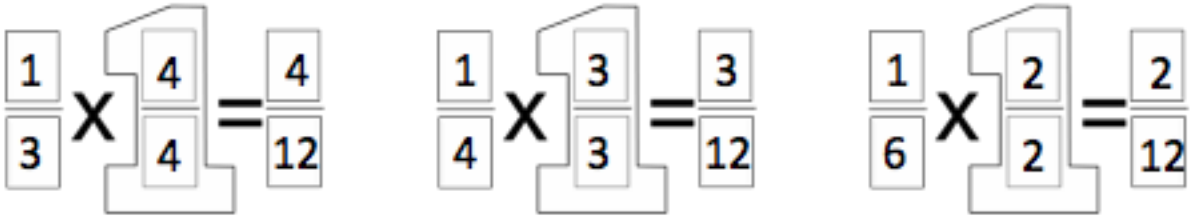
c. What steps will you follow to solve the problem?

I will add to find the space that is taken up by the strawberries, tomatoes, and onions, and then I will subtract to find the fraction that is left for carrots.

d. Find common denominators for $\frac{1}{3}$, $\frac{1}{4}$, and $\frac{1}{6}$.

	x1	x2	x3	x4	x5	x6	x7	x8	x9	x10
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
6	6	12	18	24	30	36	42	48	56	60

e. Find equivalent fractions for $\frac{1}{3}$, $\frac{1}{4}$, and $\frac{1}{6}$.



f. Find the sum of the equivalent fractions for $\frac{1}{3}$, $\frac{1}{4}$, and $\frac{1}{6}$ from Part E.

$$\frac{4}{12} + \frac{3}{12} + \frac{2}{12} = \frac{9}{12}$$

g. Find the difference of the whole garden and the parts of the garden being used for strawberries, tomatoes, and carrots.

$$\frac{12}{12} - \frac{9}{12} = \frac{3}{12}$$

h. Complete the chart with the fraction of the garden each plant represents. Use fractions with a common denominator.

Plants	Fraction of the Garden
carrots	$\frac{3}{12}$
tomatoes	$\frac{3}{12}$
onions	$\frac{2}{12}$
strawberries	$\frac{4}{12}$

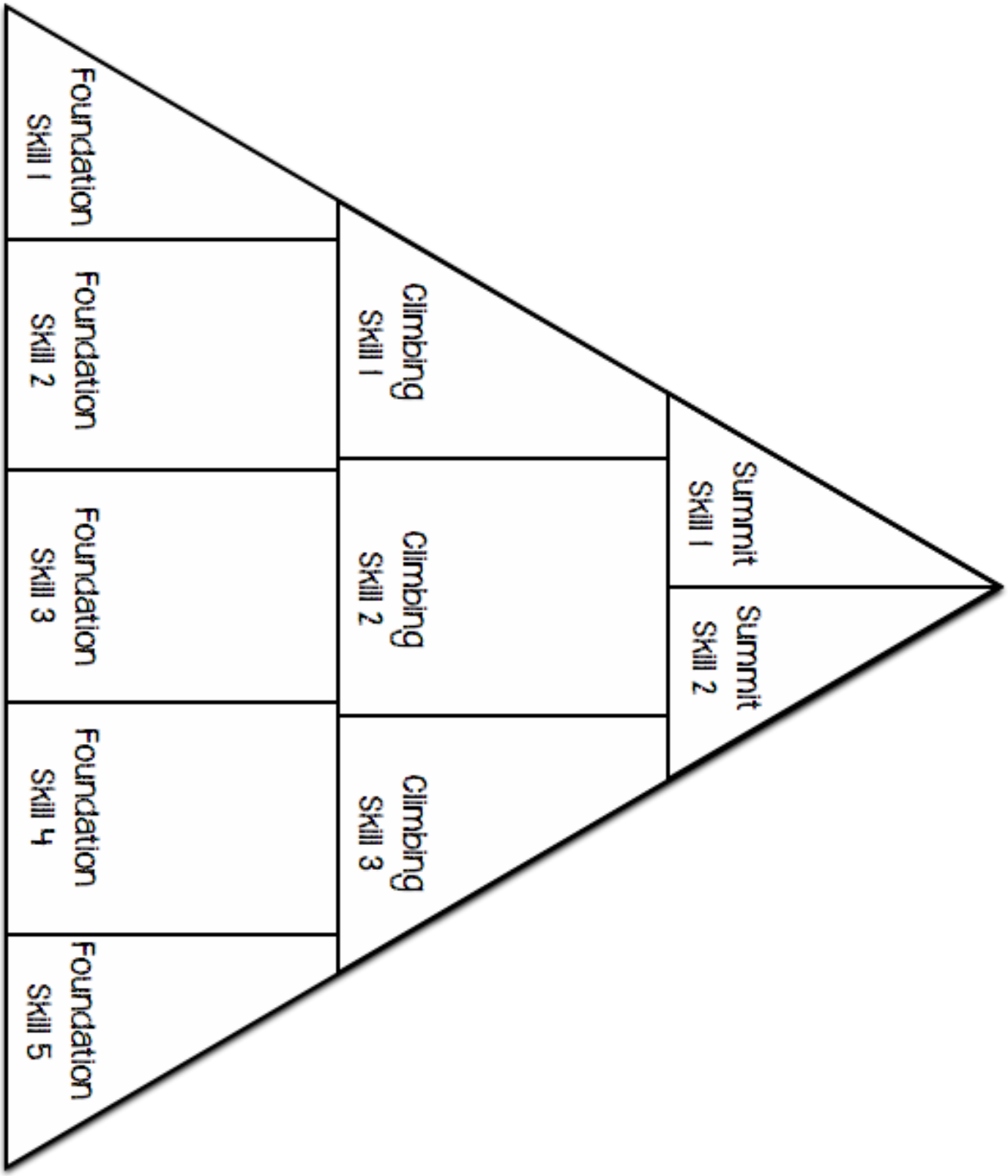
i. What fraction of the garden would hold carrots?

$\frac{3}{12}$ ($\frac{1}{4}$) of the garden would hold carrots.

Note: Students may work backward from the equivalent fraction for tomatoes to find that $\frac{3}{12} = \frac{1}{4}$.

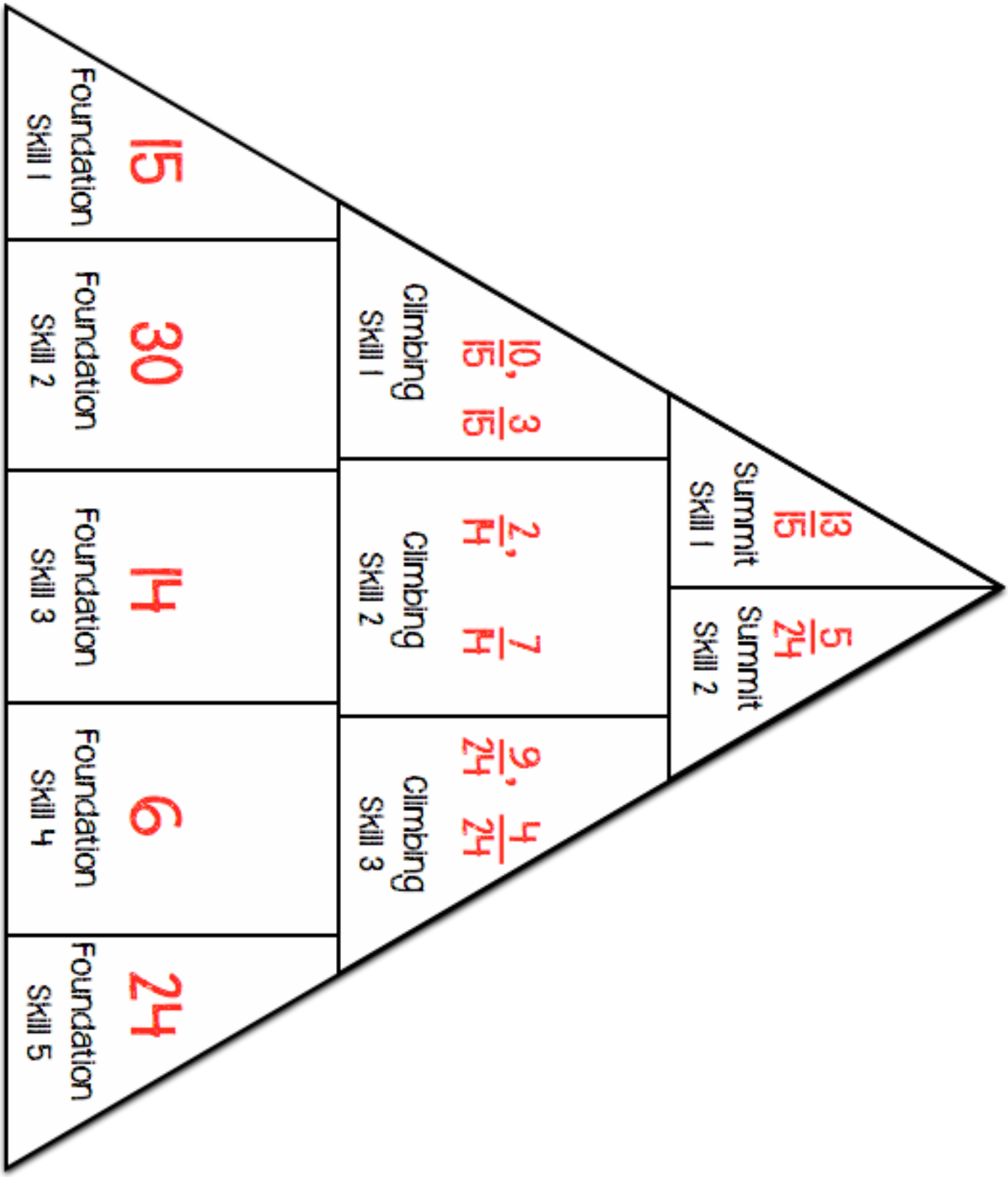
Handout 6.2: Climbing the Mountain Student Record Sheet

Name: _____

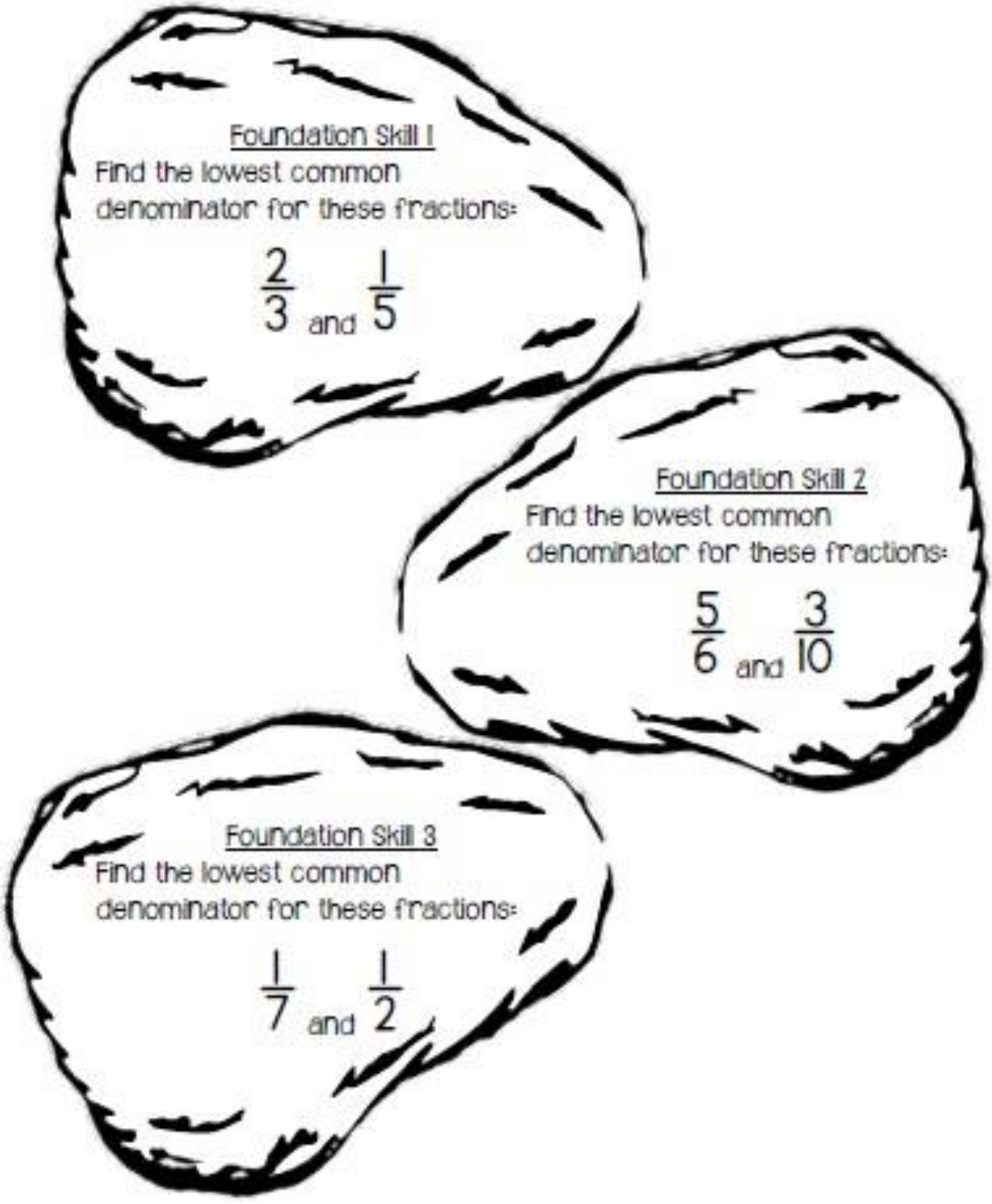


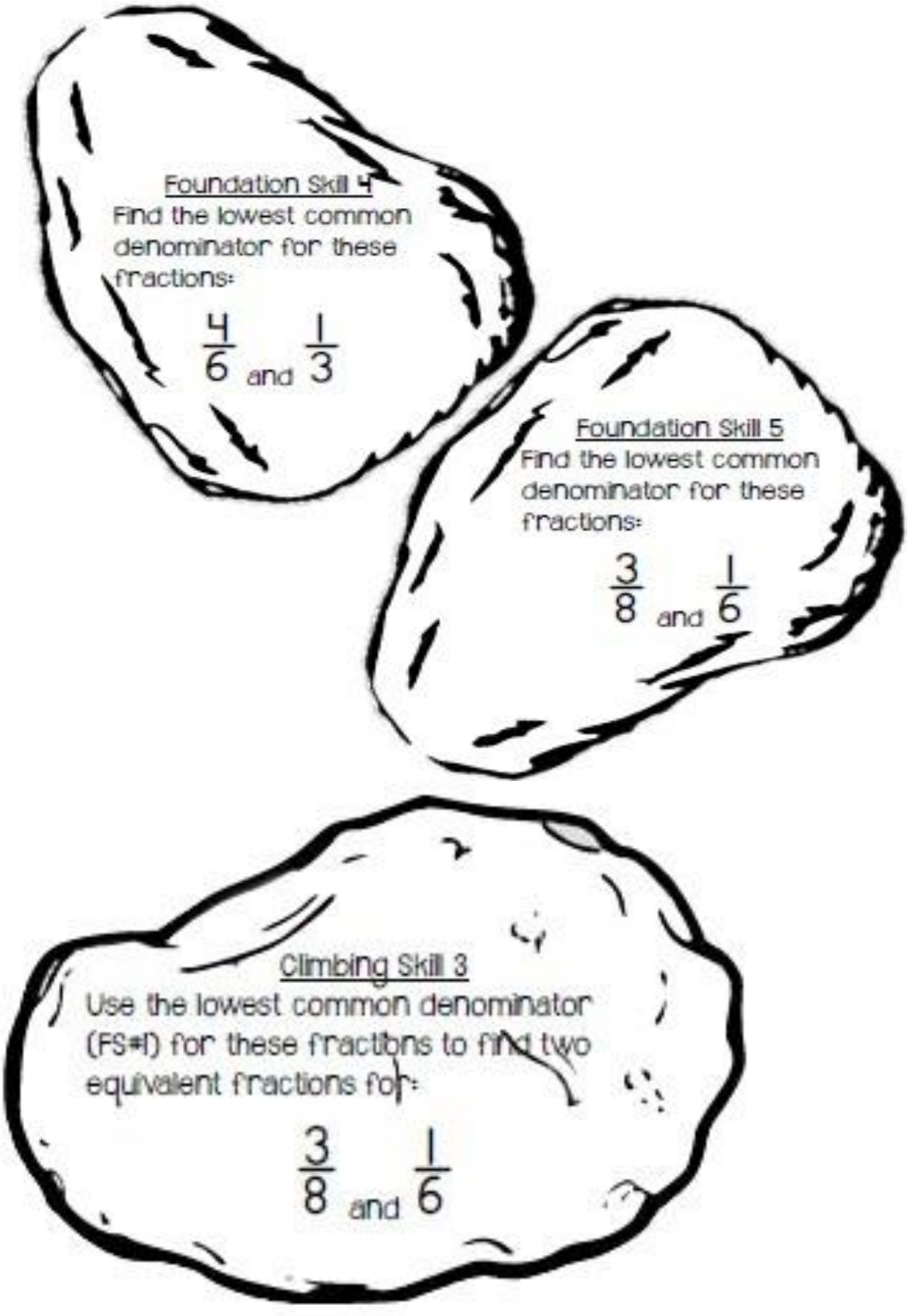
Handout 6.2: Climbing the Mountain Student Record Sheet – Key

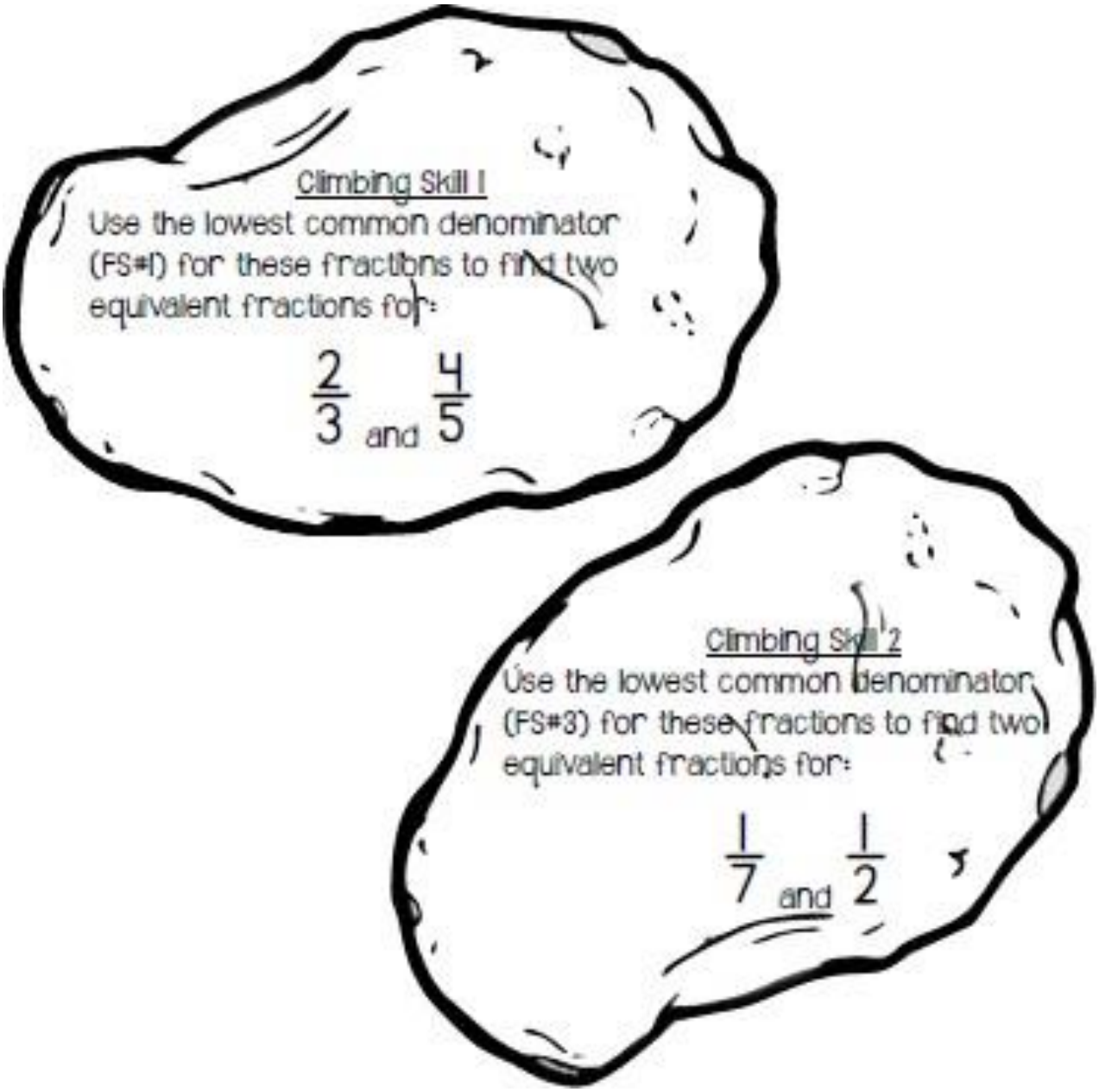
Name: _____



Handout 6.3: Climbing the Mountain Question Cards




Foundation Skill 4
Find the lowest common denominator for these fractions:
4/6 and 1/3
Foundation Skill 5
Find the lowest common denominator for these fractions:
3/8 and 1/6
Climbing Skill 3
Use the lowest common denominator (FS#1) for these fractions to find two equivalent fractions for:
3/8 and 1/6


Climbing Skill 1
Use the lowest common denominator (FS#1) for these fractions to find two equivalent fractions for:
2/3 and 4/5
Climbing Skill 2
Use the lowest common denominator (FS#3) for these fractions to find two equivalent fractions for:
1/7 and 1/2

Handout 6.4: Adding and Subtracting with Unlike Denominators Homework

Name: _____

Find the common denominator for the fractions below.

1. $\frac{1}{3}$ and $\frac{2}{6}$

2. $\frac{5}{12}$ and $\frac{2}{4}$

3. $\frac{1}{2}$ and $\frac{3}{5}$

Find the sum of the expressions below.

4. $\frac{5}{12} + \frac{2}{5}$

5. $\frac{2}{5} + \frac{4}{9}$

Find the difference of the expressions below.

6. $\frac{9}{14} - \frac{1}{2}$

7. $\frac{7}{10} - \frac{1}{5}$

8. Trey completed $\frac{1}{4}$ of a puzzle. Lynn completed $\frac{2}{3}$ of the same puzzle. What fraction of the puzzle did they complete?

Handout 6.4: Adding and Subtracting with Unlike Denominators Homework - Key

Name: _____

Find the common denominator for the fractions below.

1. $\frac{1}{3}$ and $\frac{2}{6}$ — 6

2. $\frac{5}{12}$ and $\frac{2}{4}$ — 12

3. $\frac{1}{2}$ and $\frac{3}{5}$ — 10

Find the sum of the expressions below.

4. $\frac{5}{12} + \frac{2}{5}$ — $\frac{49}{60}$

5. $\frac{2}{5} + \frac{4}{9}$ — $\frac{38}{45}$

Find the difference of the expressions below.

6. $\frac{9}{14} - \frac{1}{2}$ — $\frac{2}{14}$

7. $\frac{7}{10} - \frac{1}{5}$

8. Trey completed $\frac{1}{4}$ of a puzzle. Lynn completed $\frac{2}{3}$ of the same puzzle. What fraction of the puzzle did they complete?

$\frac{11}{12}$ of the puzzle

Lesson 7: Adding and Subtracting Mixed Numbers

Focus Standards: 5.NF.1, 5.NF.2

Standards for Mathematical Practice: SMP.3

Estimated Time: 120 minutes

Resources and Materials:

- Markers
- Glue
- Chart paper
- Handout 7.1: Number Lines
- Handout 7.2: Word Problem Cards – Addition
- Handout 7.3: Word Problem Cards - Subtraction

Lesson Targets:

- Students will add and subtract mixed numbers with unlike denominators using the associative property.
- Students will add and subtract mixed numbers with unlike denominators on a number line.
- Students will solve word problems by adding and subtracting mixed numbers with unlike denominators.

Guiding Questions:

- How is adding and subtracting mixed numbers with unlike denominators like adding and subtracting fractions with unlike denominators?
- When would you add and subtract mixed numbers with unlike fractions in real world situations?

Vocabulary

Academic Vocabulary:

- add
- addends
- benchmark fractions
- denominator
- fraction
- mixed number
- model
- numerator
- sum

Instructional Strategies for Academic Vocabulary:

- ☐ Introduce words with student-friendly definition and pictures
- ☐ Model how to use the words in discussion
- ☐ Students write/discuss using the words.
- ☐ Read and discuss the meaning of word in a mathematical context

Symbol	Type of Text and Interpretation of Symbol
	Instructional support and/or extension suggestions for students who are EL, have disabilities, or perform well below grade level and/or for students who perform well above grade level
✓	Assessment (Pre-assessment, Formative, Self, or Summative)

Instructional Plan

Understanding Lesson Purpose and Student Outcomes:
Students will solve world problems containing mixed numbers with unlike denominators. They will use number lines, decomposing fractions and finding equivalent fractions.

Anticipatory Set/Introduction to the Lesson: "My Favorite No"

✓ Distribute large index cards or half sheets of paper. Display the following for students:

Mike and Carlos were gathering apples in their garden. Mike collected $2\frac{1}{8}$ baskets of apples and Carlos collect $3\frac{3}{8}$ baskets of apples. How many baskets of apples did they collect together? How many more apples did Carlos collect than Mike?

Pair students and give them 10 minutes to discuss the problem and complete their work. Allow more time if necessary. Remind students to read the problem carefully and look for connections to previous lessons. Each pair will submit one card. At the end of the time collect the students' work being careful not to reveal the students' names. Go through the cards identifying those that have the work done

correctly as "Yes" and those that have errors as "No". Look for misconceptions (these will be called "My favorite no"). Smile when you find cards with common misconceptions and say encouraging statements such as, "Oh, I'm so glad someone did this so we can learn from it!" or "So many people make this mistake, but we can learn how to do it correctly!" Copy the incorrect work for the first problem on the board without changing it. Facilitate an open discussion about why the work is not correct. If a student says the work or answer you displayed is incorrect have them offer a reason why it is incorrect and tell how they would correct it (SMP.3).

Note: Refer to Lesson 1 for details on how to use "My Favorite No" for instruction. When using "My Favorite No", tell students you will occasionally use correct answers to see if they spot a correct process.

For students who are EL, have disabilities, or perform well below the grade-level:

- Give students fraction tiles or fraction circles to use.

Extensions for students with high interest or working above grade level:

- Have students write a paragraph to justify their answers.

Activity 1: Adding Mixed Numbers with Unlike Fractions

Tell students that today they will use what they know about adding fractions with unlike denominators to add mixed numbers with unlike denominators.

While teaching the lesson, create an anchor chart with students. Display the following expressions:

$2\frac{2}{5}+4\frac{1}{6}$ $\quad\quad$ $3\frac{1}{7}-1\frac{2}{3}$

Explain that to add mixed numbers, we can use the Associative Property to make an easier expression.

$2\frac{2}{5}+4\frac{1}{6}=2+4+\frac{2}{5}+\frac{1}{6}=6+\frac{2}{5}+\frac{1}{6}$

Ask students what we can do to add the fractions. (Find the LCD, convert them to equivalent fractions, then add the fractions.) Demonstrate how to use a chart to find the common denominator for 5 and 6 and for finding equivalent fractions.

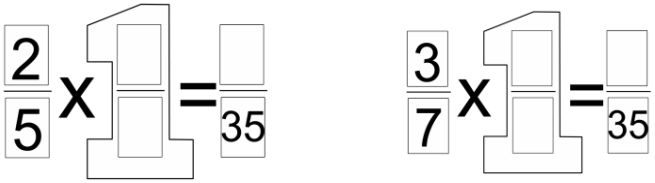
$\frac{2}{5}\ x\frac{6}{6}=\frac{12}{30}$ $\quad\quad$ $\frac{1}{6}\ x\frac{5}{5}=\frac{5}{30}$

When we add $\frac{12}{30}+\frac{5}{30}$, the sum is $\frac{17}{30}$. Adding the whole number to the fraction gives us $\frac{17}{30}+6=6\frac{17}{30}$.

1x	5	6
2x	10	12
3x	15	18
4x	20	24
5x	25	30
6x	30	36

Now look at $3\frac{1}{7} - 1\frac{2}{3}$. Explain that when you subtract mixed numbers, one method is to convert both mixed numbers into fractions greater than one. Demonstrate how to decompose the whole number into fractions to create a fraction greater than one. Ask, "In the whole number 3, how many 1s are there?" (3) Write 1 + 1 + 1. Ask, "How many $\frac{1}{7}$s are in 1? "(7) Write 3 = $\frac{7}{7}+\frac{7}{7}+\frac{7}{7}$. If we add the original fraction to the 3 wholes, $\frac{1}{7}+\frac{7}{7}+\frac{7}{7}+\frac{7}{7}=\frac{22}{7}$.

Tell students to decompose $1\frac{2}{3}$ into unit fractions on their white boards and then into a fraction greater than one. (1 = $\frac{3}{3}$ and $\frac{3}{3}+\frac{1}{3}=\frac{4}{3}$.) Tell students to turn to an elbow buddy and compare their work (SMP.3). Tell students to find a common denominator and then subtract thetwo fractions greater than one, showing their work on their personal white board. Instruct them to turn to their elbow buddy and share their work, discussing any differences (SMP.3). Call on one pair to show their work on the board. Invite other class members to comment and ask questions about the work.



✓ While students are working, walk around the room listening to conversations and checking for accuracy or misconceptions.

Note: The least common multiple for 3 and 7 is 21 so students should convert each fraction to have like denominators then add: $\frac{22}{7}x\frac{3}{3}=\frac{66}{21}$ and $\frac{4}{3}x\frac{7}{7}=\frac{28}{21}$. $\frac{66}{21}-\frac{28}{21}=\frac{38}{21}$

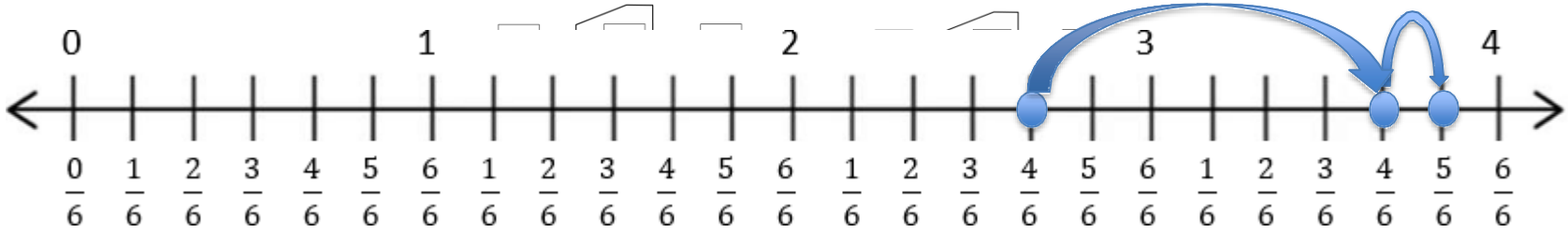
Ask students what kind of fraction $\frac{38}{21}$ is. (A fraction greater than one) Ask how they know it is a fractions greater than one? (The numerator is greater than the denominator.) Lead a class discussion to recall how to convert a fraction greater than one to a mixed number and create an anchor chart with students to display the procedure. See the following: To rewrite a mixed number as an equivalent improper fraction, divide the denominator by the numerator and express the remainder as a fraction. For the fraction $\frac{38}{21}$, 38 ÷ 21 = 1 with a remainder of 17 expressed as $1\frac{17}{21}$.

Note: Encourage the understanding that fractions greater than one may sometimes be called *improper fractions*, but they are not "bad" or "wrong." Fractions greater than one are equivalent fractions to their mixed number counterparts; they are just written in a different way. Let students know that when they take Algebra, fractions are often NOT made into mixed numbers due to the use of variables.

Activity 2: Adding Mixed Numbers with Unlike Fractions on a Number Line

Ask students if they think it's possible to add and subtract mixed numbers on a number line. Let students share their thoughts reflecting how they used a number line to add fractions with unlike denominators. Display the following: $2\frac{2}{3} + 1\frac{1}{6}$. Explain to students that the fraction part of mixed numbers must have the same denominator. Ask students what the least common denominator for 3 and 6 is. (6) Tell students to find equivalent fractions with a denominator of 6 and show their work on their personal white board. ($\frac{2}{3} = \frac{4}{6}$ and $\frac{1}{6}$ does not change).

Draw a number line and show the first addend on the number line. Move on the number line to the right the value of the whole number 1. Place a mark at 3 . Move on the number line the value of the fraction. $2\frac{4}{6} + 1\frac{1}{6} = 2\frac{4}{6} + 1 + \frac{1}{6} = 3\frac{4}{6} + \frac{1}{6} = 3\frac{5}{6}$



Note: It does not matter if students add the whole number or the fraction first, so long as they are moving the correct distance on the number line to the right. It may be easier to understand add the whole number then the fraction.

Use the same mixed numbers but change the operation to subtraction showing the numbers moving to the left on the number line.

$$2\frac{4}{6} - 1\frac{1}{6} = 2\frac{4}{6} - 1 - \frac{1}{6} = 1\frac{4}{6} - \frac{1}{6} = 1\frac{3}{6}$$

Allow time for questions and discussion clarifying any misconceptions. Tell students use their personal white boards to add $4\frac{2}{3} + 2\frac{1}{4}$. As students work, look for errors and make note of students who need one-on-one help. Ask for a volunteer to work the problem on the board. After the students have completed this task, tell them to use the same two mixed numbers but this time, subtract the mixed numbers.

Activity 3: Partner Work

Distribute **Handout 7.1: Number Lines.** Display/write theses expression on the board: $7\frac{3}{4} + 3\frac{1}{12}$ $3\frac{2}{3} + 1\frac{1}{8}$ $7\frac{3}{4} - 3\frac{1}{12}$ $3\frac{2}{3} - 1\frac{1}{8}$

Tell students they will work with their partner to find the value of all the expressions. Instruct them to find the value of both addition expressions, trade papers, check each other's work, and discuss any differences (SMP.3). Tell students to repeat the same steps doing the subtraction on the backside of the paper. While students are working with partners, call students who demonstrated a need for additional support to the teacher table to work the problems with you.

For students who are EL, have disabilities, or perform well below the grade-level:

- Students work with the teacher scaffolding instruction to show moving on the number line with whole numbers, then fractions, then mixed numbers with denominators of 2 and 4.
- Students can use fraction circles to show equivalent fractions and adding mixed numbers.

Extensions for students with high interest or working above grade level:

- Give students mixed numbers to add and observe what they do with an answer that has a whole number and a fraction greater than one.

✓ Monitor students' work looking for misconceptions or missing steps.

Prompting questions:

- Is there a part of the process you skipped?
- Is your answer reasonable?

Lead a discussion to check solutions, answering questions, and clarifying misconceptions.

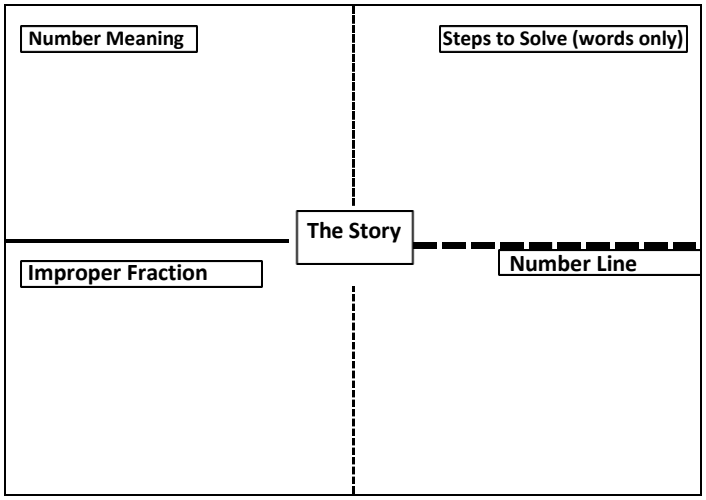
Activity 4: Adding and Subtracting Mixed Numbers in the Real World

Ask students when they might have to add and subtract mixed numbers with unlike fractions in the real world? Record student answers on chart paper. Tell students they will look at the problem from the anticipatory set but the denominators will be different. Distribute large index cards or half sheets of paper. Display the following for students:

> "Mike and Carlos were gathering apples in their garden. Mike collected $2\frac{2}{8}$ baskets of apples and Carlos collect $3\frac{5}{16}$ baskets of apples. How many baskets of apples did they collect together? How many more apples did Carlos collect than Mike?"

Tell students to find the answer to the first question on their white board using any strategy they have learned in this unit. Have them check the work of an elbow buddy, discuss any differences, and explaining corrections (SMP.3). Choose a student to show the work on the board. Tell students to do the same thing to answer the second question. Lead a discussion to answer any questions and clarify any misconceptions.

Distribute **Handout 7.2: Word Problem Cards – Addition, Handout 7.3 - Subtraction**, markers, and chart paper. Assign students to groups of Explain to students that they will each get two word problems. They will solve the problems using the adapted Frayer model to show their work. Display the adapted Frayer model they will use.



Tell students for both problems, they will glue their story to the center of the chart paper, list all the numbers in the story, describe in words only the steps to solve, solve with a number line, and with fractions greater than one. Tell students they should all do the work and check each other before creating the posters. Tell groups to exchange one poster with another group and their second poster with a different group so they have two posters from two different groups. Tell them to critique the work on the posters by two notes that will contain glows (something done well) and two notes will contain grows (things that could improve). Tell them that each poster will get a total of four sticky notes. After they have completed their critiques, tell them to return the posters to the authors. Instruct students to read the notes and determine if they agree with the observations. Lead a class discussion to share the comments and allow time for discussion. Clarify any misconceptions.

Reflection and Closing

✓ Review the lesson by discussing skills and asking questions.

Prompting questions:

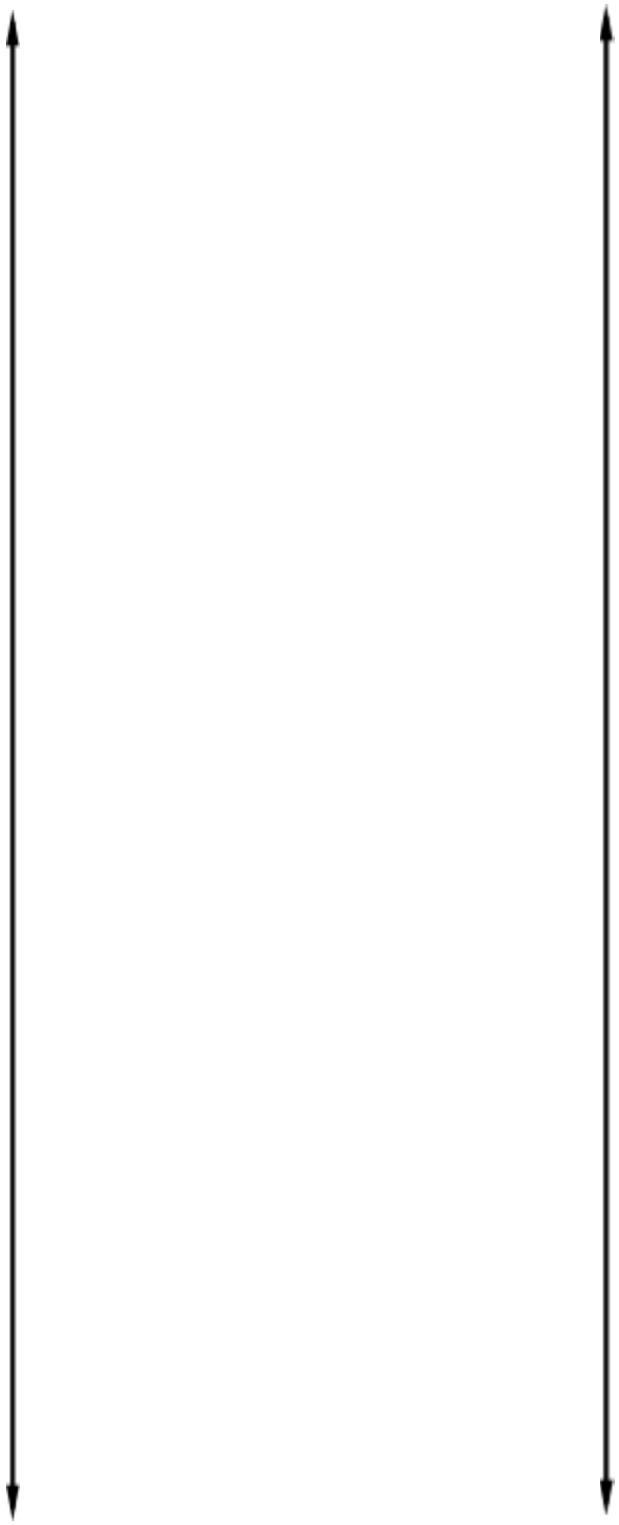
- How do we determine what denominator we need to use to add or subtract fractions?
- When do we change both denominators, and when do we just change one denominator?

Homework

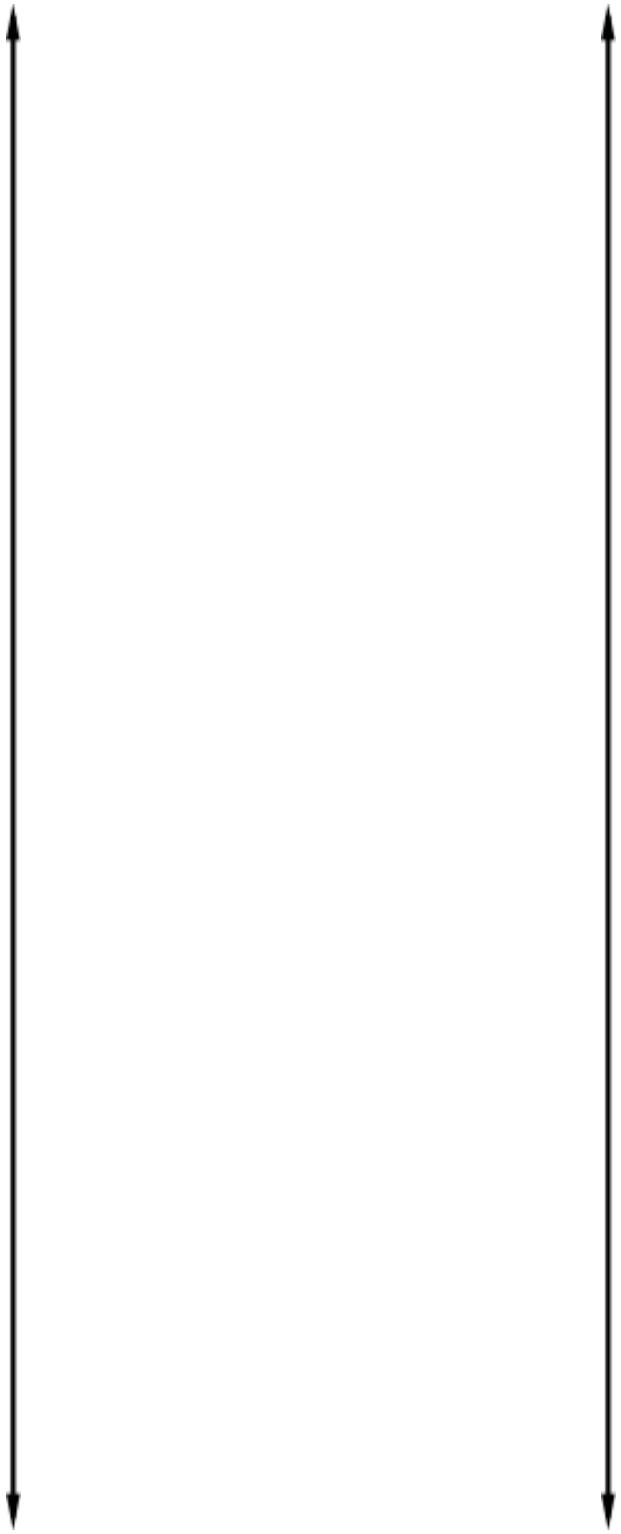
No Homework

Handout 7.1: Number Lines (Page 1)

Name: _____



Handout 7.1: Number Lines (Page 2)



Handout 7.2: Word Problem Cards – Addition

A) Sabrina uses $5\frac{1}{2}$ yards of fabric to make curtains and $3\frac{1}{4}$ yards of fabric to make pillows. How much fabric did Sabrina use?	B) Jack is packing gifts for his father who is in Iraq. One item weighs $6\frac{1}{4}$ kg and the other item weighs $3\frac{3}{8}$ kg. What is the combined weight of the items in the package?
C) Last weekend I spent $5\frac{3}{5}$ hours on history homework and $1\frac{1}{4}$ hours on math homework. How much time did I spend on homework?	D) Ava buys fruit. If she buys $2\frac{1}{3}$ pounds of apples, and $1\frac{1}{5}$ pounds of pears, how many pounds of fruit did she buy?
E) Zach is making cookies. The recipe calls for him to use $2\frac{2}{3}$ cups of white sugar and $1\frac{1}{2}$ cups of brown sugar. How much sugar will he use for the cookies?	F) Madan plays soccer. On Monday, he practiced for $1\frac{3}{4}$ hours and on Tuesday, he practiced for $1\frac{1}{3}$ hours. How much time did he practice on these two days?
G) Christina must write two essays for her English class. One essay is $2\frac{1}{8}$ pāges long and the second essay is $4\frac{1}{6}$ pages long. How many pages will she write?	H) Mario walked $5\frac{3}{7}$ km one week and the next week he walked $6\frac{1}{2}$ km. How far did he walk in both weeks?

Handout 7.3: Word Problem Cards – Subtraction

I) While cooking a stew, Brett used $2\frac{3}{4}$ teaspoons of salt and $1\frac{1}{2}$ teaspoons of pepper. How much more salt than pepper did Brett use?	J) A meteorologist recorded the rainfall in Arcadia in two consecutive months. He recorded $2\frac{5}{8}$ inches in the first month and $1\frac{5}{12}$ inches in the second month. How much more rain was recorded in the first month than the second month?
K) Ron read $5\frac{3}{5}$ chapters of his book on Friday and $3\frac{1}{3}$ chapters on Saturday. How many more chapters did he read on Friday than on Saturday?	L) A marine biologist measured two fish. The first fish was $8\frac{5}{7}$ meters long and the second fish was $5\frac{1}{3}$ meters long. How much longer was the first fish than the second fish?
M) A builder has two ladders. The first ladder is $12\frac{3}{10}$ feet tall. The second ladder is $16\frac{1}{2}$ feet tall. How much taller is the second ladder than the first ladder?	N) Marla made batches of cupcakes for her office. She used $3\frac{1}{6}$ cups of flour for the first batch and $4\frac{2}{3}$ cups of flour for the second batch. How much more flour was in the second batch?
O) Kristi wrote two lessons for her math class. The first lesson is $3\frac{2}{5}$ pages long and the second lesson is $2\frac{1}{4}$ pages long. How many more pages is the first lesson than the second lesson?	P) Devin has $7\frac{1}{2}$ hours to edit a math unit. He has worked for $5\frac{2}{5}$ hours. How much more time does Devin have left to edit his unit?

Handout 7.2: Word Problem Cards – Addition Key

A) $8\frac{3}{4}$

B) $9\frac{5}{8}$

C) $6\frac{17}{20}$

D) $9\frac{8}{15}$

E) $4\frac{1}{6}$

F) $3\frac{1}{2}$

G) $6\frac{7}{24}$

H) $11\frac{13}{14}$

Handout 7.3: Word Problem Cards – Subtraction Key

I) $1\frac{1}{4}$

J) $1\frac{5}{24}$

K) $2\frac{4}{15}$

L) $3\frac{8}{21}$

M) $4\frac{2}{10}$

N) $1\frac{3}{6}$

O) $1\frac{3}{20}$

P) $2\frac{1}{10}$

Lesson 8: Performance Task

Focus Standards: 5.NF.1, 5.NF.2

Standards for Mathematical Practice: SMP.1, SMP.2, SMP.5, SMP.6, SMP.8

Estimated Time: 60 minutes

Resources and Materials:

- Handout 8.1: Letter from the Principal
- Handout 8.2: Performance Task
- Handout 8.3: Performance Task Rubric

Lesson Targets:

- Students will find equivalent fractions for adding and subtracting fractions and mixed numbers with unlike denominators.
- Students will use skills learned in this unit to solve a problem using a rubric to evaluate their work.

Guiding Question:

- How can adding and subtracting fractions with unlike denominators help solve a problem?

Vocabulary

Academic Vocabulary:

- benchmark fractions
- denominator
- equivalent fractions
- fraction
- mixed number
- model
- numerator

Instructional Strategies for Academic Vocabulary:

- ☐ Introduce words with student-friendly definition and pictures
- ☐ Model how to use the words in discussion
- ☐ Students write/discuss using the words.
- ☐ Read and discuss the meaning of word in a mathematical context

Symbol	Type of Text and Interpretation of Symbol
	Instructional support and/or extension suggestions for students who are EL, have disabilities, or perform well below grade level and/or for students who perform well above grade level
✓	Assessment (Pre-assessment, Formative, Self, or Summative)

Instructional Plan

Understanding Lesson Purpose and Student Outcomes:
Students will complete a performance task containing fractions and mixed numbers with unlike denominators. They will use number lines, decomposing fractions and finding equivalent fractions. They will use a rubric to score their work and critique the work of others. This performance-based assessment will give evidence of students' perseverance, abstract reasoning, modeling, attending to precision, and finding structure and making use of it. Students' work should exhibit evidence of repeated mathematical reasoning and use of structure (SMP.8).

Anticipatory Set/Introduction to the Lesson: Letter from the Principal
Read **Handout 8.1: Letter from the Principal** and discuss the request with students asking if they think they can help.

Activity 1: Performance Task
The principal, Mrs. Hamilton, has asked for your help. You are to propose a daily schedule for the 7 hours of the school day. Distribute **Handout 8.2: Performance Task** and **Handout 8.3: Performance Task Rubric**. Review the task by going over the specifics. Explain to students that they will analyze the information to determine the best way to allocate time (SMP.1, SMP.2, SMP.6). Make tools and manipulatives available for students to use as they complete the task (SMP.5). Tell students to remember to include the following:

Subject/Activity	Time Required
Morning Meeting	$\frac{3}{4}$ hour
Lunch	$\frac{1}{2}$ hour
Recess	$\frac{1}{4}$ hour

Math	$1\frac{1}{2}$ hours
ELA	$\frac{9}{6}$ hours

Each school day has 7 hours. Using the time requirements above, create a schedule that also incorporates three more time periods for science, social studies, and specials (1 per day: Art/Library/Music/STEM Lab/PE).

1. Prepare a detailed schedule identifying the fraction of the school day that is spent on each subject.

2. Write a paragraph to persuade your principal explaining why he/she should choose your schedule. Be sure to justify your schedule.

3. Create a visual model that shows the fractional part of each day that is used for each subject/activity.

4. Show your calculations so that each fractional piece added together would equal the 7 hours of the school day. (Remember to use equivalent fractions and other strategies to help you add fractions with unlike denominators).

Reflection and Closing

✓Review the lesson by discussing skills and asking questions.

Prompting questions:

- How do we determine what denominator we need to use to add or subtract fractions?
- When do we change both denominators, and when do we just change one denominator?

Homework

No Homework

Handout 8.1: Letter from the Principal

Dear Fifth Grade Students,

I have a dilemma that I need your help with. There is a big problem with the class schedules. We only have 7 hours of school each day and I cannot figure out how to include all the classes. If you look at the schedule below, you can see that I have used most of the 7 hours for morning meeting, lunch, recess, math and ELA. I still need to incorporates three more time periods for science, social studies, and one special class each day. Each of the three additional time periods will last the same time amount of time. I have noticed from your test scores, that you are very intelligent and clever. I am hoping that you will be able to help me work out this puzzle.

Thank you for your help.

Sincerely,

Mrs. Hamilton

Mrs. Hamilton, Principal
(Put your school name here)

Subject/Activity	Time Required
Morning Meeting	$\frac{3}{4}$ hour
Lunch	$\frac{1}{2}$ hour
Recess	$\frac{1}{4}$ hour
Math	$1\frac{1}{2}$ hours
ELA	$\frac{9}{6}$ hours

Handout 8.2: Performance Task

Name_____ Date_____

The principal has asked for your help. You are to propose a daily schedule for the 7 hours of the school day. Remember to include the following:

Subject/Activity	Time Required
Morning Meeting	$\frac{3}{4}$ hour
Lunch	$\frac{1}{2}$ hour
Recess	$\frac{1}{4}$ hour
Math	$1\frac{1}{2}$ hours
ELA	$\frac{9}{6}$ hours

Using the time requirements above, create a schedule that also incorporates three more time periods for science, social studies, and specials (1 per day: Art/Library/Music/STEM Lab/PE).

1. Prepare a detailed schedule identifying the fraction of the school day that is spent on each subject.

2. Write a paragraph to persuade your principal explaining why he/she should choose your schedule. Be sure to justify your schedule.

3. Create a visual model that shows the fractional part of each day that is used for each subject or activity.

4. Show your calculations so that each fractional piece added together would equal the 7 hours of the school day. (Remember to use equivalent fractions and other strategies to help you add fractions with unlike denominators).

Handout 8.3: Performance Task Rubric

Level	Mastery Level	**Calculations** (Add/Subtract Unlike Fractions, Mixed Numbers, Fractions Greater than 1)	**Visual Representation** (Fractional Model & Labels of Time Spent in Each Area)	**Persuasive Letter** (Explanation of Mathematical Findings and Calculations)	**Presentation of Product**
4	Exemplifying Mastery	Calculations were correct and had a schedule of exactly 7 hours in the day.	VR accurately match the calculations and are labeled correctly.	A clear position is taken and supported with well-chosen evidence and examples.	Project shows diligent effort and ample time were put forth.
3	Approaching Mastery	Calculations were mostly correct, and schedule had 7 hours in the day.	VR mostly matched calculations and/or most labels are correct.	A clear position is supported with some relevant reasons and/or examples.	Project shows that some effort and time were put forth.
2	Developing Mastery (Bronze Medal)	Calculations were mostly incorrect, resulting in more or less than 7 hours in the day.	VR were mostly incorrect (did not match calculations). Some labeling is incorrect.	A position is taken and provided with uneven support.	Project shows that little effort and time were put forth.
1	Not Representing Mastery	Calculations were attempted or were incomplete and the schedule did not have 7 hours.	Visual representations were attempted but did not match the calculations	A weak position is suggested but lacks any convincing support.	Project shows that minimal effort and time were put forth.
0	No Evidence of Mastery	Both calculations and schedule were missing or illegible.	No visual representations or labels included.	No position is taken to convince principal.	Project was incomplete or not submitted.

For training or questions regarding this unit,
please contact:

exemplarunit@mdek12.org