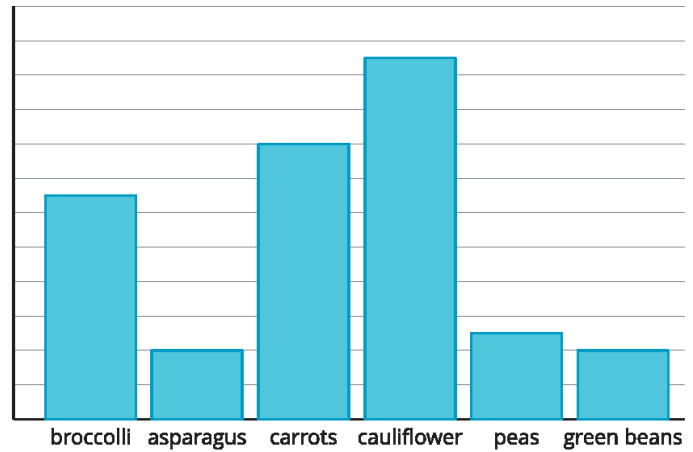




Putting It All Together

Favorite Type of Vegetable



Teacher Guide



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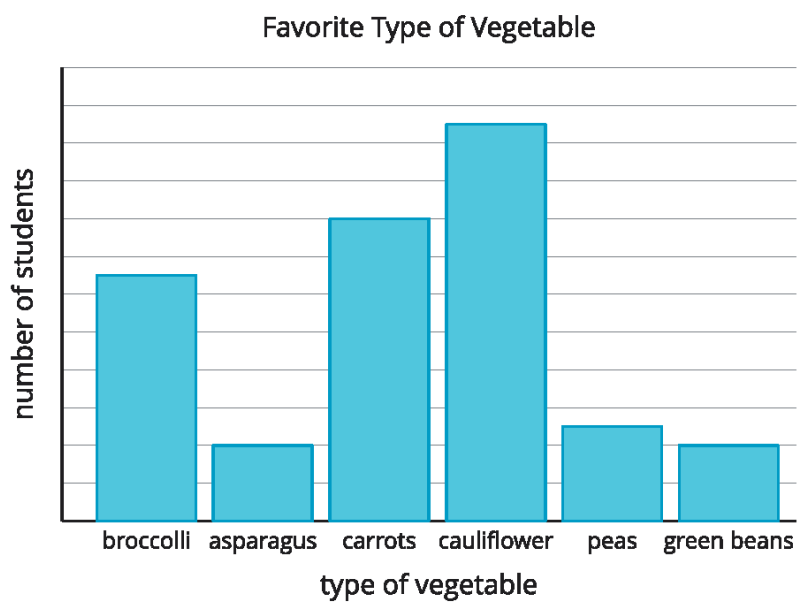
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Putting It All Together

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Putting It All Together
Teacher Guide
Core Knowledge Mathematics™

Unit 8: Putting It All Together

At a Glance

Unit 8 is estimated to be completed in 17 days.

This unit is divided into four sections including 15 lessons.

- Section A—Fraction Fun (Lessons 1-3)
- Section B—Measurement and Data (Lessons 4-7)
- Section C—Multiplication and Division Games (Lessons 8-11)
- Section D—Create and Design (Lessons 12-15)

On pages 7-8 of this Teacher Guide is a chart that identifies the section each lesson belongs in and the materials needed for each lesson.

There are no new centers in this unit. Students choose from centers that have been introduced throughout the year. Students can work at any previously introduced stages of the centers.

Unit 8: Putting It All Together

Unit Learning Goals

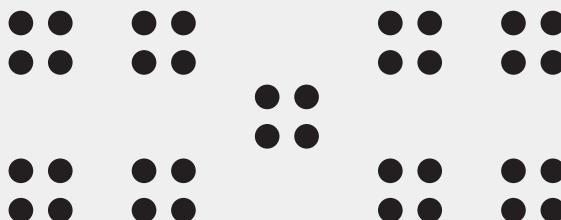
- Students consolidate and solidify their understanding of various concepts and skills related to major work of the grade. They also continue to work toward fluency goals of the grade.

In this unit, students revisit major work and fluency goals of the grade, applying their learning from the year.

In section A, students reinforce what they learned about fractions, their size, and their location on the number line. In section B, students deepen their understanding of perimeter, area, and scaled graphs by solving problems about measurement and data. Two of the lessons invite students to design a tiny house that meet certain conditions and calculate the cost for furnishing it.

Section C enables students to work toward multiplication and division fluency goals through games. In the final section, students review major work of the grade as they create activities in the format of the warm-up routines they have encountered throughout the year (Notice and Wonder, Estimation Exploration, Number Talk, and How Many Do You See?).

How many do you see? How do you see them?



The concepts and skills strengthened in this unit prepare students for major work in grade 4: comparing, adding, and subtracting fractions, multiplying and dividing within 1,000, and using the standard algorithm to add and subtract multi-digit numbers within 1 million.

The sections in this unit are standalone sections, not required to be completed in order. Within each section, many lessons can also be completed independently of the ones preceding them. The goal is to offer ample opportunities for students to integrate the knowledge they have gained and to practice skills related to the expected fluencies of the grade.

Section A: Fraction Fun

Standards Alignments

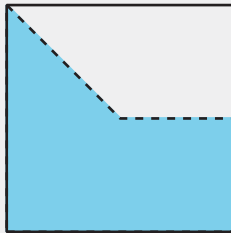
Addressing 3.NF.A.1, 3.NF.A.2, 3.NF.A.3

Section Learning Goals

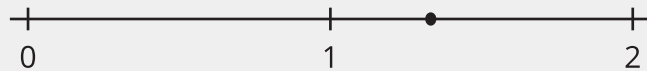
- Understand a fraction as a number and represent fractions on the number line.

In this section, students revisit and build on important fraction ideas that they have learned in the course. They think about different ways to represent fractions and to estimate the size of fractions presented in different forms: as an area diagram, a shaded strip, and a number line.

What fraction of the square is shaded?



What number is represented by the point on the number line?



Students also practice identifying and locating fractions on the number line, using tape to create a number line that shows a large number of fractions.

Later in the section, students consolidate their understanding by analyzing general statements about fractions (for instance, “a fraction is a number less than 1,” or “whole numbers are fractions”). They express their agreement or disagreement with the statements and have the chance to revise their thinking upon discussions with others.

 PLC: Lesson 3, Activity 1, Fractions Round Table

Section B: Measurement and Data

Standards Alignments

Building On	3.MD.C, 3.MD.C.7.d
Addressing	3.MD.B.3, 3.MD.C.7.b, 3.MD.C.7.d, 3.MD.D.8, 3.NBT.A.2, 3.OA.D.8
Building Towards	3.MD.B.3

Section Learning Goals

- Apply concepts of measurement and data to solve problems.

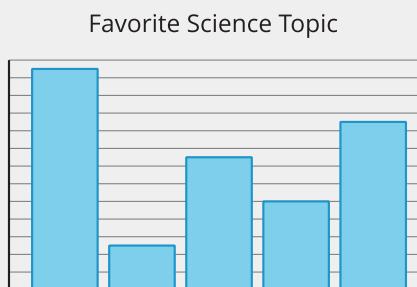
In this section, students further investigate ideas on measurement (area and perimeter) and data (scaled graphs).

Students begin by analyzing features of tiny houses. They then use their knowledge of shapes, perimeter, and area to design their own tiny house, and then write questions about the area and perimeter of shapes in their design.

Later, students apply their knowledge of addition and subtraction to calculate the cost of finishing a room in their tiny house.

In the second half of the section, students focus on data collection and representation. They think about survey questions to ask others in the class and in the school, how to present the answer choices, and how to collect and record a large set of data.

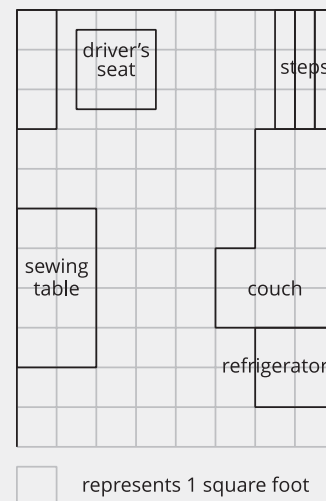
Students then conduct their survey in the school community, organize their data, and represent the data with a scaled graph. They also ask and answer questions about the data.



Write questions that could be answered with your bar graph by completing these sentences.

How many more students liked _____ than _____ ?

How many fewer students liked _____ than _____ ?



Section C: Multiplication and Division Games

Standards Alignments

Addressing 3.OA.A.3, 3.OA.B.6, 3.OA.C.7

Section Learning Goals

- Develop fluency with single-digit multiplication facts and their related division facts.

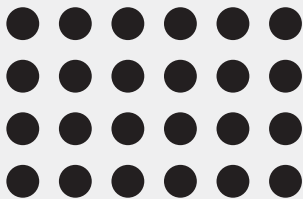
In this section, students continue their work of building fluency with multiplication and division. They begin by reflecting on the products within 100 they know from memory or can find quickly and the ones they don't know yet. Students then practice multiplication facts (focusing on the ones that are least familiar to them) through games.

Next, students reinforce their understanding of the connections between multiplication and division by matching equations and diagrams that represent the same quantities and relationships. For instance, the equations $56 \div 7 = ?$ and $? \times 7 = 56$, and a diagram of a rectangle with an area of 56 and a side length of 7 can all describe the same situation.

Here is another example that shows different representations of multiplication and division:

Which one doesn't belong?

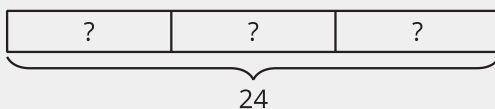
A



B



C



D

$$24 \div 6$$

Students then play games to improve their facility with multiplication and division. They revisit familiar center activities and learn new ones. Compare, Rectangle Rumble, and How Close? are the centers used in this section.

Section D: Create and Design

Standards Alignments

Building On 3.MD.B.4, 3.NBT.A.2
Addressing 3.MD.B.4, 3.NBT.A.2, 3.OA.A, 3.OA.A.1

Section Learning Goals

- Review the major work of the grade by creating and designing instructional routines.

Throughout the course, students have engaged in warm-up routines such as How Many Do You See, Exploration Estimation, Which One Doesn't Belong, True or False, and Number Talk. This section enables them to apply the mathematics they have learned (the four operations, fractions, and measurement, in particular) to design warm-ups that incorporate some of these routines.

Each lesson is devoted to a particular routine. Students begin by completing partially created tasks. They practice anticipating responses that others might give to the prompts they pose.

What do you notice? What do you wonder?




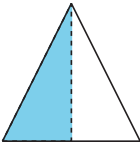
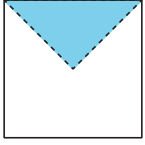
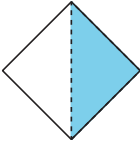
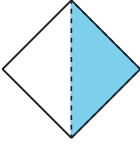
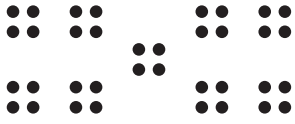
Along the way, students gain the skills and insights needed to create an activity from scratch or with minimal scaffolding. In each lesson, students have the option to facilitate their activity with another group in the class.

 PLC: Lesson 13, Activity 1, Design Your How Many Do You See

Throughout the Unit

The warm-ups throughout the unit provide an invitation for students to think about the topics addressed within each section.

Here is a sampling of the warm-ups in the unit.

lesson 1	lesson 8	lesson 13
<p data-bbox="261 352 602 384">Which One Doesn't Belong?</p> <p data-bbox="256 443 280 470">A</p>  <p data-bbox="459 443 483 470">B</p>  <p data-bbox="256 653 280 680">C</p>  <p data-bbox="459 653 483 680">D</p>  	<p data-bbox="764 352 924 384">Number Talk</p> <p data-bbox="813 415 878 447">2×4</p> <p data-bbox="813 478 878 510">5×4</p> <p data-bbox="805 541 886 573">10×4</p> <p data-bbox="805 604 886 636">17×4</p>	<p data-bbox="1049 352 1341 384">How Many Do You See?</p> 

Materials Needed

LESSON	GATHER	COPY
A.1	<ul style="list-style-type: none"> • none 	<ul style="list-style-type: none"> • none
A.2	<ul style="list-style-type: none"> • Markers • Tape (painter's or masking) 	<ul style="list-style-type: none"> • none
A.3	<ul style="list-style-type: none"> • none 	<ul style="list-style-type: none"> • none
B.4	<ul style="list-style-type: none"> • Materials from a previous activity 	<ul style="list-style-type: none"> • none
B.5	<ul style="list-style-type: none"> • Materials from a previous lesson 	<ul style="list-style-type: none"> • none
B.6	<ul style="list-style-type: none"> • none 	<ul style="list-style-type: none"> • Survey a Large Group (groups of 4)
B.7	<ul style="list-style-type: none"> • Materials from a previous activity • Materials from a previous lesson 	<ul style="list-style-type: none"> • Draw Scaled Graphs (groups of 1)
C.8	<ul style="list-style-type: none"> • Materials from a previous lesson 	<ul style="list-style-type: none"> • Card Sort: Multiplication (groups of 2) • Card Sort: Multiplication Recording Sheet (groups of 2) • Compare Stage 3 Multiplication Cards (groups of 2)
C.9	<ul style="list-style-type: none"> • Materials from previous centers 	<ul style="list-style-type: none"> • How Close? Stage 5 Recording Sheet (groups of 1) • Number Cards (0-10) (groups of 2) • Rectangle Rumble Stage 3 Grid (groups of 2) • Rectangle Rumble Stage 3 Spinners (groups of 2)

C.10	<ul style="list-style-type: none">● Glue or tape● Materials from a previous activity● Tools for creating a visual display	<ul style="list-style-type: none">● Find the Match (groups of 24)
C.11	<ul style="list-style-type: none">● Materials from previous centers● Number cubes	<ul style="list-style-type: none">● none
D.12	<ul style="list-style-type: none">● Chart paper● Markers● Picture books	<ul style="list-style-type: none">● none
D.13	<ul style="list-style-type: none">● Chart paper● Markers	<ul style="list-style-type: none">● none
D.14	<ul style="list-style-type: none">● Chart paper● Markers● Picture books● Rulers	<ul style="list-style-type: none">● none
D.15	<ul style="list-style-type: none">● none	<ul style="list-style-type: none">● none

Section A: Fraction Fun

Lesson 1: Estimation Explorations with Fractions

Standards Alignments

Addressing 3.NF.A.1, 3.NF.A.2

Teacher-facing Learning Goals

- Estimate fractions represented in diagrams and on number lines.

Student-facing Learning Goals

- Let's explore estimations with fractions.

Lesson Purpose

The purpose of this lesson is for students to practice reasoning about fraction representations through estimation.

In previous lessons, students learned how to represent fractions with area diagrams, fraction strips, and number lines. In this lesson, students revisit each of these representations in an estimation context. Students have an opportunity to think about how to partition each representation to decide what fraction is shown (MP7). Additionally, if time allows and it seems of benefit to student understanding, there is an option after each activity to find the exact value of the fraction in the task statement.

If students need additional support with the concepts in this lesson, refer back to Unit 5, Section A in the curriculum materials.

Access for:

Students with Disabilities

- Engagement (Activity 2)

English Learners

- MLR2 (Activity 1)

Instructional Routines

Which One Doesn't Belong? (Warm-up)

Lesson Timeline

Warm-up	10 min
Activity 1	15 min
Activity 2	10 min
Activity 3	10 min
Lesson Synthesis	10 min
Cool-down	5 min

Teacher Reflection Question

Which fraction representations did students seem most comfortable with today? Which representations do you want to be sure to work more with before the year is over?

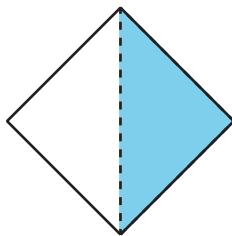
Cool-down (to be completed at the end of the lesson)

🕒 5 min

Fraction Representations

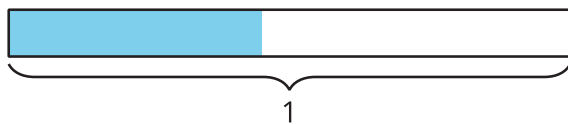
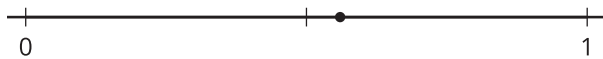
Standards Alignments

Addressing 3.NF.A.1, 3.NF.A.2

Student-facing Task Statement

Could the shaded part of the shape, the point on the number line, and the shaded part of the diagram all represent the same fraction?

Explain your reasoning.



Student Responses

No. Sample response: The shaded part of the shape is $\frac{1}{2}$. The point on the number line is greater than $\frac{1}{2}$ but is less than 1. The shaded part of the diagram is less than $\frac{1}{2}$.

Begin Lesson

Warm-up

🕒 10 min

Which One Doesn't Belong: Fractions

Standards Alignments

Addressing 3.NF.A.1

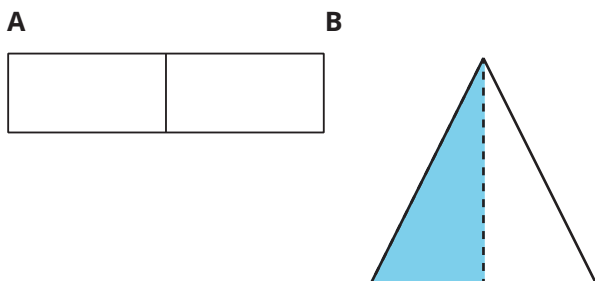
This warm-up prompts students to compare four images. It gives students a reason to use language precisely. It gives the teacher an opportunity to hear how students use terminology and talk about characteristics of the items in comparison to one another. During the synthesis, ask students to explain the meaning of any terminology they use, such as parts, pieces, whole, shapes, triangle, quadrilateral, or halves.

Instructional Routines

Which One Doesn't Belong?

Student-facing Task Statement

Which one doesn't belong?



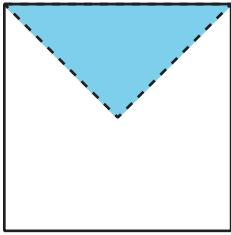
Launch

- Groups of 2
- Display the image.
- "Pick one that doesn't belong. Be ready to share why it doesn't belong."
- 1 minute: quiet think time

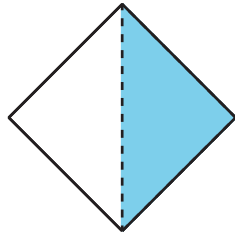
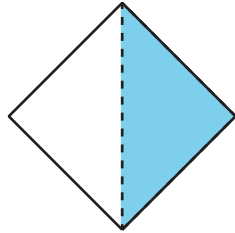
Activity

- "Discuss your thinking with your partner."
- 2-3 minutes: partner discussion

C



D



- Share and record responses.

Synthesis

- "Let's find at least one reason why each one doesn't belong."

Student Responses

- A is the only one that doesn't have any shaded parts, dashed lines, or triangles.
- B is the only one that is not a quadrilateral.
- C is the only one that doesn't show halves or equal parts.
- D is the only one that isn't just one shape or just one whole.

Activity 1

15 min

Estimation Exploration: Diagram

Standards Alignments

Addressing 3.NF.A.1

The purpose of an Estimation Exploration is to practice the skill of estimating a reasonable answer based on experience and known information. In this activity, students estimate what fraction of a square is shaded to revisit area diagrams.

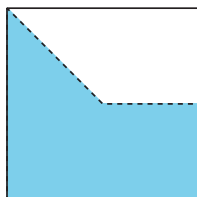
Access for English Learners

MLR2 Collect and Display: Circulate, listen for and collect the language students use as they estimate the fraction of the square that is shaded. On a visible display, record words and phrases such as: area, partition, larger area, between one-half and three-fourths, and more than one-half. Invite students to borrow language from the display as needed, and update it throughout the lesson.

Advances: Conversing, Reading

Student-facing Task Statement

What fraction of the square is shaded?



Record an estimate that is:

too low	about right	too high

Student Responses

Sample responses:

- Too low: between $\frac{1}{3}$ and $\frac{1}{2}$
- About right: between $\frac{5}{6}$ and $\frac{5}{8}$
- Too high: between $\frac{6}{8}$ and 1

Launch

- Groups of 2
- Display the image.
- “What is an estimate that’s too high? Too low? About right?”
- 1 minute: quiet think time

Activity

- “Discuss your thinking with your partner.”
- 1 minute: partner discussion
- Record responses.

Synthesis

- Consider asking:
 - “Is anyone’s estimate less than ____? Is anyone’s estimate greater than ____?”
 - “Based on this discussion does anyone want to revise their estimate?”
- “If you wanted to find out exactly what fraction of the square is shaded, how would you go about doing that?” (Try to partition the square into equal parts and see how many of the parts are shaded.)
- 2 minutes: partner discussion
- Share and record responses.

- Optional: Have students find the exact fraction shaded. ($\frac{5}{8}$)

Activity 2

🕒 10 min

Estimation Exploration: Fraction Strip

Standards Alignments

Addressing 3.NF.A.1

The purpose of this activity is for students to use their experience with fraction strips and tape diagrams to estimate what fraction of a strip is shaded.

🕒 Access for Students with Disabilities

Engagement: Internalize Self-Regulation. Synthesis: Provide students an opportunity to self-assess and reflect on their own progress. For example, their progress with estimation exploration.

Supports accessibility for: Social-Emotional Functioning

Student-facing Task Statement

What fraction of the strip is shaded?



Record an estimate that is:

too low	about right	too high

Student Responses

Sample responses:

- Too low: between $\frac{1}{8}$ and $\frac{1}{4}$

Launch

- Groups of 2
- Display the image.
- “What is an estimate that’s too high? Too low? About right?”
- 1 minute: quiet think time

Activity

- “Discuss your thinking with your partner.”
- 1 minute: partner discussion
- Record responses.

- About right: between $\frac{1}{4}$ and $\frac{3}{8}$
- Too high: between $\frac{1}{2}$ and $\frac{2}{3}$

Synthesis

- “If you wanted to find out exactly what fraction of the strip is shaded, how would you go about doing that?” (See how many copies of the shaded part can fit into the whole strip. Partition the strip into fractions we know and see what fraction the end of the shaded part lines up with.)
- 2 minutes: partner discussion
- Share and record responses.
- Optional: Have students find the exact fraction shaded. ($\frac{1}{3}$)

Activity 3

🕒 10 min

Estimation Exploration: Number Line

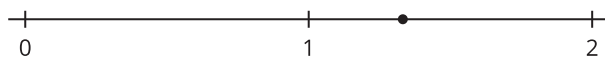
Standards Alignments

Addressing 3.NF.A.2

The purpose of this activity is for students to use their experience locating and labeling fractions to estimate the location of the point on a number line.

Student-facing Task Statement

What number does the point represent?



Record an estimate that is:

too low	about right	too high

Launch

- Groups of 2
- Display the image.
- “What is an estimate that’s too high? Too low? About right?”
- 1 minute: quiet think time

Activity

- “Discuss your thinking with your partner.”

Student Responses

Sample responses:

- Too low: between 1 and $1\frac{1}{4}$
- About right: between $1\frac{1}{4}$ and $1\frac{3}{8}$
- Too high: between $1\frac{1}{2}$ and 2

- 1 minute: partner discussion
- Record responses.

Synthesis

- “If you wanted to find out exactly what fraction is at that point on the number line, how would you go about doing that?” (Partition the number line into fractions we know and see what fraction the point lines up with.)
- 2 minutes: partner discussion
- Share and record responses.
- Optional: Have students find the exact location marked on the number line. ($\frac{4}{3}$)

Lesson Synthesis

🕒 10 min

Display the number line from the last activity.

“Today we practiced our estimation skills with fractions shown in different ways. When you were estimating the location of this point on the number line, what were some things you knew right away?” (The fraction would be greater than 1 and less than 2. The numerator had to be larger than the denominator. I could write it as 1 and a fraction. It would be closer to 1 than 2.)

“What did you have to work a little harder to think about?” (What denominator to use in my estimate because no parts are marked on the number line. What fraction would be greater than 1 but less than $1\frac{1}{2}$.)

----- Complete Cool-Down -----

Response to Student Thinking

Students have reflections to discuss with a partner.

Next Day Support

- Pair students up the next day to discuss their responses.

Lesson 2: Create Your Own Number Line

Standards Alignments

Addressing 3.NF.A.2, 3.NF.A.3

Teacher-facing Learning Goals

- Record the results of comparisons with the symbols $>$, $=$, or $<$.
- Represent fractions on a number line.

Student-facing Learning Goals

- Let's create number lines and compare fractions.

Lesson Purpose

The purpose of this lesson is for students to create their own number line to represent and compare fractions.

In previous lessons, students learned to represent fractions on number lines and to record the results of comparisons of fractions with the symbols $>$, $=$, or $<$. In this lesson, students create their own number lines to practice writing fraction comparison statements.

If students need additional support with the concepts in this lesson, refer back to Unit 5, Section B in the curriculum materials.

Access for:

Students with Disabilities

- Action and Expression (Activity 1)

English Learners

- MLR8 (Activity 1)

Instructional Routines

Which One Doesn't Belong? (Warm-up)

Materials to Gather

- Markers: Activity 1
- Tape (painter's or masking): Activity 1

Lesson Timeline

Warm-up

10 min

Teacher Reflection Question

What methods did students use most today

Activity 1	25 min
Activity 2	10 min
Lesson Synthesis	10 min
Cool-down	5 min

when they were locating fractions on their number lines? What strategies do you want students to practice using more frequently?

Cool-down (to be completed at the end of the lesson)

🕒 5 min

Where Do I Go?

Standards Alignments

Addressing 3.NF.A.2

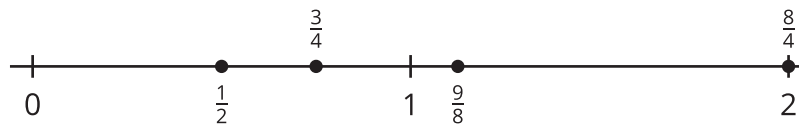
Student-facing Task Statement

Locate and label each number on the number line. Explain your reasoning.

0 1 2 $\frac{1}{2}$ $\frac{3}{4}$ $\frac{8}{4}$ $\frac{9}{8}$



Student Responses



----- Begin Lesson -----

Warm-up

🕒 10 min

Which One Doesn't Belong: Fractions on Number Lines

Standards Alignments

Addressing 3.NF.A.2

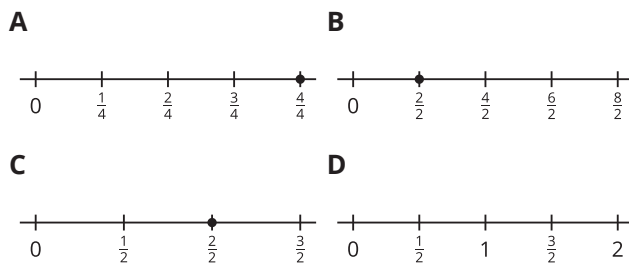
This warm-up prompts students to compare four images. It gives students a reason to use language precisely. It gives the teacher an opportunity to hear how students use terminology and talk about characteristics of the items in comparison to one another. During the synthesis, ask students to explain the meaning of any terminology they use, such as tick marks, labels, unit fractions, whole numbers, and length.

Instructional Routines

Which One Doesn't Belong?

Student-facing Task Statement

Which one doesn't belong?



Student Responses

Sample responses:

- A doesn't belong because it doesn't go past 1.
- B doesn't belong because it isn't marked with unit fractions.
- C doesn't belong because:
 - It doesn't have 5 marks.
 - It doesn't have 4 lengths.
 - It doesn't stop at a whole number.
- D doesn't belong because:
 - It isn't labeled only with fractions, it has whole numbers.
 - It isn't marked at a location.

Launch

- Groups of 2
- Display the image.
- "Pick one that doesn't belong. Be ready to share why it doesn't belong."
- 1 minute: quiet think time

Activity

- "Discuss your thinking with your partner."
- 2–3 minutes: partner discussion
- Share and record responses.

Synthesis

- "Let's find at least one reason why each one doesn't belong."

Activity 1

🕒 25 min

Create Your Own Number Line

Standards Alignments

Addressing 3.NF.A.2

The purpose of this activity is for students to use their fraction reasoning skills to practice locating fractions on a number line. Students should be in groups, but the groups should stay small enough that every member will have a chance to share their ideas. Be sure to space groups so that each has their own area to work in. Students write the fractions on their tape. Students will use the number line they create in the next activity.

As they place the different numbers students think about the meaning of the numerator and denominator in the fractions and how whole numbers can be written as fractions (MP7).

🌐 Access for English Learners

MLR8 Discussion Supports. Synthesis: At the appropriate time, give groups 2–3 minutes to plan what they will say when they present to the class. “Practice what you will say when you share your number line with the class. Talk about what is important to say, and decide who will share each part.”

Advances: Speaking, Conversing, Representing

♿ Access for Students with Disabilities

Action and Expression: Develop Expression and Communication. Synthesis: Identify connections between strategies that result in the same outcomes but use differing approaches.

Supports accessibility for: Memory

Materials to Gather

Markers, Tape (painter's or masking)

Required Preparation

- Each group of 3-4 students needs a roll of tape and a marker.

Student-facing Task Statement

Create a long number line on the floor.

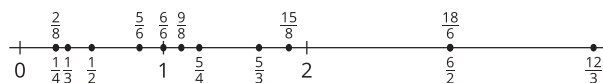
Launch

- Groups of 3–4

Locate and label each fraction on the number line. Be prepared to explain your reasoning.

0	1	2	$\frac{1}{2}$
$\frac{1}{3}$	$\frac{6}{2}$	$\frac{12}{3}$	$\frac{1}{4}$
$\frac{5}{4}$	$\frac{6}{6}$	$\frac{5}{6}$	$\frac{9}{8}$
$\frac{15}{8}$	$\frac{5}{3}$	$\frac{18}{6}$	$\frac{2}{8}$

Student Responses



- “Today you are going to work with your group to create a number line and place fractions on it. Be prepared to share your methods with the class.”
- Give each group a roll of tape and a marker.

Activity

- 10–15 minutes: small-group work time
- Monitor for methods that groups use to locate the points, such as:
 - starting with benchmark numbers, such as unit fractions or whole numbers
 - considering whether fractions are larger or smaller than 1
 - considering whether fractions are equivalent to whole numbers
 - comparing fractions with the same numerator or denominator

Synthesis

- Have each group share a method they used or a fraction they placed, based on what you noticed during the activity. Encourage groups to use their number lines when demonstrating their reasoning.
- Consider asking:
 - “Did any groups use a similar strategy?”
 - “Did any groups place that fraction in a different way?”
 - “Which fractions were easier to locate?”
 - “Which fractions were harder to locate?”
- Keep number lines displayed for the next activity.

Activity 2

 10 min

Make a Statement

Standards Alignments

Addressing 3.NF.A.3

The purpose of this activity is for students to use the number line they created in the previous activity to make comparison statements about fractions. Students use the symbols $>$, $=$, and $<$ to record comparisons between pairs of fractions.

Student-facing Task Statement

Write 6 fraction comparison statements about the numbers on your number line. Include 2 statements for each symbol ($>$, $=$, and $<$).

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

Choose 2 statements you wrote. Use numbers, pictures, or words to show that they are true.

Student Responses

Sample responses:

- $\frac{18}{6} = 3$: They are at the same location on the number line.
- $1 > \frac{1}{2}$: $\frac{1}{2}$ is to the left of 1 so I know 1 is greater than $\frac{1}{2}$.

Launch

- Groups of 3–4
- “Now you are going to work with your group to write comparison statements based on your number line.”

Activity

- 8–10 minutes: small-group work time
- Monitor for a variety of student-generated statements of each type to share during the synthesis.

Synthesis

- Have each group share at least one comparison statement they came up with and their reasoning. Be sure to share at least one statement that uses each symbol.

Lesson Synthesis

🕒 10 min

“How did you decide how long your number line should be? Does it matter?” (We looked at the largest number we had and made sure it would fit on the number line. Yes, because you had to make sure all the numbers would fit on the number line.)

“The number line of one group is noticeably longer than that of another group. Does that affect the comparison statements that each group could make?” (It wouldn’t affect the comparison statements for one group working on their own number line, but if two groups tried to compare fractions with number lines with different lengths, their statements could be wrong.)

Complete Cool-Down

Response to Student Thinking

Students put the fractions in the correct order, but space them equally or do not attend to locating them as precisely as is reasonable.

Next Day Support

- Use the next day's warm-up to have students discuss the size of halves, fourths, and eighths relative to each other.

Lesson 3: Fractions Round Table

Standards Alignments

Addressing 3.NF.A.1, 3.NF.A.2, 3.NF.A.3

Teacher-facing Learning Goals

- Generalize key ideas about fractions, such as what fractions mean, whole numbers as fractions, and fraction comparisons.

Student-facing Learning Goals

- Let's discuss fractions.

Lesson Purpose

The purpose of this lesson is for students to consider statements about fractions that will help them solidify their understanding of fractions as numbers.

In previous lessons, students learned what fractions are and how to represent fractions with area diagrams, fraction strips, and on the number line. Students also compared fractions and recognized and generated equivalent fractions. In this lesson, students think about and discuss statements that address their understanding of important ideas about fractions.

If students need additional support with the concepts in this lesson, refer back to Unit 5, Section C in the curriculum materials.

Access for:

Students with Disabilities

- Engagement (Activity 1)

English Learners

- MLR8 (Activity 1)

Instructional Routines

What Do You Know About ____? (Warm-up)

Lesson Timeline

Warm-up	10 min
Activity 1	35 min
Lesson Synthesis	10 min

Teacher Reflection Question

What was the best question you asked students today? Why would you consider it the best one based on what students said or did?

Cool-down

5 min

Cool-down (to be completed at the end of the lesson)

🕒 5 min

Round Table Reflection

Standards Alignments

Addressing 3.NF.A.1, 3.NF.A.2, 3.NF.A.3

Student-facing Task Statement

1. Which statement did you feel most sure about? Why?
2. Which statement would you like to spend more time thinking about? Why?

Student Responses

1. Answers vary.
2. Answers vary.

----- **Begin Lesson** -----**Warm-up**

🕒 10 min

What Do You Know About $\frac{1}{8}$?**Standards Alignments**

Addressing 3.NF.A.1, 3.NF.A.2, 3.NF.A.3

The purpose of this What Do You Know About _____ is to invite students to share what they know about and how they can represent the number $\frac{1}{8}$.

Instructional Routines

What Do You Know About ____?

Student-facing Task Statement

What do you know about $\frac{1}{8}$?

Student Responses

Sample responses:

- $\frac{1}{8}$ is 1 part when the whole is split into 8 equal parts.
- $\frac{1}{8}$ is smaller than $\frac{1}{2}$.
- Students may represent $\frac{1}{8}$ on a number line or with a diagram.

Launch

- Display the number.
- “What do you know about $\frac{1}{8}$?”
- 1 minute: quiet think time

Activity

- Record responses.
- “How could we represent the number $\frac{1}{8}$?”

Synthesis

- “What connections do you see between different answers?”

Activity 1

 35 min

Fractions Round Table

   PLC Activity

Standards Alignments

Addressing 3.NF.A.1, 3.NF.A.2, 3.NF.A.3

The purpose of this activity for students to think about and discuss statements that address their understanding of important ideas about fractions. Students will consider ideas about how fractions are defined, comparing fractions, and how fractions relate to whole numbers. It is not necessary for each group to discuss all of the statements, but if there are any you'd like to make sure each group discusses, let them know at the start of the activity.

Students construct viable arguments to explain their choices (MP3) and in order to do so they need to use key fraction language, such as whole and equal-size piece, precisely (MP6).

Access for English Learners

MLR8 Discussion Supports. Synthesis: Provide students with the opportunity to rehearse what they will say with a partner before they share with the whole class.

Advances: Speaking

Access for Students with Disabilities

Engagement: Develop Effort and Persistence: Chunk this task into more manageable parts. Check in with students to provide feedback and encouragement after each round.

Supports accessibility for: Organization, Focus

Student-facing Task Statement

Discuss each statement in 3 rounds with your group.

- Round 1: Go around the group and state whether you agree, disagree, or are unsure about the statement and justify your choice. You will be free to change your response in the next round.
- Round 2: Go around the group and state whether you agree, disagree, or are unsure about the statement you or someone else made in the first round. You will be free to change your response in the next round.
- Round 3: State and circle the word to show whether you agree, disagree, or are unsure about the statement now that discussion has ended.

Repeat the rounds for as many statements as you can.

Launch

- Groups of 4
- “Take a minute to read the directions for today’s activity. You will be discussing statements about fractions with your group.”
- 1 minute: quiet think time

Activity

- Consider walking students through the process and answer any questions.
- 25–30 minutes: small-group work time

Synthesis

- “Was there a statement that you changed your mind about during your group’s discussion? What was the statement? What made you change your mind?”
- Consider asking:
 - “What statements do you still have questions about?”

statement	round 1	round 2	round 3
A A fraction is a number less than 1.	agree disagree unsure	agree disagree unsure	agree disagree unsure
B A fraction can be located on a number line.	agree disagree unsure	agree disagree unsure	agree disagree unsure
C The numerator tells us the size of the part.	agree disagree unsure	agree disagree unsure	agree disagree unsure

statement	round 1	round 2	round 3
D The denominator tells us the number of parts.	agree disagree unsure	agree disagree unsure	agree disagree unsure
E Whole numbers are fractions.	agree disagree unsure	agree disagree unsure	agree disagree unsure
F fractions are whole numbers.	agree disagree unsure	agree disagree unsure	agree disagree unsure
G One half is always greater than one third.	agree disagree unsure	agree disagree unsure	agree disagree unsure
H fractions can be used to describe a length.	agree disagree unsure	agree disagree unsure	agree disagree unsure

Student Responses

Sample responses:

- A. Disagree: Fractions can be greater than 1, like $\frac{4}{3}$.

- B. Agree: A fraction can be placed on the number line just like whole numbers. Fractions are in between whole numbers.
- C. Disagree: The denominator tells the size of the parts you partition the whole into.
- D. Disagree: The numerator tells you the number of parts in the fraction.
- E. Agree: All whole numbers are fractions if you write them with a 1 in the bottom, like $\frac{3}{1}$.
- F. Disagree: Not all fractions are whole numbers, but some are. For example, $\frac{1}{2}$ is not a whole number, but $\frac{6}{2}$ is the same as 3.
- G. Disagree: If the wholes are not the same I could draw a square that is really big and a square that is really small so that one third of the big square is bigger than one half of the small square.
- H. Agree: We measured things in fractions. I could say I ran $\frac{1}{2}$ of the length of the field.

Lesson Synthesis

🕒 10 min

“Which statement did your group have the most discussion about and why?” (We discussed the idea that one half is always greater than one third the most because some people agreed and some disagreed.)

Complete Cool-Down

Response to Student Thinking

Students have reflections to discuss with a partner.

Next Day Support

- Pair up students the next day to discuss their responses.

Section B: Measurement and Data

Lesson 4: Tiny House: Design and Solve

Standards Alignments

Building On 3.MD.C, 3.MD.C.7.d
Addressing 3.MD.C.7.b, 3.MD.C.7.d, 3.MD.D.8

Teacher-facing Learning Goals

- Apply understanding of area and perimeter to solve problems about design.

Student-facing Learning Goals

- Let's design a tiny house.

Lesson Purpose

The purpose of this lesson is for students to design and solve problems about a tiny house.

In an earlier unit, students learned about area and perimeter. In this lesson, they apply their understanding of area and perimeter and their creativity to design a tiny house, which is generally a house under 400 square feet. After students design their tiny house (along with the furniture and other details), they write, revise, and answer problems involving area and perimeter that can be answered using their design.

If students need additional support with the concepts in this lesson, refer back to Unit 2, Section B in the curriculum materials.

Access for:

Students with Disabilities

- Engagement (Activity 1)

English Learners

- MLR8 (Activity 1)

Instructional Routines

Notice and Wonder (Warm-up)

Materials to Gather

- Materials from a previous activity: Activity 2

Lesson Timeline

Warm-up	10 min
Activity 1	25 min
Activity 2	15 min
Lesson Synthesis	5 min
Cool-down	5 min

Teacher Reflection Question

What patterns did you notice in the designs students created today? What evidence did you see of students using their geometry knowledge to create their design?

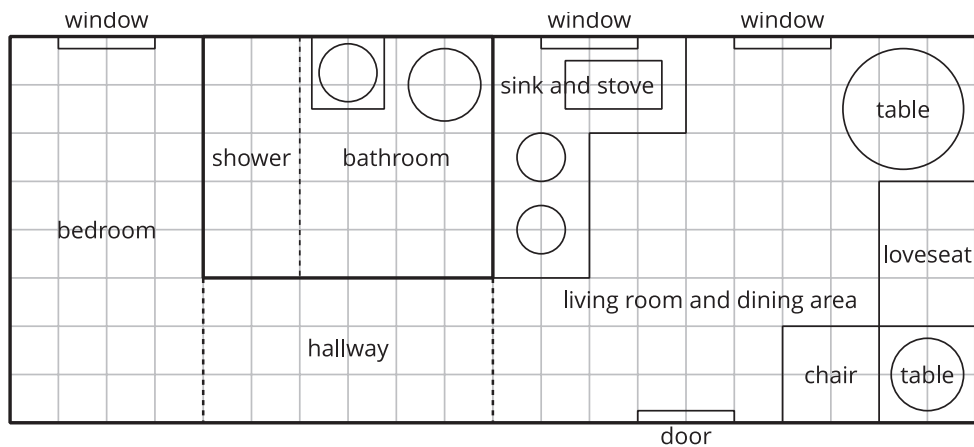
Cool-down (to be completed at the end of the lesson)

🕒 5 min

Area and Perimeter

Standards Alignments

Addressing 3.MD.C.7.b, 3.MD.D.8

Student-facing Task Statement

Each square on the diagram is 1 square foot.

1. What is the combined area of the hallway and bedroom? Explain or show your reasoning.
2. What is the perimeter of the living room and dining area? Explain or show your reasoning.

Student Responses

- 50 square feet. Sample response: The hallway is 3 feet by 6 feet so it has an area of 18 square feet. The bedroom is 4 feet by 8 feet so it has an area of 32 square feet. I added 32 and 18 to get 50.
- 36 feet. (The perimeter is the same whether students include the sink and stove or not.)
Sample responses:
 - I found 2×10 and 2×8 , then I added 20 and 16 to get 36.
 - I added the lengths of the two sides of the living room and the sides around the sink and stove, and the width of the hallway: $10 + 8 + 6 + 2 + 2 + 3 + 2 + 3$ and got 36.

----- Begin Lesson -----

Warm-up

🕒 10 min

Notice and Wonder: Tiny Houses

Standards Alignments

Building On 3.MD.C

The purpose of this warm-up is to familiarize students with tiny houses and encourage them to think about the area of a tiny house, which will be useful when students design a tiny house in a later activity. While students may notice and wonder many things about the images, the fact that the tiny houses are very small and cover small areas are the important discussion points.

Instructional Routines

Notice and Wonder

Student-facing Task Statement

What do you notice? What do you wonder?

Launch

- Groups of 2
- Display the images.
- "What do you notice? What do you wonder?"
- 1 minute: quiet think time



Student Responses

Students may notice:

- There's a cabin.
- There's a house that looks really boxy.
- The cabin is in the woods.
- The cabin looks small.
- One picture is of the inside of a school bus, but there's a couch and a sewing table.
- There are doors and windows shaped like quadrilaterals.

Students may wonder:

- Does someone live in these houses?
- How many people can these houses hold?
- Why are these houses so small?
- How much area do you have in the houses?

Activity

- "Discuss your thinking with your partner."
- 1 minute: partner discussion
- Share and record responses.

Synthesis

- "These are all types of tiny houses, which are houses that are usually under 400 square feet. What might be some reasons for choosing to build or live in a tiny house?" (It is less expensive to build. It works for those who live alone or don't want a lot of space. It is good for the environment because it takes up less space in nature.)
- "Tiny houses come in many forms or types. Some are small cabins, but some are built out of shipping containers and even school buses (as in the last image)."
- "What could be some advantages of each type? What could be some disadvantages of each type?" (A shipping container would be strong, but it could rust and could be challenging to create windows and doors. A cabin would be kind of like building a regular house. You could have 2 stories and you could make it bigger, but some people might not like the look of a cabin. The school bus is mobile, so you wouldn't have to stay in one spot, but there are a bunch of windows, so you would have to cover some.)

Activity 1

Design a Tiny House

🕒 25 min

👤 ↔ 👤 PLC Activity

Standards Alignments

Building On 3.MD.C.7.d

The purpose of this activity is for students to choose a type of tiny house and design the spaces inside it by partitioning the rectangular floor plan into smaller areas. The synthesis provides time to share and ask questions about each others' designs.

As students design the different living needs for their home, thinking about the amount of space needed for each part and the available space, they model with mathematics (MP4).

Access for English Learners

MLR8 Discussion Supports. Synthesis: At the appropriate time, provide students 2–3 minutes to plan what they will say when they present their design. “Practice what you will say when you share your design with the class. Practice what is important to say, and if you are part of a group, decide who will share each part.”

Advances: Speaking, Conversing, Representing

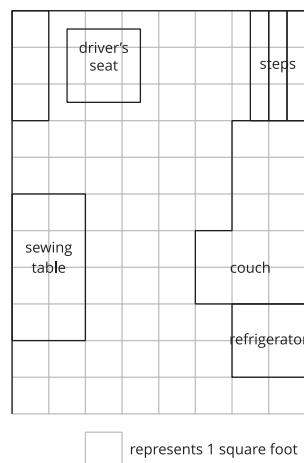
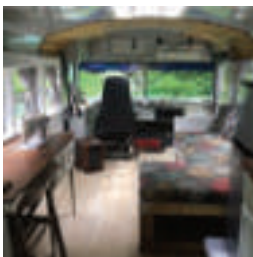
Access for Students with Disabilities

Engagement: Provide Access by Recruiting Interest. Invite students to share connection between activity context/content and their own lives.

Supports accessibility for: Attention, Visual-Spatial Processing

Student-facing Task Statement

Here is an image of the inside of a converted school bus.



1. Choose the type of tiny house you will design. Be sure to consider the advantages and disadvantages of each type and how

Launch

- Groups of 1-4
- Display the images.
- “The second image is a drawing that we could use to show the layout of the school bus. How are the images the same? How are they different?” (They both show the furniture like the driver’s seat and the couch. The picture is taken from inside the bus, but the drawing shows what the inside looks like if we’re looking at it from above.)
- 1 minute: partner discussion
- Share responses.
- “You can work independently, in partners, or in a small group to design your tiny house. Independently or with your group, read the details of the choices you have for your tiny house and choose one. Be prepared to explain your choice.”

you'll use the area.

shipping
container



8 ft x 20
feet



cabin



8 ft x 10 feet
downstairs
8 ft x 8 feet
upstairs



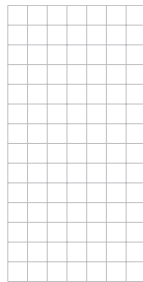
upstairs



school bus



7 ft x 14
feet



2. Create a design for your tiny house. Be sure to include:
 - different rooms
 - windows and a door
 - furniture and any other details you think are important

Student Responses

Sample response:

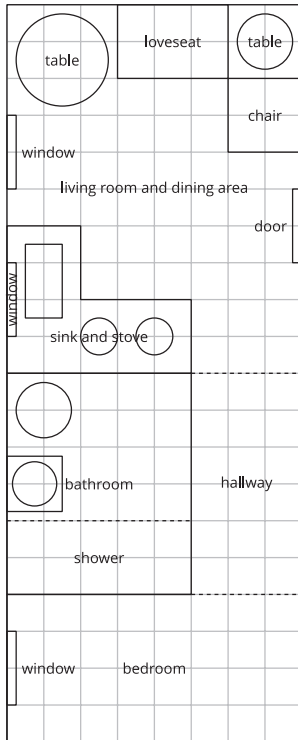
- 2–3 minutes: independent or group work time
- Share responses.
- Consider asking: “What is the area of the house type you chose?”

Activity

- “Partition the type you choose into different rooms. You’ll have time to include furniture, labels, and other details so others can understand your plan for a tiny house.”
- 10–15 minutes: independent or group work time

Synthesis

- Display the student designs around the room.
- Ask half of the students to stand with their design and share their ideas or answer questions as the other half of the class visits their designs.
- 2–4 minutes: students visit designs
- Remind students to move to a new design after 2 minutes if they haven’t already, so they see at least a couple of designs.
- Switch student roles and repeat.



Advancing Student Thinking

If students don't include a reasonable amount of space for a specific room in their design, consider asking:

- "Tell me about how you decided on the amount of space you included for _____."
- "How could we use a yardstick (or a ruler, or a tape measure) to get a sense of the size of the space?"

Activity 2

🕒 15 min

Ask, Revise, and Answer

Standards Alignments

Addressing 3.MD.C.7.d, 3.MD.D.8

The purpose of this activity is for students to generate questions involving area and perimeter that can be answered with their tiny house design (MP2). To confirm that their questions make sense and can be answered with their design, students work with a partner to answer their own questions before posing the questions to others (MP3).

Materials to Gather

Materials from a previous activity

Required Preparation

- Each student needs the tiny house design they created in the previous activity.

Student-facing Task Statement

1. Write two questions about your tiny house design:
 - a. one question that involves area
 - b. one question that involves perimeter
2. Work with a partner to answer your own questions about your tiny house design. Make any revisions to your questions if needed.
3. Find a new partner. Answer their questions about their tiny house design.

Student Responses

1. Sample responses:
 - a. What is the combined area of the bedroom and bathroom?
 - b. What is the perimeter of the living room?
2. No response required.
3. Answers vary.

Launch

- Groups of 2
- “Work independently to write two questions that could be answered using your tiny house design. One question should be about area and the other about perimeter.”
- 3–5 minutes: independent work time

Activity

- “Share your questions with your partner and answer them together. Revise your questions if needed.”
- 5 minutes: partner work time
- “Find a new partner and answer each other’s questions. Be sure to share your tiny house design with your new partner.”
- 5 minutes: partner work time

Synthesis

- See lesson synthesis.

Lesson Synthesis

 5 min

Invite a student to share their questions and ask their partner to share the answers.

If time permits, consider asking:

- “What was something you noticed about the designs you saw today?” (A lot of the designs used rectangles to make the rooms. A lot of the bedrooms were the same size so they could fit a bed. Other students were really creative with how they used the space.)
- “What was something you wondered about the designs you saw today?” (What do designs look like from people who build these houses? How do designers fit all the parts of a house into such a small space? Are there tiny houses that are a little bigger to include more things? Where can I learn more about building tiny houses?)

----- Complete Cool-Down -----

Response to Student Thinking

Students find the perimeter when asked about area or find the area when asking about perimeter.

Next Day Support

- During the launch of the next day's activity, have students discuss the difference between area and perimeter and what types of units are used to measure each.

Lesson 5: Tiny House: Cost

Standards Alignments

Addressing 3.NBT.A.2, 3.OA.D.8

Teacher-facing Learning Goals

- Solve problems about the cost of finishing a room in a tiny house.

Student-facing Learning Goals

- Let's calculate the cost of finishing a room in a tiny house.

Lesson Purpose

The purpose of this lesson is for students to apply what they've learned about operations to calculate the cost to finish a space in a tiny house.

In a previous lesson, students used what they learned about area and perimeter to design a tiny house. In this lesson, they apply their knowledge of operations to calculate the cost of finishing one of the rooms of their tiny house. Students engage in aspects of mathematical modeling as they make decisions about quantities, relate measurements and costs, and interpret their results in context (MP4).

If students need additional support with the concepts in this lesson, refer back to Unit 3, Section A in the curriculum materials.

Access for:

Students with Disabilities

- Action and Expression (Activity 1)

English Learners

- MLR8 (Activity 1)

Instructional Routines

Estimation Exploration (Warm-up)

Materials to Gather

- Materials from a previous lesson: Activity 1

Lesson Timeline

Warm-up	10 min
Activity 1	35 min

Teacher Reflection Question

What strategy did you anticipate today? Which did you not anticipate?

Lesson Synthesis 10 min

Cool-down 5 min

Cool-down (to be completed at the end of the lesson)

🕒 5 min

Find the Cost?

Standards Alignments

Addressing 3.OA.D.8

Student-facing Task Statement

What is the cost of 18 square feet of tile and kitchen plumbing? Explain your reasoning.

item	cost
flooring: tile wood carpet	\$5 for each square foot \$4 for each square foot \$2 for each square foot
paint	\$25 for each gallon (up to 400 square feet)
bathroom plumbing	\$379
toilet	\$138
bathroom sink and faucet	\$112
kitchen plumbing	\$253
kitchen sink and faucet	\$227
cabinets	\$90 for each foot
shelving	\$20 for each foot
dishes, cups, forks, spoons, etc.	Prices vary. Research or estimate cost.
dishwasher	\$389
portable stove	\$174

furniture	Prices vary. Research or estimate cost.
compact washer- dryer combination	\$225
bed	\$189

Student Responses

\$343. Sample response: Tile flooring costs \$90, because 18×5 is $10 \times 5 + 8 \times 5$, which is $50 + 40$ or 90. Adding 253 and 90 together gives 343.

----- Begin Lesson -----

Warm-up

🕒 10 min

Estimation Exploration: Cost of a Room

Standards Alignments

Addressing 3.OA.D.8

The purpose of an Estimation Exploration is to practice the skill of estimating a reasonable answer based on experience and known information.

Instructional Routines

Estimation Exploration

Student-facing Task Statement

What is the cost of all the labeled items in the bus?

Launch

- Groups of 2
- Display the image.
- “What is an estimate that’s too high? Too low? About right?”



Record an estimate that is:

too low	about right	too high

Student Responses

Sample response:

- Too low: \$200–\$350
- About right: \$350 –\$400
- Too high: over \$400

- 1 minute: quiet think time

Activity

- “Discuss your thinking with your partner.”
- 1 minute: partner discussion
- Record responses.

Synthesis

- “What are some of the items you would need to buy to finish the rooms after you built a tiny house?” (furniture, cabinets, stove, lights, pictures, bed)

Activity 1

🕒 35 min

What’s the Cost?

Standards Alignments

Addressing 3.NBT.A.2, 3.OA.D.8

The purpose of this activity is for students to calculate the cost of finishing a room in the tiny house they designed. Students will have a cost sheet with common items, but, if time permits, students could research the cost of additional items that are not listed. Also, the lesson could be extended by having students finish a second room in their tiny house design.

When students decide which room to work on and which items to purchase for the room, with a

constraint of \$1,000, they model with mathematics (MP4).

Access for English Learners

MLR8 Discussion Supports. Prior to solving the problem, invite students to make sense of the items on the cost sheet. Monitor and clarify any questions about the context.

Advances: Reading, Representing

Access for Students with Disabilities

Action and Expression: Internalize Executive Functions. Synthesis: To support working memory, provide students with access to sticky notes or mini whiteboards.

Supports accessibility for: Memory, Organization

Materials to Gather

Materials from a previous lesson

Required Preparation

- Each student needs the tiny house design they created in the previous lesson.

Student-facing Task Statement

Choose a room from your tiny house to finish. Use the cost sheet to calculate the cost of finishing the room in your tiny house. Your budget is \$1,000.

item	cost
flooring:	
tile	\$5 for each square foot
wood	\$4 for each square foot
carpet	\$2 for each square foot
paint	\$25 for each gallon (up to 400 square feet)
bathroom plumbing	\$379
toilet	\$138
bathroom sink and faucet	\$112
kitchen plumbing	\$253
kitchen sink and faucet	\$227

Launch

- Groups of 2
- “Work independently to calculate the cost of finishing a room in the tiny house you designed. You have a budget of \$1,000. You’ll have some time to work with a partner after you’ve spent some time working independently.”

Activity

- 10–12 minutes: independent work time
- “Now, you can spend some time working with your partner or continue working independently. If you choose to work independently, still be available to your partner if they need help thinking about their design.”
- 10–15 minutes: partner or independent work time

cabinets	\$90 for each foot
shelving	\$20 for each foot
dishes, cups, forks, spoons, etc.	Prices vary. Research or estimate cost.
dishwasher	\$389
portable stove	\$174
furniture	Prices vary. Research or estimate cost.
compact washer/dryer combination	\$225
bed	\$189

Student Responses

Sample response: I chose to calculate the cost of the kitchen. I was able to get everything I needed for \$994.

- \$253: kitchen plumbing
- \$227: kitchen sink and faucet
- \$174: portable stove
- \$45: I used 9 square feet of tile and each square foot costs \$5, so the cost for the tile was \$45.
- \$25: white paint
- \$180: I used 9 feet of shelving and each foot costs \$20 so the cost was 9×20 or 180.
- \$90: pots, pans, dishes, and utensils

$$253 + 227 = 480$$

$$174 + 25 = 199$$

$$180 + 90 + 45 = 315$$

$$480 + 199 + 315 = 994$$

- Monitor for what students use to finish their rooms and encourage them to include critical items such as flooring and plumbing in rooms where it's required.

Synthesis

- Display student work.
- "Take some time to walk around and see what room your classmates chose to finish and how they finished the room. Write down something that you notice and something that you wonder."
- 3–5 minutes: independent work time
- 1 minute: partner discussion
- Share responses.

Advancing Student Thinking

If students choose too many items and exceed their budget of \$1,000, consider asking:

- "Tell me about how much you spent on finishing your room?"
- "How could rounding or estimating help you keep the cost under \$1,000?"

Lesson Synthesis

🕒 10 min

"Today, you calculated the cost of finishing one of the rooms in your tiny house."

"What decisions did you make to finish a room in your tiny house?" (Which room to finish. Which items to include without going over \$1,000. How much or how many of each item to get.)

Complete Cool-Down

Response to Student Thinking

Students add $18 + 5 + 253$, instead of multiplying 5 and 18, then adding 253.

Next Day Support

- Before the warm-up, pass back the cool-down and work in small groups to make corrections.

Lesson 6: Survey the Class, Survey the School

Standards Alignments

Building Towards 3.MD.B.3

Teacher-facing Learning Goals

- Collect categorical data to create a data set with several categories.

Student-facing Learning Goals

- Let's survey a large group.

Lesson Purpose

The purpose of this lesson is for students to use a survey to collect a data set with several categories.

Earlier in the course, students used scaled picture graphs and bar graphs to represent data sets with several categories. In this lesson, they collect a large data set by surveying others at the school. In the next lesson, they represent the data on scaled picture graphs and bar graphs.

Students should survey at least several classes, as many as time and circumstances permit. The lesson may take 2 or 3 days depending on the survey size.

If students need additional support with the concepts in this lesson, refer back to Unit 1, Section A in the curriculum materials.

Access for:

Students with Disabilities

- Engagement (Activity 2)

English Learners

- MLR8 (Activity 2)

Instructional Routines

Notice and Wonder (Warm-up)

Materials to Copy

- Survey a Large Group (groups of 4): Activity 2

Lesson Timeline

Warm-up	10 min
---------	--------

Teacher Reflection Question

What was one thing that surprised you about your students' understanding as they collected

Activity 1	10 min	data today?
Activity 2	25 min	
Lesson Synthesis	10 min	
Cool-down	5 min	

Cool-down (to be completed at the end of the lesson)

🕒 5 min

Reflect on Collecting Data

Standards Alignments

Building Towards 3.MD.B.3

Student-facing Task Statement

Reflect on your experience surveying others and collecting data.

1. What went well? Why do you think it went well?
2. What was challenging or didn't go as well? What might be the reason?

Student Responses

Sample responses:

1. We were able to collect our data quickly and there was no confusion. I think it went well because we showed people the question and choices instead of just reading them aloud and we used a recording sheet.
2. We missed some people in the class and couldn't easily tell who we missed. I think it was because we didn't think about a way to make sure everyone had a turn.

Begin Lesson

Warm-up

🕒 10 min

Notice and Wonder: Survey

Standards Alignments

Building Towards 3.MD.B.3

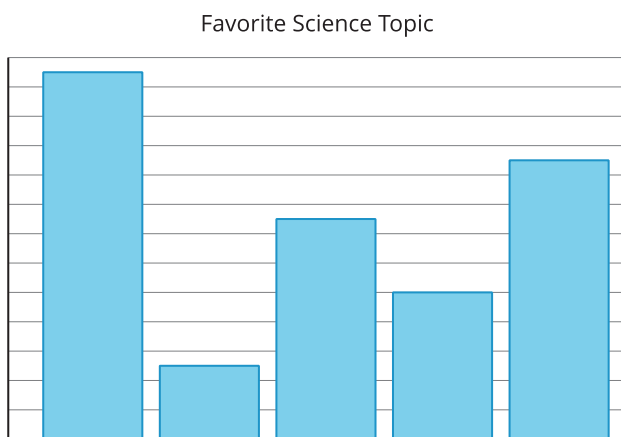
The purpose of this warm-up is to elicit the idea that each bar on the bar graph represents a category, which will be useful when students use survey data to create a bar graph in a later activity.

Instructional Routines

Notice and Wonder

Student-facing Task Statement

What do you notice? What do you wonder?



Student Responses

Students may notice:

- The graph is about students' favorite science topics.
- There are 5 categories.
- Some bars stop at a horizontal line and others stop between two lines.

Students may wonder:

- What are the categories?
- What does each line or each step represent?
- How many people were surveyed to get the data?

Launch

- Groups of 2
- Display the graph.
- "What do you notice? What do you wonder?"
- 1 minute: quiet think time

Activity

- "Discuss your thinking with your partner."
- 1 minute: partner discussion
- Share and record responses.

Synthesis

- "This is a graph about students' favorite science topic. What are some possible categories for the graph?" (living things, space, ecosystems, weather, energy)

Activity 1

🕒 10 min

Create a Survey

Standards Alignments

Building Towards 3.MD.B.3

The purpose of this activity is for students to decide on a question and answer choices that they will use to survey a group of students.

Student-facing Task Statement

Create a survey that you'll use with a large group of students. It should include:

- a question
- up to 6 answer choices

Student Responses

Sample responses:

- What is your favorite type of book?
- informational books, biographies, story books, comic books, poetry books, other

Launch

- Groups of 4
- "Think about some topics you could survey students in the class about." (favorite sport, favorite food, favorite subject)
- 1 minute: quiet think time
- Share and record responses.

Activity

- "Work with your group to choose a topic and create your survey. It should include a question and up to 6 answer choices."
- 5-7 minutes: group work time

Synthesis

- Invite each group to share their questions and answer choices.
- "Does anyone want to revise their answer choices after hearing ideas from other groups?"
- Give students time to revise their survey, if needed.

Activity 2

🕒 25 min

Survey a Large Group

Standards Alignments

Building Towards 3.MD.B.3

The purpose of this activity is for students to survey a large group of students. This data set will be used in the next lesson to make a scaled picture graph and a scaled bar graph. This process could take 2–3 days depending on how many students in your school are surveyed.

A blank table for recording survey results is included in the Instructional master, but students can also use lined paper. Here is a partial image of the table for reference:

Question:						
	A	B	C	D	E	F

🌐 Access for English Learners

MLR8 Discussion Supports. Synthesis: Provide students with the opportunity to rehearse what they will say with a partner before they share with the whole class.

Advances: Speaking

♿ Access for Students with Disabilities

Engagement: Develop Effort and Persistence. Invite students to generate a list of shared expectations for group work. Record responses on a display and keep visible during the activity.

Supports accessibility for: Social-Emotional Functioning

Materials to Copy

Survey a Large Group (groups of 4)

Required Preparation

- A Instructional master is provided to record students' survey results, but they could also record their

results using lined paper.

Student-facing Task Statement

Your group will be surveying a lot of people. This means asking your survey question and giving the answer choices repeatedly.

To prepare for the work ahead, discuss these questions with your group:

- How will you present the survey question and answer choices? Who will present them?
- How will you record and organize the responses? Who will record them?
- How will you make sure you don't record a response from the same student multiple times?

Student Responses

Sample responses:

- We will write down the question and choices on paper or on a small whiteboard. We will take turns giving the question and choices.
- We can use a recording sheet showing the six choices (A, B, C, D, E, F) and then use check marks or tally marks. Or, we can record the initials of the student and the letter of their choice.
- We can write the name and grade of each student who has responded.

Launch

- Groups of 4
- “You will be asking your survey question to a lot of students. Let’s think about ways to prepare for it so that you could collect data smoothly.”
- “Discuss the questions in the activity with your group.”
- 3–5 minutes: group work time
- Share responses.
- Consider giving each group a copy of the table to record their survey results.
- Students may wish to create a display that shows their question and answer choices. Provide access to tools for creating a visual display, in case requested.

Activity

- 15 minutes: in-class survey time
- Give students additional time if surveying students in another class.

Synthesis

- See lesson synthesis.

Lesson Synthesis

🕒 10 min

“Today we used a survey to create a set of data.”

“What was the most interesting part of making a survey and surveying other students?” (I got to hear lots of opinions about a topic. I didn’t expect some of the responses. The results were what I expected.)

“What was most surprising as you surveyed students today? Why?” (I didn’t think so many students would have blue as their favorite color. I didn’t realize there were so many third grade students.)

----- **Complete Cool-Down** -----

Response to Student Thinking

Students have responses they’d like to share with a partner.

Next Day Support

- Pair students up the next day to discuss their responses.

Lesson 7: Graph and Answer

Standards Alignments

Addressing 3.MD.B.3

Teacher-facing Learning Goals

- Draw a scaled bar graph to represent a data set with several categories.
- Solve one- and two-step “how many more” and “how many less” problems using information presented in scaled bar graphs.

Student-facing Learning Goals

- Let’s represent our data on scaled bar graphs and answer questions about the data.

Lesson Purpose

The purpose of this lesson is for students to draw a scaled bar graph to represent a data set with several categories.

In a previous lesson, students used a survey to collect data. In this lesson, they represent their data set with a scaled bar graph. Then, students ask and answer questions about the information presented in their scaled bar graphs.

If students need additional support with the concepts in this lesson, refer back to Unit 1, Section A in the curriculum materials.

Access for:

Students with Disabilities

- Representation (Activity 1)

English Learners

- MLR8 (Activity 2)

Instructional Routines

Notice and Wonder (Warm-up)

Materials to Gather

- Materials from a previous activity: Activity 2
- Materials from a previous lesson: Activity 1

Materials to Copy

- Draw Scaled Graphs (groups of 1): Activity 1

Lesson Timeline

Warm-up	10 min
Activity 1	20 min
Activity 2	20 min
Lesson Synthesis	5 min
Cool-down	5 min

Teacher Reflection Question

As students worked in their small groups today, whose ideas were heard, valued, and accepted? How can you adjust the group structure tomorrow to ensure each student's ideas are a part of the collective learning?

Cool-down (to be completed at the end of the lesson)

🕒 5 min

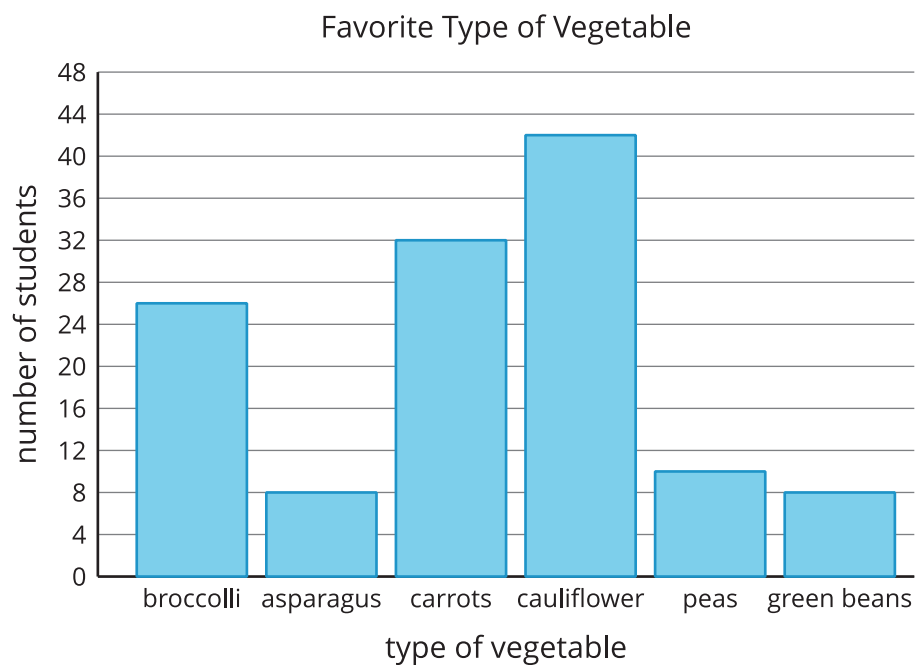
Graph Question

Standards Alignments

Addressing 3.MD.B.3

Student-facing Task Statement

How many more students liked cauliflower than asparagus or peas? Explain your reasoning.



Student Responses

24 more students: Sample response: 8 students liked asparagus and 10 students liked peas. This is 18 students. 42 students liked cauliflower which is 24 more students than students who liked asparagus or peas.

Begin Lesson

Warm-up

🕒 10 min

Notice and Wonder: Graph

Standards Alignments

Addressing 3.MD.B.3

The purpose of this warm-up is to elicit the idea that bar graphs need a title and a scale in order to be able to communicate information clearly (MP6), which will be useful when students draw a scaled bar graph in a later activity. During the synthesis, focus the discussion on the missing scale.

Instructional Routines

Notice and Wonder

Student-facing Task Statement

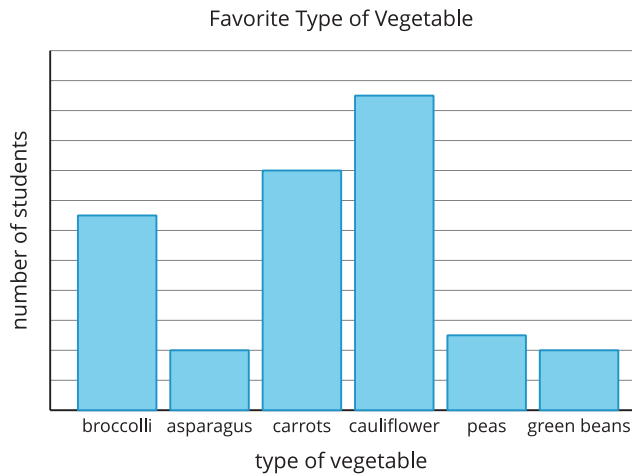
What do you notice? What do you wonder?

Launch

- Groups of 2
- Display the graph.
- “What do you notice? What do you wonder?”
- 1 minute: quiet think time

Activity

- “Discuss your thinking with your partner.”
- 1 minute: partner discussion
- Share and record responses.



Student Responses

Students may notice:

- The bottom of the graph is labeled with types of vegetables.
- Cauliflower has the tallest bar in the graph.
- Broccoli, peas, and cauliflower have bars that end between the lines.
- The graph is titled with “favorite type of vegetable.”

Students may wonder:

- Does each line represent 1, or a number other than 1?
- Why is the number of students greater for cauliflower than all the other vegetables?
- Does the graph show the number of people who like each vegetable?
- If each unit (the space between two lines) on the graph represents 1 student, would the bars that stop between the lines mean half of a student? Or does it mean the student has two favorite vegetables and their response is split into half and half?

Synthesis

- “Could each unit or each space between two lines on the graph represent 1 student? Why or why not?” (No, because that would mean half of a student likes broccoli, cauliflower, and peas.)
- “If each unit on the graph represents 2 students, how many students have broccoli as their favorite vegetable?” (13) “What if it represents 4 students?” (26)
- “How should you decide on a scale for your graph?” (Think about how many people you surveyed and use a scale that will fit them on your graph. Use a scale that will make the bar graph easy to read.)

Activity 1

🕒 20 min

Draw a Scaled Bar Graph

Standards Alignments

Addressing 3.MD.B.3

The purpose of this activity is for students to make a scaled bar graph to represent the data from the survey conducted in the previous lesson (MP2). The synthesis focuses on how students chose the scales for their graphs. Students will use their scaled bar graphs in the next activity.

🕒 Access for Students with Disabilities

Representation: Internalize Comprehension. Synthesis: Invite students to identify which details were most important when accurately creating scaled bar graphs. Display the sentence frame, “The next time I create scaled bar graphs, I will pay attention to”

Supports accessibility for: Memory

Materials to Gather

Materials from a previous lesson

Materials to Copy

Draw Scaled Graphs (groups of 1)

Required Preparation

- Each group of 4 needs the survey data from the previous lesson.

Student-facing Task Statement

Work with your group to create a bar graph that represents your survey data. When drawing your bar graph, think about:

- what each unit on the graph represents
- how tall the bar will be for the most popular category and for the least popular category
- the title and labels to use

Launch

- Groups of 4
- “We are going to represent the survey results from the previous lesson using scaled bar graphs. What are some things you’ll need to consider as you make your graphs?” (The scale I will use so I can fit my graph on the grid provided. I’ll have to decide how I will title my graph.)
- 1 minute: small-group discussion
- Share responses.

Student Responses

Answers vary.

Activity

- “Work with your group to create a scaled bar graph that represents your survey data. As you work together, each member of the group should make their own graph.”
- 10–12 minutes: small-group work time

Synthesis

- Invite 2-3 groups to share their graphs.
- “How did you decide what scale to use for your graphs?” (We made sure that every category would fit on the graph. We thought about making the graph easy to read.)

Advancing Student Thinking

If students choose a scale that doesn't allow the data to fit on the graph, consider asking:

- “Tell me about how you chose the scale for your graph.”
- “How could you adjust your scale so the graph fits all of the data you collected?”

Activity 2

🕒 20 min

Ask and Answer Questions

Standards Alignments

Addressing 3.MD.B.3

The purpose of this activity is for students to ask and answer questions using their bar graphs from a previous activity. Students work with the group they collected survey data with to create questions that can be answered with their bar graphs. Then students are paired up with a new partner to use these questions to practice solving one- and two-step “how many more” and “how many fewer” problems using information presented in scaled bar graphs (MP2).

Access for English Learners

MLR8 Discussion Supports. Prior to solving the problems, invite students to make sense of the bar graphs and take turns sharing their understanding with their partner. Listen for and clarify any questions about the context.

Advances: Speaking, Representing

Materials to Gather

Materials from a previous activity

Required Preparation

- Each group needs the bar graphs they created in the previous activity.

Student-facing Task Statement

- Write questions that could be answered with your bar graph by completing these sentences.

a. How many more students liked _____
than _____?

b. How many fewer students liked _____ than _____?

c. How many more students liked _____ or _____ than _____?

- Use your partner's graph to answer their questions. Show or explain your reasoning.

The answers to the questions from _____'s graph:

-
-
-

Launch

- Groups of 4
- "Work with your group to complete these sentences to write questions that could be answered with your bar graph."
- 5–7 minutes: small-group work time
- Have each group share one of their questions and how they came up with the question.

Activity

- Groups of 2
- Be sure students have a partner that wasn't in their group in the previous activity.
- "Use your partner's graph to answer the questions your partner wrote. They'll answer your questions while you're answering theirs. Then you'll spend a few minutes checking each other's work."
- 7–10 minutes: partner work time
- Have students switch partners again and repeat as time permits.

Student Responses

1. Sample responses:
 - a. How many more students like poetry books than informational books?
 - b. How many fewer students liked winter than summer?
 - c. How many more students liked comic books or story books than biographies?
2. Answers vary.

Synthesis

- “What was the most interesting question you answered about a scaled graph?”

Lesson Synthesis

🕒 5 min

“Today we represented the data you collected with your surveys on scaled bar graphs.”

“How was a scale other than 1 helpful in making your graph?” (There were a lot of students surveyed, so using a scale that jumped by 1 would take up a lot of space. I was able to use fewer boxes on the graph because the numbers went up a lot faster when each square represented a larger number.)

Complete Cool-Down

Response to Student Thinking

Students only compare the students who like cauliflower to one other category, instead of combining the students who liked asparagus and peas.

Next Day Support

- Before the warm-up, have students work in partners to discuss a correct response to this cool-down.

Section C: Multiplication and Division Games

Lesson 8: Multiplication Center Day

Standards Alignments

Addressing 3.OA.C.7

Teacher-facing Learning Goals

- Practice multiplication within 100.
- Reflect on multiplication fluency.

Student-facing Learning Goals

- Let's sort multiplication facts and play a multiplication game.

Lesson Purpose

The purpose of this lesson is for students to evaluate their fluency with multiplication within 100.

Throughout the course, students have worked to develop fluency with multiplication and division within 100. In this lesson, they reflect on their progress and ways to improve their fluency with products within 100.

Students sort multiplication facts into groups based on whether they know them right away, can find them quickly, or don't know them yet. They then consider strategies for finding the value of unfamiliar products efficiently and practice applying those strategies.

At the end of the year, grade 3 students are expected to fluently multiply and divide within 100 and to know from memory all products of two single-digit numbers.

If students need additional support with the concepts in this lesson, refer back to Unit 1, Section B in the curriculum materials.

Access for:



Students with Disabilities

- Action and Expression (Activity 2)



English Learners

- MLR8 (Activity 1)

Instructional Routines

Number Talk (Warm-up)

Materials to Gather

- Materials from a previous lesson: Activity 1

Materials to Copy

- Card Sort: Multiplication (groups of 2): Activity 1
- Card Sort: Multiplication Recording Sheet (groups of 2): Activity 1
- Compare Stage 3 Multiplication Cards (groups of 2): Activity 2

Lesson Timeline

Warm-up	10 min
Activity 1	20 min
Activity 2	15 min
Lesson Synthesis	10 min
Cool-down	5 min

Teacher Reflection Question

Reflect on the development of students' fluency with multiplication and division. What activities or discussions particularly helped students during the year? What will you do differently next year to foster your students' fluency with multiplication and division?

Cool-down (to be completed at the end of the lesson)

 5 min

Multiplication Reflection

Standards Alignments

Addressing 3.OA.C.7

Student-facing Task Statement

What progress have you made this year with multiplying within 100?

What do you still need to work on?

Student Responses

Sample response:

- I know a lot more multiplication facts than when I started.
- I can use what I know about fives and tens to find other products quickly.
- Multiplying a number by 8 takes me more time to figure out. I'd like to get faster.

Begin Lesson

Warm-up

🕒 10 min

Number Talk: Products

Standards Alignments

Addressing 3.OA.C.7

The purpose of this Number Talk is to elicit strategies and understandings students have for multiplying one- and two-digit numbers, which will be helpful later in this lesson when students multiply within 100.

When students use products they know to find a product they don't know, they look for and make use of structure (MP7).

Instructional Routines

Number Talk

Student-facing Task Statement

Find the value of each expression mentally.

- 2×4
- 5×4
- 10×4
- 17×4

Student Responses

- 8: I counted by 4 twice. I just knew it.
- 20: I know 5 groups of 4 is 20. I just knew it.
- 40: It's double 5×4 . I just knew it.
- 68: It's the sum of the first three products.
 $17 = 10 + 5 + 2$, so $17 \times 4 = (10 + 5 + 2) \times 4$
 or $(10 \times 4) + (5 \times 4) + (2 \times 4)$, which is
 $40 + 20 + 8$ or 68.

Launch

- Display one expression.
- "Give me a signal when you have an answer and can explain how you got it."
- 1 minute: quiet think time

Activity

- Record answers and strategy.
- Keep expressions and work displayed.
- Repeat with each expression.

Synthesis

- "How did the first 3 expressions help you find the value of the last expression?" (The last expression is 17 groups of 4 which is like 10 groups, 5 groups, and 2 groups of 4 combined. Adding up the value of the first 3 expressions gives you the value of the last expression.)

Activity 1

🕒 20 min

Card Sort: Multiplication

Standards Alignments

Addressing 3.OA.C.7

In this activity, students check their progress toward fluent multiplication within 100. They do this by revisiting an activity from a previous unit, in which they sorted multiplication expressions from 1×1 to 10×10 into groups: those that they know right away, those they can find quickly, or those they don't know yet. Here, students sort the same set of expressions, then practice finding five products of their choice after sharing strategies for finding products they don't know yet.

🌐 Access for English Learners

MLR8 Discussion Supports. Synthesis: Create a visual display of multiplication facts students do not yet know. As students share their strategies for finding a product, annotate the display to illustrate connections. For example, next to " 9×8 ", write "10 groups of 8 minus 1 group of 8."
Advances: Speaking, Representing

Materials to Gather

Materials from a previous lesson

Materials to Copy

Card Sort: Multiplication (groups of 2), Card Sort: Multiplication Recording Sheet (groups of 2)

Required Preparation

- Gather materials from Multiplication Card Sort, an activity from a previous unit.
- If remaking the cards, create a set of cards from the Instructional master for each group of 2.

Student-facing Task Statement

Quiz your partner on their multiplication facts and sort your partner's facts into one of these columns:

1. know it right away
2. can find it quickly
3. don't know it yet

Launch

- Groups of 2
- "Today we're going to revisit the multiplication facts to see how many you've learned so far."
- "There are some multiplication facts you know right away. What does it mean to

Multiplication expressions I'm going to practice:

- 1.
- 2.
- 3.
- 4.
- 5.

Student Responses

Answers vary.

'know something right away?'" (To know it without doing much thinking. To know from memory.)

- "There are some multiplication facts you may not know right away but can find quickly. What do you think it means 'to find a product quickly?'" (To figure it out within a few seconds, using a strategy.)
- Consider asking:
 - "Does anyone have different ideas about what it means to find a product quickly?"
 - "Can someone give an example of a strategy for finding a product quickly?"
- Give each group a set of cards and a copy of the table from the Instructional master.

Activity

- "Take some time to quiz each other on your multiplication facts. Use the table to sort the expressions into three groups based on whether your partner knows the value right away, can find the value quickly, or doesn't know it yet."
- 7-10 minutes: partner work time
- "Choose five expressions whose value you don't know yet and record them. These are the products you will practice finding."
- 1 minute: independent work time
- "Now, share the products you want to practice with your partner. Work together to think of some strategies you could use to remember or find their values quickly. After you have some ideas, practice finding the products you chose."
- 5-7 minutes: partner work time

Synthesis

- "What were some useful strategies for

finding products you didn't know yet?"
 (Using a product I already know to find the one I didn't know yet. Using products of 2, 5, and 10 to figure out other products.)

Advancing Student Thinking

If students are not sure what strategy could help them find multiplication facts, consider asking:

- "Is there a multiplication fact that you know that could help you with this fact?"
- "Is there another group you could ask about a strategy for the fact you're working on?"

Activity 2

🕒 15 min

Compare, Multiply Within 100

Standards Alignments

Addressing 3.OA.C.7

The purpose of this activity is for students to learn stage 3 of the Compare center to practice multiplying within 100. Students may compare expressions by finding the value of each or by reasoning about the features of the expressions (MP7). (For example, when comparing 12×7 and 12×9 they see that both involve 12 groups but in 12×9 there are 2 more in each group than in 12×7 .)

When students multiply 2 one-digit numbers, they should know these products from memory. When students multiply a one-digit and a two-digit number, students should have an efficient method for finding the product, but do not need to know the product from memory. If students need more practice with their one-digit multiplication facts, consider having them use the cards from the first activity.

♿ Access for Students with Disabilities

Action and Expression: Develop Expression and Communication. Synthesis: Identify connections between strategies that result in the same outcomes but use differing approaches.

Supports accessibility for: Memory, Conceptual Processing

Materials to Copy

Compare Stage 3 Multiplication Cards (groups of 2)

Required Preparation

- Create a set of cards from the Instructional master for each group of 2.

Student-facing Task Statement

Play Compare with 2 players.

1. Split the deck between the players.
2. Each player turns over a card.
3. Compare the values. The player with the greater value keeps both cards.
4. Play until you run out of cards. The player with the most cards at the end of the game wins.

Student Responses

Answers vary.

Launch

- Groups of 2
- Give each group of 2 students a set of pre-cut cards.
- "Take a minute to read the directions for Compare."
- 1 minute: quiet think time
- Play a round of Compare against the class.

Activity

- "Play Compare with your partner."
- 10-12 minutes: partner work time

Synthesis

- "What were some useful strategies for comparing the expressions on the cards?" (Comparing by thinking about what the expressions mean, instead of by multiplying. For example, 16×6 was greater than 15×6 because it's 1 more group of 6. Breaking apart some of the large factors into smaller factors to make multiplying easier.)

Lesson Synthesis

🕒 10 min

"What did you learn about your progress in multiplication during today's lesson?" (I have lots of strategies for multiplying. I still need to work on multiplying by 7 because those facts are challenging. I

have a really good strategy for multiplying by 9.)

“There will be a few more lessons that focus on getting better at multiplying and dividing. Keep what you learned today in mind because you’ll have the chance to apply it in upcoming practice games.”

Complete Cool-Down

Response to Student Thinking

Students have responses they’d like to share with a partner.

Next Day Support

- Pair students up the next day to discuss their responses.

Lesson 9: Multiplication Game Day

Standards Alignments

Addressing 3.OA.C.7

Teacher-facing Learning Goals

- Practice finding products within 100 by playing multiplication games.

Student-facing Learning Goals

- Let's play multiplication games.

Lesson Purpose

The purpose of this lesson is for students to practice multiplying within 100.

In the previous lesson, students sorted multiplication expressions to gauge their fluency in finding products. They also played a multiplication game to practice multiplying within 100. In this lesson, students continue to develop their fluency through games. In the first activity, students are introduced to two multiplication centers. In the second activity, students choose between three centers to practice multiplying within 100.

If students need additional support with the concepts in this lesson, refer back to Unit 4, Section B in the curriculum materials.

Access for:

Students with Disabilities

- Engagement (Activity 2)

English Learners

- MLR7 (Activity 1)

Instructional Routines

Number Talk (Warm-up)

Materials to Gather

- Materials from previous centers: Activity 2

Materials to Copy

- How Close? Stage 5 Recording Sheet (groups of 1): Activity 1
- Number Cards (0-10) (groups of 2): Activity 1
- Rectangle Rumble Stage 3 Grid (groups of 2): Activity 1

- Rectangle Rumble Stage 3 Spinners (groups of 2): Activity 1

Lesson Timeline

Warm-up	10 min
Activity 1	20 min
Activity 2	20 min
Lesson Synthesis	5 min
Cool-down	5 min

Teacher Reflection Question

Who participated in math class today? What assumptions are you making about those who did not participate? How can you leverage each of your students' ideas to support them in being seen and heard in tomorrow's math class?

Cool-down (to be completed at the end of the lesson)

 5 min

Reflect on Multiplication

Standards Alignments

Addressing 3.OA.C.7

Student-facing Task Statement

What have you learned about multiplication this year?

Student Responses

Answers vary. Sample responses:

- Multiplication is how we represent equal groups.
- Multiplication is related to division.
- Multiplication can represent area.
- You can use different strategies to multiply like using a fact you know.
- There are patterns in the multiplication table.

----- Begin Lesson -----

Warm-up

 10 min

Number Talk: Multiplying Large Factors

Standards Alignments

Addressing 3.OA.C.7

The purpose of this Number Talk is to elicit strategies and understandings students have for multiplying a one-digit number and a two-digit number, which will be helpful later in this lesson when students continue to practice multiplying within 100.

Instructional Routines

Number Talk

Student-facing Task Statement

Find the value of each expression mentally.

- 4×10
- 4×20
- 4×21
- 4×24

Student Responses

- 40: I just knew it.
- 80: It's twice the previous product because the 10 doubled to 20. I just knew it.
- 84: It would be 4 more than 4×20 , so it would be 80 plus 4.
- 96: $4 \times 20 = 80$. $4 \times 4 = 16$. $80 + 16 = 96$.

Launch

- Display one expression.
- "Give me a signal when you have an answer and can explain how you got it."
- 1 minute: quiet think time

Activity

- Record answers and strategy.
- Keep expressions and work displayed.
- Repeat with each expression.

Synthesis

- "How did you figure out the more challenging products?" (Once I knew 4×20 , I was able to build on it to find 4×21 and 4×24 by just adding more fours. I knew that 4 groups of 25 make 100, so I took away 4 to find 4 groups of 24.)

Activity 1

🕒 20 min

Introduce Rectangle Rumble and How Close?

Standards Alignments

Addressing 3.OA.C.7

The purpose of this activity is for students to learn stage 3 of the Rectangle Rumble center and stage 5 of the How Close? center to practice multiplying within 100. These are centers that were previously suggested, so if one of them has been used before, only introduce the center that is new to students. If both centers are familiar to students, consider giving them center choice time or choosing one or more centers for students to play.

🌐 Access for English Learners

MLR7 Compare and Connect. Synthesis: After all strategies have been presented, lead a discussion comparing, contrasting, and connecting the different approaches. Ask, “Did anyone solve the problem the same way, but would explain it differently?”, “What did the strategies have in common?”, “How were they different?”

Advances: Representing, Conversing

Materials to Copy

How Close? Stage 5 Recording Sheet (groups of 1), Number Cards (0-10) (groups of 2), Rectangle Rumble Stage 3 Grid (groups of 2), Rectangle Rumble Stage 3 Spinners (groups of 2)

Student-facing Task Statement

Directions for Rectangle Rumble:

- Choose a color for your rectangles different from your partner.
- Each partner:
 - Spin each spinner.
 - Shade in a rectangular area to represent the product of the two numbers.

Launch

- Groups of 2

Activity

- “We are going to learn how to play Rectangle Rumble. Take a minute and read the directions for Rectangle Rumble.”
- 1 minute: independent work time
- Display a Rectangle Rumble Stage 3 Grid.

- Take turns until the grid can't fit any more rectangles.
- Add up your total area. The partner with the greatest total square units wins.

Directions for How Close?:

- Each partner:
 - Take 4 cards.
 - Choose 2–3 cards to multiply.
 - Write an equation to show the product of the numbers you chose.
 - Your score for each round is the difference between your product and 100.
- Take new cards so that you have 4 cards to start the next round.
- At the end of the game, add your scores from each round. The player with the lowest score wins.

Student Responses

Answers vary.

- 5–7 minutes: Play a 2-3 rounds of Rectangle Rumble Stage 3 against the class.
- Explain that, once the grid can't fit any more rectangles, the player with the greatest number of square units filled in wins the game.
- "Now, we are going to learn how to play How Close?. Take a minute and read the directions for How Close?."
- 1 minute: independent work time
- Display the How Close? Stage 5 recording sheet.
- 5–7 minutes: Play 2-3 rounds of How Close? Stage 5 against the class.
- Explain to students that after their recording sheet is full, they should add their score for each round and the player with the lowest score wins.
- Answer any questions students have about how to play the games.

Synthesis

- "What strategies were you able to practice in these centers?" (I was able to use multiplication facts I know to figure out facts that I'm still working on. I was able to practice some of the multiplication facts that I still need to work on.)

Activity 2

🕒 20 min

Choice Time: Multiplication Games

Standards Alignments

Addressing 3.OA.C.7

In this activity, students practice multiplying within 100 by playing a game of their choice. The game options are from previously introduced centers:

- Compare, Stage 3: Multiply within 100
- How Close, Stage 5: Multiply to 100
- Rectangle Rumble, Stage 3: Factors 1–10

If students had center choice time in the last activity, consider having students design their own multiplication game with the materials used in the centers. Students could also use additional materials such as number cubes, grid paper, and index cards if they are available.

Access for Students with Disabilities

Engagement: Provide Access by Recruiting Interest. Use visible timers or audible alerts to help learners anticipate and prepare to transition between activities.

Supports accessibility for: Social-Emotional Functioning, Organization

Materials to Gather

Materials from previous centers

Required Preparation

- Gather materials from:
 - Compare, Stage 3
 - How Close, Stage 5
 - Rectangle Rumble, Stage 3

Student-facing Task Statement

Choose a center to practice multiplying within 100.

- Compare, Multiply within 100: Decide which expression has the greatest value.
- How Close? Multiply to 100: Choose 2–3 numbers to multiply to get a product closest to 100.
- Rectangle Rumble, Factors 1–10: Multiply numbers to create rectangular areas to fill a grid with the most squares.

Launch

- “Now we are going to play games to practice multiplication.”
- Display the center choices and ask students to consider what they’d like to do.

Activity

- Invite students to work at the center of their choice.
- 12–15 minutes: center work time

Student Responses

No response required.

Synthesis

- “What did you enjoy about the game you played?” (Thinking about which numbers to multiply to get close to 100 without going over. Competing against my partner.)

Lesson Synthesis

🕒 5 min

“Today, we played some multiplication games.”

“What multiplication strategies were you able to practice as you played multiplication games?” (I was able to use the strategies I had practiced in the last lesson. I was able to use multiplication facts that I know to find multiplication facts that I don’t know.)

Complete Cool-Down

Response to Student Thinking

Students have responses they’d like to share with a partner.

Next Day Support

- Pair students up the next day to discuss their responses.

Lesson 10: Multiplication and Division

Standards Alignments

Addressing 3.OA.A.3, 3.OA.B.6

Teacher-facing Learning Goals

- Interpret representations of the relationship between multiplication and division.
- Represent the relationship between multiplication and division.

Student-facing Learning Goals

- Let's represent equal groups and write equal groups situations.

Lesson Purpose

The purpose of this lesson is for students to use a variety of representations to illustrate the relationship between multiplication and division to develop fluency with division within 100.

In previous units, students learned the meaning of multiplication and division and understood division as an unknown-factor problem. They have worked to develop fluency with multiplication within 100. In this lesson, they continue that work by reinforcing their understanding of the relationship between multiplication and division.

In the first activity, students are given a card with an equation or a diagram and asked to find another student whose card represents the same situation or quantities. Then, they create an additional diagram and a situation that matches their division equation. Students then view and compare the diagrams and the situations that their classmates created in a gallery walk.

If students need additional support with the concepts in this lesson, refer back to Unit 4, Section B in the curriculum materials.

Access for:

Students with Disabilities

- Engagement (Activity 1)

English Learners

- MLR7 (Activity 2)

Instructional Routines

Card Sort (Activity 1), Which One Doesn't Belong? (Warm-up)

Materials to Gather

- Glue or tape: Activity 1
- Materials from a previous activity: Activity 2
- Tools for creating a visual display: Activity 1

Lesson Timeline

Warm-up	10 min
Activity 1	25 min
Activity 2	10 min
Lesson Synthesis	10 min
Cool-down	5 min

Materials to Copy

- Find the Match (groups of 24): Activity 1

Teacher Reflection Question

What did you say, do, or ask during the lesson synthesis that helped students be clear on the learning of the day? How did previewing the cool-down of the lesson help you synthesize student learning?

Cool-down (to be completed at the end of the lesson)

🕒 5 min

Relate Multiplication to Division

Standards Alignments

Addressing 3.OA.B.6

Student-facing Task Statement

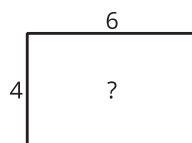
Give an example of how multiplication and division are related. Explain or show your reasoning.

Student Responses

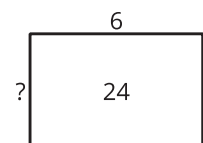
Sample responses:

- We can think of $24 \div 4 = ?$ as $4 \times ? = 24$.
- If I'm dividing, it's like multiplying, but instead of not knowing the total number of objects, I'm missing the number of equal groups or the number in each group.

- This diagram shows multiplication: the side lengths are known but the area isn't.



- This diagram shows division: the area is known, but a side length is missing.



Begin Lesson

Warm-up

🕒 10 min

Which One Doesn't Belong: Multiplication and Division**Standards Alignments**

Addressing 3.OA.B.6

This warm-up prompts students to compare four representations. The reasoning here prepares students to connect the previous multiplication work to the division work of this lesson. It gives students an opportunity to use precise terms such as “factors,” “product,” and “quotient” in making comparisons (MP6). During the synthesis, ask students to explain the meaning of any terminology they use.

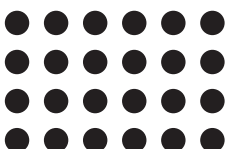
Instructional Routines

Which One Doesn't Belong?

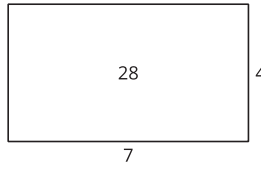
Student-facing Task Statement

Which one doesn't belong?

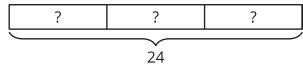
A



B



C



D

$$24 \div 6$$
Student Responses

Sample responses:

- A is the only one without numbers.
- B is the only one that doesn't represent a total of 24.

Launch

- Groups of 2
- Display images and expression.
- “Pick one that doesn't belong. Be ready to share why it doesn't belong.”
- 1 minute: quiet think time

Activity

- “Discuss your thinking with your partner.”
- 2-3 minutes: partner discussion
- Share and record responses.

Synthesis

- “What equation can each diagram represent?” (The array represents $4 \times 6 = 24$ because there are 4 rows of 6 dots, and there are 24 dots in the array. The area diagram could represent $4 \times 7 = 28$ or $28 \div 4 = 7$ since the sides are 4 and 7, and the area is 28. The tape

- C is the only one that doesn't show 4 as a factor or a quotient, or 4 groups of something.
- D is the only one that is not a diagram.

diagram could represent $24 \div 3 = ?$ or $3 \times ? = 24$ because we know the total is 24 and there are 3 groups, but we don't know how many are in each group.)

Activity 1

🕒 25 min

Card Sort: Find the Match

👤 ↔ 👤 PLC Activity

Standards Alignments

Addressing 3.OA.B.6

The purpose of this activity is for students to relate multiplication and division using a variety of representations. Students are given a card with a base ten diagram, tape diagram, area diagram, multiplication equation with a missing factor, or division equation. Students need to find the other student who has the card that matches their card. Each pair of cards includes a division equation. After students find the student with the matching card, they work together to create another diagram and a division situation that their cards could represent (MP2).

Here are images of the cards for reference:

<p>Division Card A</p> $4 \times 7 = 28$	<p>Division Card B</p>	<p>Division Card C</p>	<p>Division Card D</p> $64 \div 8 = ?$
<p>Division Card E</p> $56 \div 7 = ?$	<p>Division Card F</p> $21 \div 3 = ?$	<p>Division Card G</p>	<p>Division Card H</p> $54 \div 6 = ?$
<p>Division Card I</p> $96 \div 24 = ?$	<p>Division Card J</p> $99 \div 9 = ?$	<p>Division Card K</p> $8 \times 7 = 64$	<p>Division Card L</p>

<p>Equation M</p> $48 \div 3 = ?$	<p>Equation N</p> $36 \div 3 = ?$	<p>Equation O</p>	<p>Equation P</p> $42 \div 6 = ?$
<p>Equation Q</p> $81 \div 9 = ?$	<p>Equation R</p>	<p>Equation S</p> $28 \div 4 = ?$	<p>Equation T</p>
<p>Equation U</p>	<p>Equation V</p> $? \times 7 = 56$	<p>Equation W</p> $72 \div 4 = ?$	<p>Equation X</p>

Access for Students with Disabilities

Engagement: Develop Effort and Persistence. Chunk this task into more manageable parts. Give students a subset of the cards to start with and introduce the remaining cards once students have completed their initial set of matches.

Supports accessibility for: Organization, Social-Emotional Functioning

Instructional Routines

Card Sort

Materials to Gather

Glue or tape, Tools for creating a visual display

Materials to Copy

Find the Match (groups of 24)

Required Preparation

- The Instructional master has 24 cards. Copy and cut enough cards so that each student can have one card.

Student-facing Task Statement

Your teacher will give you a card that shows an equation or a diagram.

- Find a classmate whose card represents the same situation or quantities as your card

Launch

- Groups of 2
- Give one card to each student.
- Display an example of each type of representation shown on the cards

does. Be prepared to explain why your cards belong together.

2. Work with your partner to create a poster that includes:
 - a. your cards
 - b. a different diagram that your division equation could represent
 - c. a situation that your division equation could represent

Show your thinking and organize it so it can be followed by others.

Student Responses

1.
 - A and S
 - B and P
 - C and M
 - D and K
 - E and V
 - G and N
 - H and U
 - I and O
 - J and T
 - L and Q
 - R and W
 - F and X
2. Sample responses:
 - a. Cards B and P
 - b. A tape diagram showing a total length of 42, 6 equal parts, and a question mark in each part.
 - c. A room has an area of 42 square feet. If one side length is 6 feet, what is the missing side length?

(division equation, multiplication equation with missing factor, area diagram, tape diagram, and base ten diagram).

- “We saw in the warm-up that different diagrams and equations can represent the same situation such as 4 groups of 6 or 4 times 6.”
- “Think about what situation or quantities your card represents. Then, think about what another representation of the situation or quantities might look like.”
- 1 minute: quiet think time

Activity

- “Find a student whose card represents the same situation or quantities as your card does. Be ready to explain why your cards belong together.”
- 2-3 minutes: partner work time
- Invite 2-3 groups to share their matches and how they knew they matched.
- “Work with your partner to create a poster that includes your cards and a diagram and situation that match your division equation. We’ll use these for a gallery walk, so organize your work so others can understand it.”
- Give students glue or tape and tools for creating a visual display.
- 10-15 minutes: partner work time

Synthesis

- Display students' posters around the room.

Activity 2

🕒 10 min

Find the Match Gallery Walk

Standards Alignments

Addressing 3.OA.A.3

The purpose of this activity is to reinforce students' understanding of the relationship between multiplication and division by examining different representations of that relationship.

🌐 Access for English Learners

MLR7 Compare and Connect. Synthesis: After the Gallery Walk, lead a discussion comparing, contrasting, and connecting the different representations. "What did the representations have in common?" "How did the relationship between multiplication and division show up in each representation?" To amplify student language, and illustrate connections, follow along and point to the relevant parts of the displays as students speak.

Advances: Representing, Conversing

Materials to Gather

Materials from a previous activity

Required Preparation

- Keep posters from the previous activity displayed.

Student-facing Task Statement

As you visit the posters with your partner, answer these questions:

1. Describe a representation you saw that was different from the ones you showed in your poster.
2. Choose a poster that is not yours. Describe one way that it shows the relationship between multiplication and division.

Launch

- Groups of 2

Activity

- Arrange for half of the groups to stand at their poster and answer questions while the other half visit their posters.
- 8–10 minutes: gallery walk
- Ask groups to switch roles after 4–5 minutes.

Student Responses

1. Sample response: One of the posters had a multiplication equation with a missing factor to represent the division situation.
2. Sample response: One of the posters had a rectangular area with a missing side length. The area could be represented with a division equation or with a multiplication equation with a missing factor.

Synthesis

- See lesson synthesis.

Lesson Synthesis

🕒 10 min

“Today we created posters that showed ways to represent division.”

“How does an area diagram show us the relationship between multiplication and division?” (It shows that multiplying is like finding the area of a rectangle when the two side lengths are known, and dividing is like finding a side length when we know the area and the other side length.)

“How does a tape diagram or equal-groups diagram show multiplication and division?” (Both show multiplying as a way to find the total when we know the number of groups and how many in each group, and dividing as a way to find either the number of groups or the size of each group when the total is known.)

“What were some aspects of the posters you saw that helped make the math your classmates used clear for you?” (Clear labels on diagrams that helped me understand their thinking. Units on their answers. When other students wrote their explanations, it helped me understand their thinking.)

----- Complete Cool-Down -----

Response to Student Thinking

Students list related multiplication and division equations, but do not explain or show their reasoning around how multiplication and division are related.

Next Day Support

- Before the warm-up, select a student's cool-down from the previous lesson (name anonymous). Ask students to identify what the student did well and what the student needs to do to improve the cool-down.

Lesson 11: Division Game Day

Standards Alignments

Addressing 3.OA.C.7

Teacher-facing Learning Goals

- Practice dividing whole numbers within 100.

Student-facing Learning Goals

- Let's play division games.

Lesson Purpose

The purpose of this lesson is for students to develop fluency with dividing within 100.

In this lesson, students continue to develop fluency with dividing whole numbers within 100 by playing games. Students should have an efficient strategy for finding quotients, but they do not need to know quotients from memory.

If students need additional support with the concepts in this lesson, refer back to Unit 4, Section D in the curriculum materials.

Access for:

Students with Disabilities

- Engagement (Activity 1)

English Learners

- MLR8 (Activity 2)

Instructional Routines

Number Talk (Warm-up)

Materials to Gather

- Materials from previous centers: Activity 2
- Number cubes: Activity 1

Lesson Timeline

Warm-up	10 min
Activity 1	15 min

Teacher Reflection Question

What strategies are students using most often to divide? How can you help students build on those strategies to further develop fluency?

Activity 2	20 min
Lesson Synthesis	10 min
Cool-down	5 min

Cool-down (to be completed at the end of the lesson)

🕒 5 min

Reflect on Division Games

Standards Alignments

Addressing 3.OA.C.7

Student-facing Task Statement

1. Which division strategy did you find most helpful as you played division games today?
2. Which division facts do you still need to work on?

Student Responses

Sample responses:

1. For finding division facts I didn't know, it was helpful to think of a related division fact that I did know. It was helpful to think about related multiplication facts.
2. I need to practice dividing large numbers by 7 and 9.

Begin Lesson

Warm-up

🕒 10 min

Number Talk: Divide 48

Standards Alignments

Addressing 3.OA.C.7

The purpose of this Number Talk is to elicit strategies and understandings students have for finding related quotients, which will be helpful later in this lesson when students divide within 100.

When students use the relationship between multiplication and division and known division facts to find a division fact they don't know, they look for and make use of structure (MP7).

Instructional Routines

Number Talk

Student-facing Task Statement

Find the value of each expression mentally.

- $48 \div 2$
- $48 \div 3$
- $48 \div 4$
- $48 \div 6$

Student Responses

- 24: Half of 48 is 24. Forty divided by 2 is 20, and 8 divided by 2 is 4, so 48 divided by 2 is 24.
- 16: I know that 3×10 is 30 and 3×6 is 18, so 3 groups of 16 is 48.
- 12: $40 \div 4 = 10$. $8 \div 4 = 2$. $10 + 2 = 12$.
- 8: I know that 5×8 is 40. One more group of 8 would be 48, so that's 6 groups of 8.

Launch

- Display one expression.
- "Give me a signal when you have an answer and can explain how you got it."
- 1 minute: quiet think time

Activity

- Record answers and strategy.
- Keep expressions and work displayed.
- Repeat with each expression.

Synthesis

- "There are lots of ways to divide 48. What are some other numbers that can be divided in many ways?" (24, because it can be divided by 2 to get 12 or by 4 to get 6. 100, because it can be divided by 2, 4, 5, 10, 20, or 25.)

Activity 1

 15 min

Play Race to 1

Standards Alignments

Addressing 3.OA.C.7

The purpose of this activity is for students to practice division within 100 by playing a game called Race to 1. The goal of the game is to repeatedly divide numbers until they reach one.

Access for Students with Disabilities

Engagement: Develop Effort and Persistence. Check in and provide each group with feedback that encourages collaboration and community.

Supports accessibility for: Social-Emotional Functioning, Organization

Materials to Gather

Number cubes

Student-facing Task Statement

Directions for Race to 1

On your first turn:

1. Roll a number cube. The number you roll is your divisor. (If you roll a 5, roll again.)
2. Choose one number from the top row of your table. Divide it by your divisor.
3. Write a division expression and record the quotient in the table. Your turn is done.

On all your other turns:

1. Roll a number cube. The number you roll is your divisor. (If you roll a 5, roll again.)
2. Choose either a quotient from one of your past turns or a new number from the top row of the table. Divide it by your divisor.
3. Write a division expression and record the quotient in the table.
4. The first player to get a quotient of 1 wins.

Sample Game

Jada rolled 3 on her first turn, then rolled 2 a few times afterwards.

Launch

- Groups of 2
- “Take a minute to read the directions for Race to 1.”
- 1 minute: quiet think time
- “Let’s look at a sample game. Jada rolled a 3 on her first turn, then rolled 2 a few times afterwards. Talk with your partner about what her next move should be if she rolls 2 on her next turn.” (She should divide 4 or 6 by 2 because those moves get her really close to one.)
- 1 minute: partner discussion
- Share responses.
- Give each group a number cube.

Activity

- “Play Race to 1 with your partner.”
- 10–15 minutes: partner work time
- If students finish early, have them play again. Students can fill in the same numbers from the first game at the top of the columns of the second game or use the numbers 24, 36, 48, and 72 for a challenge.

start number	12	16	18	24
division expression	$12 \div 3$	$16 \div 2$		$24 \div 2$
quotient	4	8		12
division expression				$12 \div 2$
quotient				6
division expression				
quotient				

Game 1

start number	12	16	18	24
division expression				
quotient				
division expression				
quotient				
division expression				
quotient				
division expression				
quotient				
division expression				
quotient				
division expression				
quotient				
division expression				
quotient				
division expression				
quotient				
division expression				
quotient				

Game 2

Synthesis

- “How was having an efficient way to divide helpful as you played Race to 1?” (I had to decide which number I was going to divide, so it was helpful to be able to do it quickly. I had to divide a few times on each turn.)
- “What was a helpful strategy as you played Race to 1?” (I had to think about which number I could divide by the number I rolled. I divided the smallest number by the largest divisor to try to get to the quotient to be as small as possible so I could get to 1 first.)

start number				
division expression				
quotient				
division expression				
quotient				
division expression				
quotient				
division expression				
quotient				
division expression				
quotient				
division expression				
quotient				
division expression				
quotient				
division expression				
quotient				
division expression				
quotient				

Activity 2

🕒 20 min

Play Compare, Division

Standards Alignments

Addressing 3.OA.C.7

The purpose of this activity is for students to practice dividing within 100. They do this by revisiting the Compare center introduced in a previous unit. (As was the case then, exclude cards with two-digit divisors from this activity.)

Students may compare expressions by finding the value of each or by reasoning based on the expressions (MP7). (For example, when comparing $92 \div 4$ and $84 \div 4$, they can recognize that $92 \div 4$ is greater because it would be more groups of 4.) When students divide within 100, students should have an efficient method for finding the quotient, but do not need to know the quotient from memory.

Access for English Learners

MLR8 Discussion Supports. Synthesis: Provide students with the opportunity to rehearse what they will say with a partner before they share with the whole class.

Advances: Speaking

Materials to Gather

Materials from previous centers

Required Preparation

- Gather materials from:
 - Compare, Stage 4

Student-facing Task Statement

Play Compare with 2 players.

1. Split the deck between the players.
2. Each player turns over a card.
3. Compare the values. The player with the greater value keeps both cards.
4. Play until you run out of cards. The player with the most cards at the end of the game wins.

Student Responses

Answers vary.

Launch

- Groups of 2
- Give each group of 2 students a set of pre-cut cards.
- Play a round of Compare against the class.

Activity

- “Play Compare with your partner.”
- 10-12 minutes: partner work time

Synthesis

- “What were some division strategies that were helpful as you played your game?” (I used multiplication to help me divide. I used quotients that I knew to find

quotients that I didn't know.)

Lesson Synthesis

🕒 10 min

"Today, we played some division games to practice dividing within 100."

"How have you made progress in your division fluency this year?" (I use multiplication to divide because multiplication and division are related. I got better at using a quotient I know to figure out a quotient I don't know. I learned to divide large numbers in parts to make it easier. I'm a lot faster at dividing than when I first learned about it earlier in the year.)

Complete Cool-Down

Response to Student Thinking

Students have responses they'd like to share with a partner.

Next Day Support

- Pair students up the next day to discuss their responses.

Section D: Create and Design

Lesson 12: Notice and Wonder

Standards Alignments

Addressing 3.OA.A

Teacher-facing Learning Goals

- Apply understanding of equal groups to create a Notice and Wonder activity.

Student-facing Learning Goals

- Let's create a Notice and Wonder activity.

Lesson Purpose

The purpose of this lesson is for students to apply their understanding of equal groups to create a Notice and Wonder activity.

This lesson provides an opportunity to observe the ways in which students notice and describe equal groups. After the warm-up, students create their own Notice and Wonder activity and then facilitate it with other students in the class. Students can find images to use for their Notice and Wonder from books or other sources.

If students need additional support with the concepts in this lesson, refer back to Unit 1, Section B in the curriculum materials.

Access for:

Students with Disabilities

- Engagement (Activity 1)

English Learners

- MLR8 (Activity 2)

Instructional Routines

Notice and Wonder (Warm-up)

Materials to Gather

- Chart paper: Activity 2
- Markers: Activity 2

- Picture books: Activity 1

Lesson Timeline

Warm-up	10 min
Activity 1	20 min
Activity 2	15 min
Lesson Synthesis	10 min
Cool-down	5 min

Teacher Reflection Question

As students worked together today, where did you see evidence of the mathematical community established over the course of the school year?

Cool-down (to be completed at the end of the lesson)

🕒 5 min

Notice and Wonder Reflection

Standards Alignments

Addressing 3.OA.A

Student-facing Task Statement

Respond to one or both of these prompts.

1. Describe something you really understand well about equal groups after today's lesson.
2. Describe something that was confusing or challenging.

Student Responses

Sample response: I understand that when equal groups are organized into rows or columns, they are easier to count because we only need to count one row and then multiply by the number of rows.

----- Begin Lesson -----

Warm-up

🕒 10 min

Notice and Wonder: Equal Groups

Standards Alignments

Addressing 3.OA.A

The purpose of this warm-up is to elicit the idea that equal groups appear in many contexts, which will be useful when students create their own Notice and Wonder in a later activity. In the synthesis, discuss what students know about Notice and Wonders and what they need to think about to create one like this example.

Instructional Routines

Notice and Wonder

Student-facing Task Statement

What do you notice? What do you wonder?



Student Responses

Students may notice:

- There are baskets or groups of berries.
- The berries are organized by type.
- There are blueberries, raspberries, and strawberries.
- The baskets are organized in rows.

Students may wonder:

- How many baskets of each berry are there?
- How many more baskets of strawberries are there than blueberries?
- How many of each type of berry is in a

Launch

- Groups of 2
- Display the image.
- “What do you notice? What do you wonder?”
- 1 minute: quiet think time

Activity

- “Discuss your thinking with your partner.”
- 1 minute: partner discussion
- Share and record responses.

Synthesis

- “What do you know about Notice and Wonders?” (They have pictures that help us think about math ideas like equal groups. We might have questions about what's in the pictures.)
- Consider asking: “What would you have to think about if you were going to design a Notice and Wonder like this one?” (Find an image showing equal groups, groups that make counting easier, or different types of groups. Find an image that shows a missing piece of information, or a group that is different than other groups.)
- Record and display responses for all to see.

basket?

Activity 1

 20 min

Design Your Notice and Wonder

Standards Alignments

Addressing 3.OA.A

The purpose of this activity is for students to collaborate and create a Notice and Wonder activity that involves equal groups. Students find an image in a book or from another source and anticipate what other students might notice and wonder about the image.

Access for Students with Disabilities

Engagement: Develop Effort and Persistence. Invite students to generate a list of shared expectations for group work. Record responses on a display and keep visible during the activity.

Supports accessibility for: Social-Emotional Functioning

Materials to Gather

Picture books

Required Preparation

- Each group of 3-4 needs picture books to use as they create their Notice and Wonder activity.

Student-facing Task Statement

1. Find an image that would encourage your classmates to notice and wonder about equal groups.
2. Write down the possible things students might notice and wonder about your image.

Students may notice:

-
-
-

Launch

- Groups of 3 - 4
- Give each group access to picture books.
- “Work with your group to create a Notice and Wonder activity about equal groups.”

Activity

- 15 minutes: small-group work time

Students may wonder:

-
-
-

Student Responses

Answers vary.

Synthesis

- “What questions do you still have about creating your Notice and Wonder?”
- Give students a few minutes to make adjustments, if needed.

Activity 2

🕒 15 min

Facilitate Your Notice and Wonder

Standards Alignments

Addressing 3.OA.A

The purpose of this activity is for students to facilitate the Notice and Wonder they created in the previous activity. Each group takes turns facilitating their Notice and Wonder for another group (or two groups, if time permits).

🌐 Access for English Learners

MLR8 Discussion Supports. During group work, invite students to take turns sharing their responses. Ask students to restate what they heard using precise mathematical language and their own words. Display the sentence frame: “I heard you say . . .” Original speakers can agree or clarify for their partner.

Advances: Listening, Speaking

Materials to Gather

Chart paper, Markers

Required Preparation

- Each group of 3-4 from the previous activity needs 1 piece of chart paper and a marker.

Student-facing Task Statement

1. Display your image for your classmates.

Launch

- Groups of 3–4 from the previous activity

2. Ask them, “What do you notice? What do you wonder?”
3. Give them a minute to discuss together.
4. Ask them to share what they notice and wonder.
5. Record their ideas.

Student Responses

No response required.

- Give each group a piece of chart paper and a marker to record responses.
- “Now, work with another group and take turns facilitating the Notice and Wonder activity you created.”

Activity

- 10–12 minutes: small-group work time
- Remind groups to switch roles after 5–6 minutes.

Synthesis

- “What did you learn as you facilitated your Notice and Wonder?” (Others might notice or wonder things we did not think of. Recording the ideas helps people understand what is being shared.)

Lesson Synthesis

🕒 10 min

“What important things about your image did you consider as you created your Notice and Wonder?” (We thought about whether the image shows equal groups and whether others would see the same groups that we saw. We thought about possible questions others might ask and whether they would be about the groups or something else.)

“If you had a chance to revise your Notice and Wonder or create a new one, what would you do differently?” (Choose an image with more things to notice, or with something missing or something curious. Think about whether others might notice things about math in the image.)

Complete Cool-Down

Response to Student Thinking

Students have reflections to discuss with a partner.

Next Day Support

- Pair students up to discuss their responses.

Lesson 13: How Many Do You See?

Standards Alignments

Addressing 3.OA.A, 3.OA.A.1

Teacher-facing Learning Goals

- Apply understanding of equal groups and multiplication to create a How Many Do You See activity.

Student-facing Learning Goals

- Let's create a How Many Do You See activity.

Lesson Purpose

The purpose of this lesson is for students to apply their understanding of equal groups and multiplication to create a How Many Do You See activity.

This lesson provides an opportunity to observe the ways in which students find the number of objects in equal groups. After the warm-up, students create their own How Many Do You See activity and then facilitate it with other students in the class.

If students need additional support with the concepts in this lesson, refer back to Unit 1, Section B in the curriculum materials.

Access for:

Students with Disabilities

- Action and Expression (Activity 2)

English Learners

- MLR8 (Activity 2)

Instructional Routines

How Many Do You See? (Warm-up)

Materials to Gather

- Chart paper: Activity 2
- Markers: Activity 2

Lesson Timeline

Warm-up

10 min

Teacher Reflection Question

What did you learn about students' mathematical understandings today as you

Activity 1	20 min	listened to their discussions?
Activity 2	15 min	
Lesson Synthesis	10 min	
Cool-down	5 min	

Cool-down (to be completed at the end of the lesson)

 5 min

How Many Do You See Reflection

Standards Alignments

Addressing 3.OA.A

Student-facing Task Statement

Describe a time from class today when you heard a classmate explain the dots in a different way than you saw them.

Student Responses

Sample response: In the warm-up, I saw 9 groups of 4 and my classmate saw 4 groups of 8 and another group of 4.

----- Begin Lesson -----

Warm-up

 10 min

How Many Do You See: Equal Groups

Standards Alignments

Addressing 3.OA.A.1

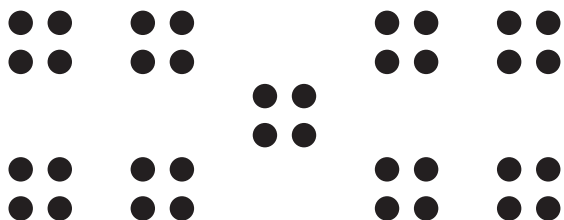
The purpose of this How Many Do You See is to allow students to use subitizing or grouping strategies to describe the images they see. In the synthesis, discuss what students know about the How Many Do You See routine and what they need to think about to create one like this example.

Instructional Routines

How Many Do You See?

Student-facing Task Statement

How many do you see? How do you see them?



Student Responses

36. Sample responses:

- I see 9 groups of 4 dots. I see 4 groups on each side and one group in the middle.
- I counted two groups in the upper left corner as 2, 4, 6, 8, and saw that there were 4 groups like that, plus one extra 4, so $4 \times 8 + 4 = 36$.
- I saw 4×4 in the top half and another 4×4 in the bottom half, plus 4 in the middle. That's $16 + 16 + 4$, which is 36.

Launch

- Groups of 2
- “How many do you see? How do you see them?”
- Flash the image.
- 30 seconds: quiet think time

Activity

- Display the image.
- “Discuss your thinking with your partner.”
- 1 minute: partner discussion
- Record responses.

Synthesis

- “What do you know about How Many Do You See?” (They have dots arranged in groups that make the dots easier to count. There are many different ways to count the dots.)
- Consider asking: “What would you have to think about if you were going to design a How Many Do You See like this one?” (How the dots are organized. How to create groups of dots that are easy to count. Different ways that the dots could be seen.)
- Record and display responses for all to see.

Activity 1

Design Your How Many Do You See

🕒 20 min

👤 ↔ 👤 PLC Activity

Standards Alignments

Addressing 3.OA.A.1

The purpose of this activity is for students to collaborate and create a How Many Do You See activity that focuses on equal groups. Students create their own dot image and come up with different ways that other students might see the dots.

Student-facing Task Statement

1. Draw a dot image that would encourage your classmates to count equal groups.
2. Write down possible ways students might see the dots in your image.

Ways students might see the dots:

-
-
-

Student Responses

Answers vary.

Launch

- Groups of 3 - 4
- “Work with your group to create a How Many Do You See activity about equal groups.”

Activity

- 15 minutes: small-group work time
- If time permits, encourage students to create a second dot image.

Synthesis

- “What questions do you still have about creating your How Many Do You See?”
- Give students a few minutes to make adjustments, if needed.

Activity 2

🕒 15 min

Facilitate Your How Many Do You See

Standards Alignments

Addressing 3.OA.A

The purpose of this activity is for students to facilitate the How Many Do You See they created in the previous activity. Each group takes turns facilitating their How Many Do You See for another group (or two groups, if time permits).

Access for English Learners

MLR8 Discussion Supports. Synthesis: Provide students with the opportunity to rehearse what they will say with a partner before they share with the whole class.

Advances: Speaking

Access for Students with Disabilities

Action and Expression: Internalize Executive Functions. Check for understanding by inviting students to rephrase directions in their own words. Keep a display of directions visible throughout the activity.

Supports accessibility for: Memory; Organization

Materials to Gather

Chart paper, Markers

Required Preparation

- Each group of 3-4 from the previous activity needs 1 piece of chart paper and a marker.

Student-facing Task Statement

1. Ask your classmates, “How many do you see? How do you see them?”
2. Flash your image.
3. Give 30 seconds quiet think time.
4. Display your image.
5. Give them a minute to discuss together.
6. Ask them to share how many they saw and how they saw them.
7. Record their ideas.

Student Responses

No response required.

Launch

- Groups of 3 - 4 from previous activity
- Give each group a piece of chart paper and a marker to record responses.
- “Now, work with another group and take turns facilitating the How Many Do You See activity you created.”

Activity

- 10–12 minutes: small-group work time
- Remind students to switch roles after 5–6 minutes.

Synthesis

- “What did you learn from facilitating your activity?” (Others might see the dots in ways we did not think of. Arranging the dots thoughtfully is important so others can see the pattern we are after.)

Lesson Synthesis

🕒 10 min

“What important things did you consider as you created the image for your How Many Do You See? Why were these things important?” (We thought about the ways to arrange the dots, so they could be grouped to help other students count them. We thought about how many dots were in the groups, because if they were too big, other students wouldn't have time to count the dots in a short amount of time.)

Complete Cool-Down

Response to Student Thinking

Students have reflections to discuss with a partner.

Next Day Support

- Pair students up the next day to discuss their responses.

Lesson 14: Estimation Exploration

Standards Alignments

Building On 3.MD.B.4
Addressing 3.MD.B.4

Teacher-facing Learning Goals

- Apply understanding of measuring objects to the nearest half and fourth of an inch to create an Estimation Exploration activity.

Student-facing Learning Goals

- Let's create an Estimation Exploration activity.

Lesson Purpose

The purpose of this lesson is for students to apply their understanding of measurement of fractional lengths to create an Estimation Exploration activity.

This lesson provides an opportunity to observe the ways in which students think about fractional measurements. After the warm-up, students create their own Estimation Exploration activity and then facilitate it with other students in the class. Students can find images to use for their Estimation Exploration from books or other provided sources, or use actual objects from around the classroom.

If students need additional support with the concepts in this lesson, refer back to Unit 6, Section A in the curriculum materials.

Access for:

Students with Disabilities

- Representation (Activity 1)

English Learners

- MLR8 (Activity 2)

Instructional Routines

Estimation Exploration (Warm-up)

Materials to Gather

- Chart paper: Activity 2
- Markers: Activity 2
- Picture books: Activity 1
- Rulers: Activity 1

Lesson Timeline

Warm-up	10 min
Activity 1	20 min
Activity 2	15 min
Lesson Synthesis	10 min
Cool-down	5 min

Teacher Reflection Question

What do you love most about math? How are you sharing that joy with your students and encouraging them to think about what they love about math?

Cool-down (to be completed at the end of the lesson)

🕒 5 min

Estimation Exploration Reflection

Standards Alignments

Building On 3.MD.B.4

Student-facing Task Statement

Describe a time when you were able to explain your ideas to other people in your class.

Student Responses

Sample response: I explained how I thought about the estimation exploration we wrote to my group so that we could think about how other students might respond.

----- **Begin Lesson** -----

Warm-up

🕒 10 min

Estimation Exploration: Fractional Measurement

Standards Alignments

Addressing 3.MD.B.4

The purpose of an Estimation Exploration is to practice the skill of estimating a reasonable answer

based on experience and known information. In the synthesis, discuss what students know about Estimation Explorations and what they need to think about to create one like this example.

Instructional Routines

Estimation Exploration

Student-facing Task Statement

What is the length of this earthworm?



Record an estimate that is:

too low	about right	too high

Student Responses

Sample responses

- Too low: 3 inches or less
- About right: $3\frac{1}{2}$ inches to $3\frac{3}{4}$ inches
- Too high: 4 inches or more

Launch

- Groups of 2
- Display the image.
- “What is an estimate that’s too high? Too low? About right?”
- 1 minute: quiet think time

Activity

- “Discuss your thinking with your partner.”
- 1 minute: partner discussion
- Record responses.

Synthesis

- “What do you know about Estimation Explorations?” (It’s not about finding the exact answer. We make an estimate that is too low, too high, and about right. The estimate could be the value of an expression, the number of items in an image, or a measurement.)
- Consider asking: “What would you have to think about if you were going to design an Estimation Exploration like this one?” (There is something in the image that gives a clue about the general length of the object. Choosing an object that is not an exact length in whole inches.)
- Record and display responses for all to see.

Activity 1

🕒 20 min

Design Your Estimation Exploration

Standards Alignments

Addressing 3.MD.B.4

The purpose of this activity is for students to collaborate and create an Estimation Exploration activity that focuses on fractional measurement. Students find an object from the classroom or an image in a book or another source. They anticipate and record what other students might estimate the length of the object to be.

🕒 Access for Students with Disabilities

Representation: Internalize Comprehension. Synthesis: Invite students to identify which details were most useful in creating an estimation exploration. Display the sentence frame, “The next time I create an estimation exploration, I will pay attention to . . .”

Supports accessibility for: Memory

Materials to Gather

Picture books, Rulers

Required Preparation

- Each group of 2-3 needs picture books and a ruler to design their Estimation Exploration activity.

Student-facing Task Statement

1. Find an object or an image that would make an interesting estimation problem. Write a question that would encourage others to answer with a length estimated to the nearest half or fourth of an inch.
2. Think about possible estimates others might make for the length of the object or image.

Record an estimate that is:

Launch

- Groups of 2-3
- Give each group picture books and a ruler.
- “Work with your group to create an Estimation Exploration activity about measuring objects to the nearest half or fourth of an inch.”

Activity

- 15 minutes: small-group work time

too low	about right	too high

- Measure the length of the object or image to make sure your estimates make sense. If needed, revise your estimates.

Student Responses

Answers vary.

Synthesis

- “What questions do you still have about creating your Estimation Exploration?”
- Give students a few minutes to make adjustments, if needed.

Activity 2

🕒 15 min

Facilitate Your Estimation Exploration

Standards Alignments

Building On 3.MD.B.4

The purpose of this activity is for students to facilitate the Estimation Exploration they created in the previous activity. Each group takes turns facilitating their Estimation Exploration for another group (or two groups, if time permits).

🌐 Access for English Learners

MLR8 Discussion Supports. Synthesis: Display sentence frames to support whole-class discussion: “I learned . . .” “The next time I create an estimation exploration, I will . . .”

Advances: Speaking, Representing

Materials to Gather

Chart paper, Markers

Required Preparation

- Each group of 2–3 from the previous activity needs 1 piece of chart paper and a marker.

Student-facing Task Statement

1. Display your image for your classmates.
2. Ask them, "What is an estimate that's too high? Too low? About right?"
3. Give them a minute of quiet think time.
4. Give them a minute to discuss together.
5. Ask them to share their estimates.
6. Record their ideas.

Student Responses

No response required.

Launch

- Groups of 2–3 from the previous activity
- Give each group a piece of chart paper and a marker to record responses.
- "Now work with another group and take turns facilitating the Estimation Exploration activity you created."

Activity

- 10–12 minutes: small-group work time
- Remind students to switch roles after 5–6 minutes.

Synthesis

- "What did you learn as you facilitated your Estimation Exploration?" (The estimates might be much higher or lower than expected. It helps to be familiar with what we're trying to estimate.)

Lesson Synthesis

🕒 10 min

"What were some important things you considered about the length of the object as you created your Estimation Exploration? Why were they important?" (To make it possible to estimate, we need to show how long 1 inch was compared to the length of the object. The object is not so large or so tiny that it would be hard to estimate to the nearest half or quarter inch, or that it wouldn't make sense to do so.)

----- **Complete Cool-Down** -----

Response to Student Thinking

Students have reflections to discuss with a partner.

Next Day Support

- Pair students up the next day to discuss their responses.

Lesson 15: Number Talk

Standards Alignments

Building On 3.NBT.A.2
Addressing 3.NBT.A.2

Teacher-facing Learning Goals

- Apply understanding of addition and subtraction within 1,000 to create a Number Talk activity.

Student-facing Learning Goals

- Let's create a Number Talk activity.

Lesson Purpose

The purpose of this lesson is for students to apply their understanding of addition and subtraction to create a Number Talk activity.

This lesson provides an opportunity to observe the ways in which students make use of structure and repeated reasoning to design a Number Talk. The warm-up is followed by four Number Talk activities. In the first activity, students are given three expressions and asked to write the missing expression. In each of the subsequent activities, one additional expression is missing. In the last activity, students write all four expressions of a Number Talk.

It is not essential that students complete all four activities. Decide which activities to do based on how much scaffolding students may need. The lesson may take more than one day, especially if students facilitate their Number Talk with other groups.

If students need additional support with the concepts in this lesson, refer back to Unit 3, Sections A and B in the curriculum materials.

Access for:

Students with Disabilities

- Action and Expression (Activity 2)

English Learners

- MLR8 (Activity 1)

Instructional Routines

Number Talk (Warm-up)

Lesson Timeline

Warm-up	10 min
Activity 1	15 min
Activity 2	15 min
Activity 3	15 min
Activity 4	15 min
Lesson Synthesis	10 min
Cool-down	5 min

Teacher Reflection Question

What do your students think it means to be good at math? How are you helping them change negative impressions they might have about their ability to reason mathematically?

Cool-down (to be completed at the end of the lesson)

🕒 5 min

Number Talk Reflection

Standards Alignments

Building On 3.NBT.A.2

Student-facing Task Statement

As mathematicians, we use patterns and things we see happening over and over again to help us reason about new problems. Describe a time today where you did that.

Student Responses

Sample response: When we were designing a Number Talk, I tried to think of how to make the problems similar enough so that we could use the same method for all the problems.

----- **Begin Lesson** -----**Warm-up**

🕒 10 min

Number Talk: Addition

Standards Alignments

Addressing 3.NBT.A.2

The purpose of this Number Talk is to elicit strategies and understandings students have for adding within 1,000. These understandings help students develop fluency and will be helpful when students create their own Number Talk activities.

In the synthesis, discuss what students know about Number Talks and what they need to think about to create one like this example.

Instructional Routines

Number Talk

Student-facing Task Statement

Find the value of each expression mentally.

- $300 + 400$
- $300 + 437$
- $321 + 437$
- $425 + 514$

Student Responses

- 700: I know that 400 plus 300 is 700. I just know it.
- 737: I added the hundreds to get 700 and there 37 more, so the sum is 737.
- 758: I added the hundreds to get 700, the tens to get 50, and the ones to get 8. So, the sum is 758.
- 939: I added the hundreds, the tens, then the ones to get 939.

Launch

- Display one expression.
- “Give me a signal when you have an answer and can explain how you got it.”
- 1 minute: quiet think time

Activity

- Record answers and strategy.
- Keep expressions and work displayed.
- Repeat with each expression.

Synthesis

- “What do you know about Number Talks?” (They always have four expressions and we find their values in our head. Sometimes we can use the same method for each expression. Sometimes we can use the first couple of expressions to help us find the value of other expressions.)
- Consider asking: “What would you have to think about if you were going to design a Number Talk like this one?” (How one expression might relate to the next. What strategies might make it possible for someone to find the value mentally. Whether

it's possible to use one expression to find the value of other expressions.)

- Record and display responses for all to see.

Activity 1

🕒 15 min

Number Talk Design 1

Standards Alignments

Addressing 3.NBT.A.2

The purpose of this activity is for students to reason about subtraction and write another subtraction expression to complete a partially-completed Number Talk activity. If there is time, students can facilitate their Number Talk with another group. Students are given three expressions and prompted to think of ways that they could be evaluated mentally. They then write a fourth expression in which similar reasoning could be used, or by making use of the first three expressions.

🌐 Access for English Learners

MLR8 Discussion Supports. Synthesis: Create a visual display of the task. As students share their expression, annotate the display with the expression and its connection to the third expression in the Number Talk. For example, if students share $500 - 299$, write “100 less than 399” next to the expression.

Advances: Reading, Representing

Student-facing Task Statement

Here are three subtraction expressions.

- $600 - 400$
- $600 - 399$
- $500 - 399$
- _____

1. Think of at least two different ways to find the value of each difference mentally.

Launch

- Groups of 2 - 4
- “Here are three expressions like the kinds you might see in a Number Talk.”

Activity

- “How would you find the value of each expression, without writing? For each expression, think of at least two ways. Then, share your thinking with your group.”

2. Write a fourth subtraction expression whose value can be found using one of the strategies you thought of.

Student Responses

Answers vary.

- Reiterate to students that they are to consider how someone might reason about each difference, rather than only finding the value.
- 4 minutes: independent work time
- 4 minutes: small-group discussion
- “Write one more expression that could go with the other three expressions and would complete a Number Talk activity.”
- 4 minutes: small-group work time
- Monitor for groups who consider the following strategies in writing their expression:
 - adjust the 399 to a different number, but keep the 500
 - leave the 399, but adjust the 500
 - adjust both the 500 and the 399, but create a problem that can be reasoned as in previous expressions
- Identify groups who chose different strategies to share in the synthesis.

Synthesis

- Select groups to share their last expression and their reasoning.
- As each group shares, ask others in the class if they had used the same strategy to write their expression and if they arrived at a similar expression.

Activity 2

🕒 15 min

Number Talk Design 2

Standards Alignments

Addressing 3.NBT.A.2

The purpose of this activity is for students to reason about addition and apply their reasoning to complete a partially-completed Number Talk activity. This time, students are given addition expressions and are asked to think about how the value of the sums could be found mentally. They then write two new addition expressions to complete the set.

Access for Students with Disabilities

Action and Expression: Internalize Executive Functions. To support working memory, provide students with access to sticky notes or mini whiteboards.

Supports accessibility for: Memory, Organization

Student-facing Task Statement

Here are two addition expressions.

- $500 + 199$
- $504 + 199$
- _____
- _____

1. Think of at least two different ways to find the value of each sum mentally.
2. Write two more addition expressions whose value can be found using the strategies you thought of.

Student Responses

Answers vary.

Launch

- Groups of 2 - 4
- "Here are two expressions like the kinds you might see in a Number Talk."

Activity

- "How would you find the value of each expression, without writing? For each expression, think of at least two ways. Then, share your thinking with your group."
- Reiterate to students that they are to consider how someone might reason about each sum, rather than only finding the value.
- 3 minutes: independent work time
- 3 minutes: small-group discussion
- "Write two more expressions that could go with the other two expressions and would complete a Number Talk activity."
- 5 minutes: small-group work time
- Monitor for groups who consider the following strategies in writing their expression:
 - adjust the 504 to a different number, but keep the 199
 - leave the 504, but adjust the 199

- adjust the 504 and the 199, but create a problem that can be reasoned as in previous expressions
- Identify groups who chose different strategies to share in the synthesis.

Synthesis

- Select groups to share their two expressions and their reasoning.
- As each group shares, ask others in the class if they had used the same strategy to write their expressions and if they arrived at similar expressions.

Activity 3

🕒 15 min

Number Talk Design 3

Standards Alignments

Addressing 3.NBT.A.2

The purpose of this activity is for students to write a sequence of three subtraction expressions to complete a Number Talk with only one given expression. As in earlier activities, students consider strategies that they or others might use to mentally subtract numbers within 1,000.

Student-facing Task Statement

Write three subtraction expressions to complete the Number Talk.

- 900 – 400
- _____
- _____
- _____

Launch

- Groups of 2 - 4
- “Work with your group to complete a Number Talk with three expressions missing. Write them in the blank lines.”

Activity

- 10 minutes: small-group work time

Student Responses

Answers vary.

- Monitor for groups who:
 - adjust the 900 or 400 to emphasize a certain subtraction strategy
 - make slight adjustments in each expression but promote the same reasoning strategy throughout
- Identify groups who choose different strategies to share in the synthesis.

Synthesis

- Select groups to share their completed Number Talk and ask the class how the groups might have chosen the expressions.

Activity 4

🕒 15 min

Number Talk Design 4

Standards Alignments

Building On 3.NBT.A.2

The purpose of this activity is for students to design a Number Talk from a blank slate. They can choose to write addition or subtraction expressions, but still consider possible ways that others might find the value of the expressions mentally. If there is time, allow students to facilitate their Number Talk with another group.

Student-facing Task Statement

Write four addition or subtraction expressions to create a Number Talk.

- _____
- _____
- _____

Launch

- Groups of 1 - 4
- “Work independently or with your group to create a Number Talk activity. You can decide whether to write addition or subtraction expressions.”

Student Responses

Answers vary.

Activity

- 10 minutes: independent or small-group work time
- Monitor for groups who design their expressions based on certain strategies for subtracting numbers mentally, such as:
 - adding hundreds to hundreds, tens to tens, and ones to ones
 - adding up to subtract
 - relating to benchmarks such as multiples of 100 or 10

Synthesis

- Invite 1–2 groups to share their completed Number Talk or to facilitate it for the class.
- Alternatively, if time permits, allow groups to take turns facilitating their Number Talk with another group.

Lesson Synthesis

🕒 10 min

“What were some important things you considered as you created expressions for your Number Talk? Why were these things important?” (I thought about what method I wanted other students to think about, because this helped me think about which expressions to write. I thought about how one problem was related to the next, to make sure the Number Talk made sense.)

Complete Cool-Down

Response to Student Thinking

Students have reflections to discuss with a partner.

Next Day Support

- Pair students up the next day to discuss their responses.

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Family Support
Materials

Family Support Materials

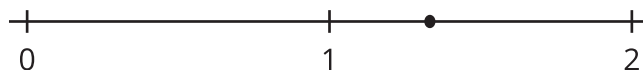
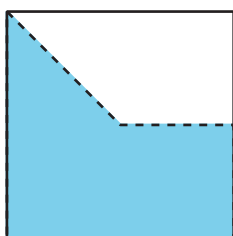
Putting It All Together

In this unit, students apply what they have learned throughout the year to strengthen major concepts and fluency goals of the grade.

Section A: Fraction Fun

In this section, students revisit and build on important fraction ideas that they have learned in the course. They think about different ways to represent fractions and to estimate the size of fractions presented in different forms: as an area diagram, a shaded strip, and a number line.

What fraction of the square is shaded? What number is represented by the point on the number line?



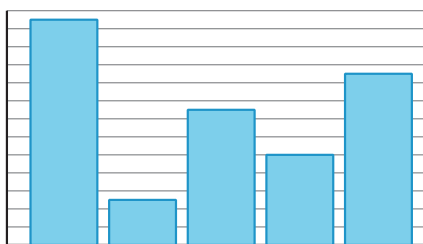
Students also practice identifying and locating fractions on the number line, using tape to create a number line that shows a large number of fractions.

Section B: Measurement and Data

In this section, students first use their knowledge of shapes, perimeter, and area to design their own tiny house. They ask and answer questions about the area and perimeter of shapes in their design. Then, they calculate the cost of finishing a room in their tiny house.



Favorite Science Topic




Next, students focus on data collection and representation. They conduct a survey in the school community, organize their data, and represent the data with a scaled graph. They also ask and answer questions about the data.


Section C: Multiplication and Division Games

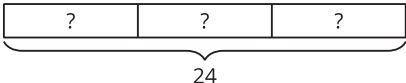
In this section, students continue to build their fluency with multiplication and division. They reflect on the products within 100 they know from memory or can find quickly and the ones they don't know yet. Students then practice multiplication facts through games.

Students also reinforce their understanding of the connections between multiplication and division by matching equations and diagrams.

Which one doesn't belong?

A 

B 

C 

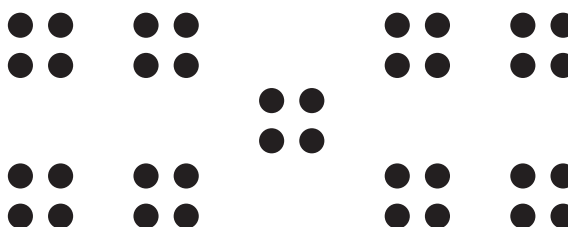
D $24 \div 6$

Section D: Create and Design

Throughout the course, students have participated in warm-up routines such as How Many Do You See, Exploration Estimation, Which One Doesn't Belong, True or False, and Number Talk.

In this section, they apply the mathematics they have learned to design warm-ups that use some of these routines.

How many do you see? How do you see them?



Try it at home!

Near the end of the unit, ask your student to share the warm-up routines they created. Questions that may be helpful as they share:

- How did you design the routine?
- How does the routine relate to what you learned this year?
- What might you change to improve the routine?

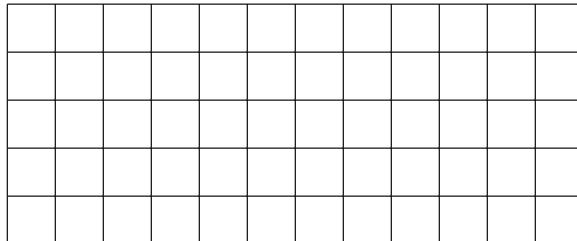
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Unit Assessments

End-of-Course Assessment and Resources

Putting It All Together: End-of-Course Assessment and Resources

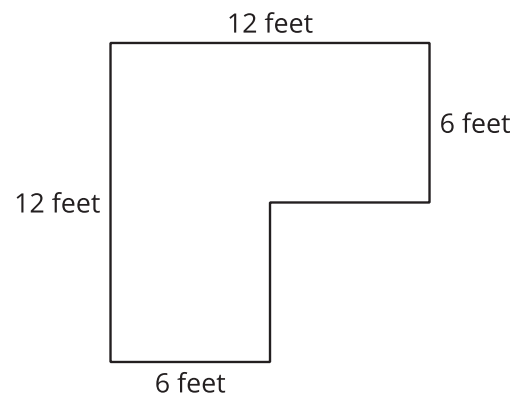
1. Select all expressions that represent the area of the rectangle.



- A. 12×5
- B. $10 \times 5 + 2 \times 5$
- C. $5 \times 10 - 5 \times 2$
- D. $12 + 5 + 12 + 5$
- E. $12 \times 3 + 12 \times 2$

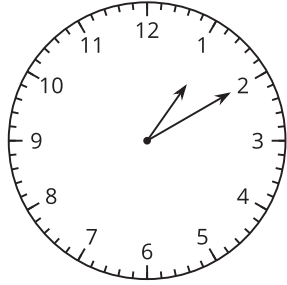
2. Here is a diagram of a patio.

What is the area of the patio? Explain or show your reasoning.

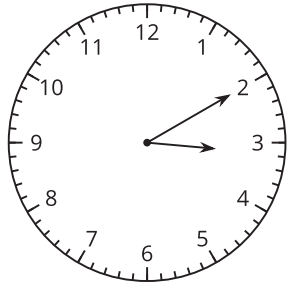


3. Soccer practice began at 2:45 p.m. and lasted 95 minutes. Which clock shows the time when soccer practice ended?

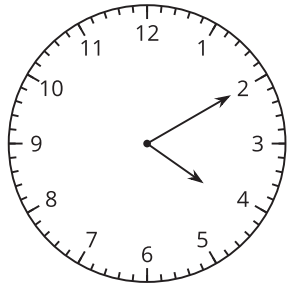
A.



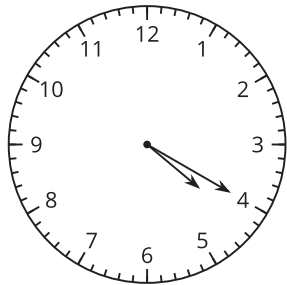
B.



C.



D.



4. Seven bags of dog food weigh 63 kilograms. If all the bags have the same weight, how many kilograms does each bag of dog food weigh?
- Write an equation to represent the situation. Use a letter or symbol for the unknown.
 - Solve the problem.
5. a. Think of a situation that the equation $5 \times 3 = ?$ could represent. Describe or show what the 5, 3, and “?” represent. Draw a diagram if it helps to show your thinking.
- b. Think of a situation that the equation $36 \div 4 = ?$ could represent. Describe or show what the 36, 4, and “?” represent. Draw a diagram if it helps to show your thinking.

6. There are 60 books on 5 shelves. There are the same number of books on each shelf. How many books are on each shelf?

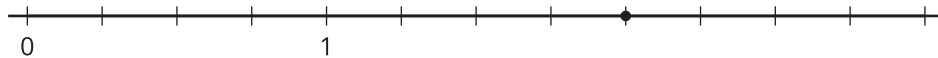
a. Write a multiplication equation to represent the situation. Use a “?” for the unknown.

b. Write a division equation to represent the situation. Use a “?” for the unknown.

c. Find how many books are on each shelf. Explain or show your reasoning.

7. A farmer brought 525 oranges to the market. She sold 8 boxes of 12 oranges. How many oranges does she have now? Show your reasoning.

8. Select **all** numbers that represent the point on the number line.



A. 2

B. $\frac{7}{4}$

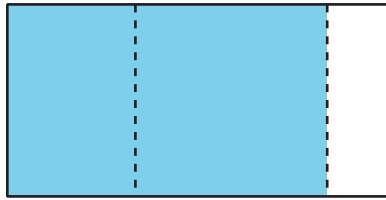
C. $\frac{8}{4}$

D. $\frac{2}{1}$

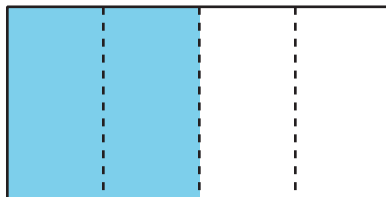
E. 8

9. Select **all** diagrams that show $\frac{2}{3}$ or an equivalent fraction of the rectangle shaded.

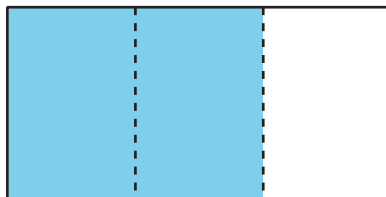
A.



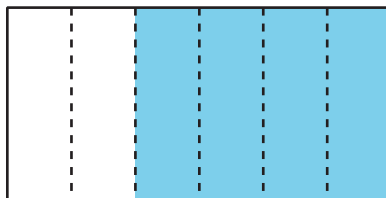
B.



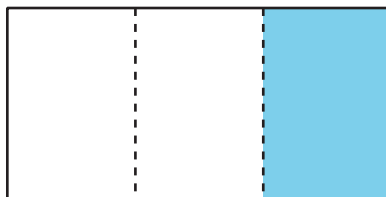
C.



D.



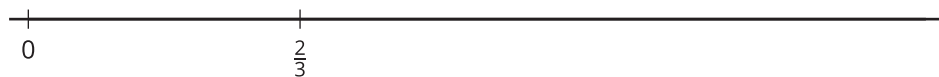
E.



10. a. Locate and label $\frac{1}{4}$ and $\frac{5}{4}$ on the number line. Explain your reasoning.



- b. Locate and label 1 on the number line. Explain your reasoning.



11. a. Find the value of 5×2 , 5×4 , and 5×6 .

- b. Why is the last digit of an even number multiplied by 5 always 0?

12. Write $<$, $=$, or $>$ in each blank to make the statement true. Explain your reasoning.

a. $\frac{3}{6}$ _____ $\frac{3}{8}$

b. $\frac{3}{6}$ _____ $\frac{1}{2}$

c. $\frac{3}{6}$ _____ $\frac{2}{6}$

13. Find the value of each expression.

a. 14×7

b. 3×26

c. 37×2

d. $42 \div 3$

e. $85 \div 5$

f. $90 \div 9$

14. Find two ways to write each number as a product of two factors. Record each way as an equation.

a. i. 16

ii. 18

iii. 24

b. i. 30

ii. 36

iii. 60

c. i. 72

ii. 98

iii. 96

15. Lin's class is designing a garden at school. Their garden is a rectangle that is 8 feet by 12 feet. The table shows how far some different plants need on all sides to grow well.

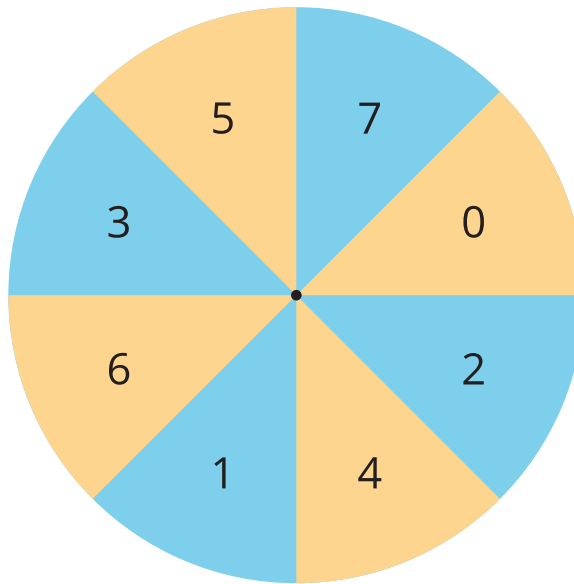
plant	space on all sides
tomato	2 feet
lettuce	1 foot
onion	$\frac{1}{2}$ foot
carrot	$\frac{1}{6}$ foot
pumpkin	5 feet

- a. Which plant takes up the most amount of space? Which plant takes up the least amount of space?
- b. Andre wants to plant pumpkins. Lin says that there is not enough room. Do you agree with Lin? Explain or show your reasoning.
- c. How many lettuce plants can the class fit in the garden? Explain or show your reasoning.

d. Design your own garden. Make sure to:

- choose at least 3 different kinds of plants
- give each plant enough space to grow
- fit as many of the plants as you can in the garden

16. a. Spin the spinner 6 times and record the digits.



Use them to write a pair of three-digit numbers that make the largest sum possible without going over 1,000. (You can place the digits you get in any order.)

_____ and _____

- b. Spin the spinner 6 more times and record the digits.

Use them to write a pair of three-digit numbers that make the smallest difference possible. (You can place the digits you get in any order.)

_____ and _____

17. a. Write a division equation for each situation. Use “?” for the unknown quantity.
- i. There are 35 students in the room. They are seated at 7 tables, with the same number of students at each table. How many students are at each table?

 - ii. There are 35 students in the room. There are 7 students seated at each table. How many tables of students are there?
- b. How are the situations the same? How are they different?

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Assessment Answer Keys

End-of-Course Assessment and Resources

Assessment Answer Keys

Assessment: End-of-Course Assessment and Resources

Teacher Instructions

The items here focus on major work of the grade, fluencies of the grade, and also include at least one in-depth problem that provides a context where students apply key ideas they have learned over the year. The items included here can be used prior to the final unit to focus remaining time in the year or to assess student understanding at the end of the year. It is not recommended that these resources be used all at once.

Problem 1

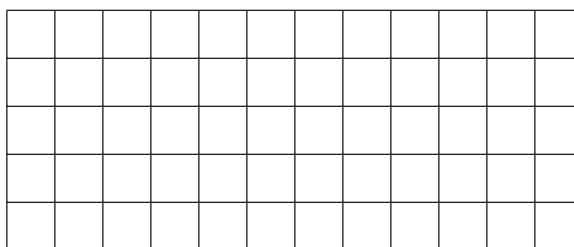
Standards Alignments

Addressing 3.MD.C.5, 3.MD.C.6, 3.MD.C.7.a, 3.MD.C.7.c, 3.OA.A.1

Narrative

Students identify different expressions for the area of a rectangle, including both multiplication expressions and an addition expression. Students who select C have likely divided the rectangle into two smaller rectangles but chosen the wrong operation, subtraction instead of addition. Students who select D are probably confusing the perimeter of the shape with its area.

Select **all** expressions that represent the area of the rectangle.



- A. 12×5
- B. $10 \times 5 + 2 \times 5$
- C. $5 \times 10 - 5 \times 2$
- D. $12 + 5 + 12 + 5$
- E. $12 \times 3 + 12 \times 2$

Solution

["A", "B", "E"]

Problem 2

Standards Alignments

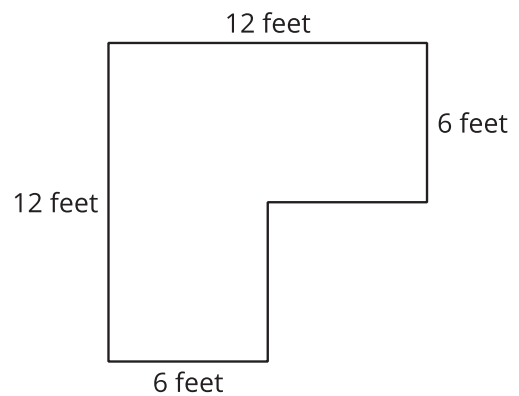
Addressing 3.MD.C.7.b, 3.MD.C.7.d, 3.OA.A.3, 3.OA.B.5

Narrative

Students find the area of a composite rectangular shape. They may divide the shape into rectangles in different ways. If they cut the shape into two rectangles then one of the products that they find is a two-digit number and a one-digit number within 100. A likely strategy here is to use the distributive property.

Here is a diagram of a patio.

What is the area of the patio? Explain or show your reasoning.



Solution

108 square feet. Sample response: I cut the shape into a rectangle that is 12 feet by 6 feet and another that is 6 feet by 6 feet.

The area of the first rectangle:

$$10 \times 6 = 60$$

$$2 \times 6 = 12$$

$$12 \times 6 = 72$$

The area of the second rectangle:

$$6 \times 6 = 36$$

$$72 + 36 = 108$$

Problem 3

Standards Alignments

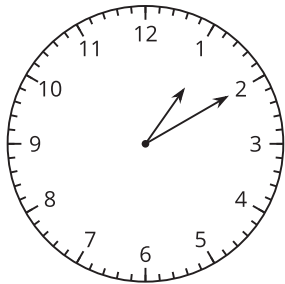
Addressing 3.MD.A.1

Narrative

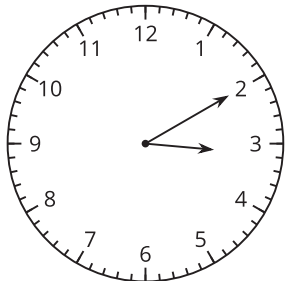
Students calculate a time from a context and then identify the time on a clock. Students may select A if they subtract 95 minutes from 2:45 instead of adding 95 minutes. Students may select B if they have correctly found the minutes but not accounted for the extra hour in 95 minutes. Students may select C if they make a small miscalculation in the minutes.

Soccer practice began at 2:45 p.m. and lasted 95 minutes. Which clock shows the time when soccer practice ended?

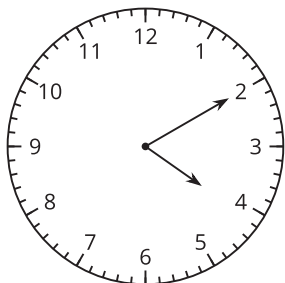
A.



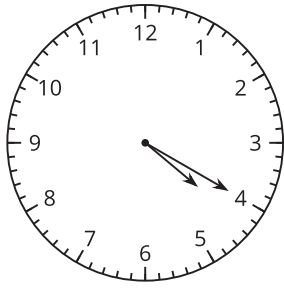
B.



C.



D.



Solution

D

Problem 4

Standards Alignments

Addressing 3.MD.A.2, 3.OA.A.4

Narrative

Students write an equation to represent an equal groups situation. It is an unknown factor problem which they may represent with either multiplication or division. At the end of the year, students should know the solution but they may also reason it out by using facts that they know.

Seven bags of dog food weigh 63 kilograms. If all the bags have the same weight, how many kilograms does each bag of dog food weigh?

- Write an equation to represent the situation. Use a letter or symbol for the unknown.
- Solve the problem.

Solution

- $7 \times ? = 63$ or $? \times 7 = 63$ or $63 \div 7 = ?$ or $63 \div ? = 7$
- 9 kilograms

Problem 5

Standards Alignments

Addressing 3.OA.A.1, 3.OA.A.2, 3.OA.A.4

Narrative

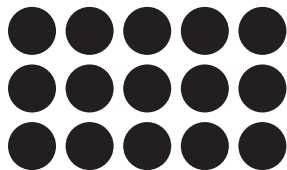
Students describe situations that are represented by a multiplication equation and a division equation each with an unknown. Students may use an array as in the solution to the first problem or they may describe an equal groups situation as in the solution to the second problem.

- Think of a situation that the equation $5 \times 3 = ?$ could represent. Describe or show what the 5, 3, and “?” represent. Draw a diagram if it helps to show your thinking.
- Think of a situation that the equation $36 \div 4 = ?$ could represent. Describe or show what the 36, 4, and “?” represent. Draw a diagram if it helps to show your thinking.

Solution

Sample responses:

- There are 5 columns of dots and each column has 3 dots. How many dots are there? The picture shows that's 5×3 and there are 15 dots total so $5 \times 3 = 15$.



- There are 36 students in the gym. They are split into 4 equal teams. How many students are on each team? There are 9 students on each team, $36 \div 4 = 9$.

Problem 6

Standards Alignments

Addressing 3.OA.A.3, 3.OA.B.6, 3.OA.C.7

Narrative

Students write a multiplication and a division equation using a ? for the unknown to represent an equal groups situation. They may solve using any method. Since the number of books on a shelf is greater than 10, students may need several steps to find the value of the quotient $60 \div 5$. They may draw a picture or use equations.

There are 60 books on 5 shelves. There are the same number of books on each shelf. How many books are on each shelf?

- Write a multiplication equation to represent the situation. Use a “?” for the unknown.
- Write a division equation to represent the situation. Use a “?” for the unknown.
- Find how many books are on each shelf. Explain or show your reasoning.

Solution

- $5 \times ? = 60$ or $? \times 5 = 60$
- $60 \div 5 = ?$ or $60 \div ? = 5$
12. Sample response:
 $5 \times 10 = 50$
 $5 \times 2 = 10$
 $5 \times 12 = 60$

Problem 7

Standards Alignments

Addressing 3.OA.C.7, 3.OA.D.8

Narrative

Students solve a two-step arithmetic problem within 1,000. They find a product within 100 and then perform subtraction within 1,000 to solve the problem. The multiplication part of the problem may require several steps as students may not know the value of 8×12 without calculating. They may find the difference using equations, an algorithm, or a form of compensation as in the given solution.

A farmer brought 525 oranges to the market. She sold 8 boxes of 12 oranges. How many oranges does she have now? Show your reasoning.

Solution

429. Sample response: There are 8×12 oranges in the boxes. $8 \times 10 = 80$ and $8 \times 2 = 16$, so $8 \times 12 = 96$. To find $525 - 96$, I took away 100 from 525 to get 425 and then added 4 back (because I took 4 more than 96), which gives 429.

Problem 8

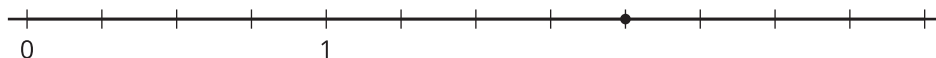
Standards Alignments

Addressing 3.NF.A.2, 3.NF.A.3.c

Narrative

Students choose different representations of a point on a number line. Only 0 and 1 are labeled on the number line and there are tick marks at each fourth. Students who do not select A or who select E have perhaps not seen that 1 is labeled on the number line. Students who do not select C or D need more practice labeling whole numbers as fractions on number lines. Students may select B if they count fourths and skip the labeled tick mark.

Select **all** numbers that represent the point on the number line.



- A. 2
- B. $\frac{7}{4}$
- C. $\frac{8}{4}$
- D. $\frac{2}{1}$
- E. 8

Solution

["A", "C", "D"]

Problem 9

Standards Alignments

Addressing 3.NF.A.1, 3.NF.A.3.b

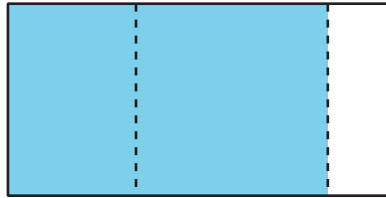
Narrative

Students identify diagrams that show $\frac{2}{3}$. Students who select A probably do not notice that the 3 parts making the rectangle are not equal-size. Students who select B or E have only correctly

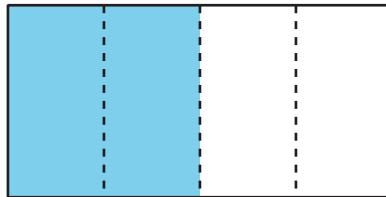
interpreted one part of the fraction, the numerator or the denominator. Students may not select D if they do not think of equivalent fractions.

Select **all** diagrams that show $\frac{2}{3}$ or an equivalent fraction of the rectangle shaded.

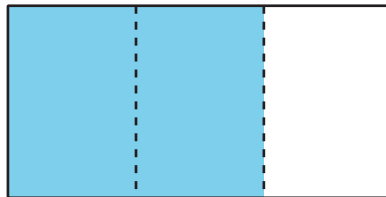
A.



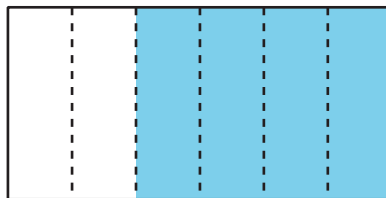
B.



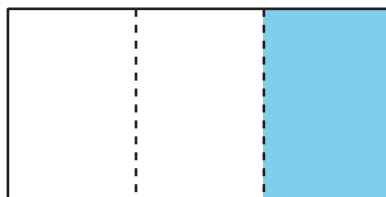
C.



D.



E.



Solution

["C", "D"]

Problem 10

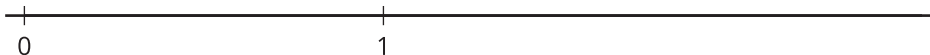
Standards Alignments

Addressing 3.NF.A.2.a, 3.NF.A.2.b

Narrative

Students locate different fractions on the number line. For the first problem, they need to understand how to make fourths on the number line, with 0 and 1 given, and then label them correctly. In particular, they need to understand that 1 is $\frac{4}{4}$ so $\frac{5}{4}$ is the next fourth after 1. The second problem takes two steps because $\frac{2}{3}$ is not a unit fraction. Students can find $\frac{1}{3}$ and then find 1 as the third tick mark. A less likely but valid strategy would be to find $\frac{4}{3}$ and $\frac{6}{3}$ and identify that 1 is half of $\frac{6}{3}$.

- a. Locate and label $\frac{1}{4}$ and $\frac{5}{4}$ on the number line. Explain your reasoning.



- b. Locate and label 1 on the number line. Explain your reasoning.



Solution

- a. First I divided into fourths and then I labeled the 5th tick mark.



- b. There are 2 thirds so I took half of that which is 1 third and then 3 of those makes 1.



Problem 11

Standards Alignments

Addressing 3.OA.D.9

Narrative

Students explain why an even number multiplied by 5 is a number whose last digit is 0. They may draw a picture to show that each pair of 5's makes a 10 or they may identify that when you keep adding 5's, the last digit switches between 0 and 5 because two groups of 5 makes one 10 and 0 ones. Or they may observe the pattern from the first few multiples and realize that an even multiple of 5 is a multiple of 10.

- Find the value of 5×2 , 5×4 , and 5×6 .
- Why is the last digit of an even number multiplied by 5 always 0?

Solution

- 10, 20, 30
- Sample response: The even numbers are 2, 4, 6 and so on. When I multiply these by 5 I get 10, 20, 30, always a number of tens. Any number of tens will have a last digit that's 0.

Problem 12

Standards Alignments

Addressing 3.NF.A.3.a, 3.NF.A.3.d

Narrative

Students compare fractions using $<$, $>$, and $=$. The comparisons include pairs of fractions with the same numerators, the same denominators, and one pair of equivalent fractions.

Write $<$, $=$, or $>$ in each blank to make the statement true. Explain your reasoning.

- $\frac{3}{6}$ _____ $\frac{3}{8}$
- $\frac{3}{6}$ _____ $\frac{1}{2}$
- $\frac{3}{6}$ _____ $\frac{2}{6}$

Solution

- a. $>$. Sample response: There are 3 pieces in both fractions but sixths are bigger than eighths.
- b. $=$. Sample response: I can divide each half into 3 equal pieces and that gives me $\frac{3}{6}$.
- c. $>$. Sample response: There is one more sixth in $\frac{3}{6}$ than in $\frac{2}{6}$.

Problem 13

Standards Alignments

Addressing 3.OA.B.5

Narrative

Students find products and quotients within 100. No explanation is requested so students may use a variety of techniques. For multiplication they may draw a diagram and use the distributive property, building on facts that they know. For the division problems, they may multiply up or they may also draw a diagram to help keep track of their calculations.

Find the value of each expression.

- a. 14×7
- b. 3×26
- c. 37×2
- d. $42 \div 3$
- e. $85 \div 5$
- f. $90 \div 9$

Solution

- a. 98
- b. 78
- c. 74
- d. 14
- e. 17
- f. 10

Problem 14

Standards Alignments

Addressing 3.MD.C.7.a, 3.OA.B.5, 3.OA.B.6, 3.OA.C.7

Narrative

Students find multiple pairs of numbers they can multiply to get a given number within 100. They may use an area model, especially for smaller numbers. Grids should be made available for these students. They may think of the problems in terms of division or multiplication (a missing factor equation). The instructions ask for two different ways to write each number as a product. Students who find two products quickly can be encouraged to find as many as they can as this will help them develop fluency with multiplication and division.

The numbers are divided into 3 groups. The first group are smaller numbers with factors that they may recognize or find with division or multiplication. The second group are larger but also have recognizable factors. The third group are numbers close to 100 and students may need to experiment to find factors.

This activity can be repeated as needed, with these numbers or others, and is intended to give the teacher an opportunity to observe students work and evaluate their fluency with multiplication and division within 100 (3.OA.C.7).

Find two ways to write each number as a product of two factors. Record each way as an equation.

- a.
 - i. 16
 - ii. 18
 - iii. 24
- b.
 - i. 30
 - ii. 36
 - iii. 60
- c.
 - i. 72
 - ii. 98
 - iii. 96

Solution

Sample responses:

- a.
 - i. $16 = 8 \times 2$, $16 = 4 \times 4$
 - ii. $18 = 3 \times 6$, $18 = 2 \times 9$
 - iii. $24 = 3 \times 8$, $24 = 4 \times 6$, $24 = 2 \times 12$

- b. i. $30 = 5 \times 6$, $30 = 3 \times 10$, $30 = 2 \times 15$
 ii. $36 = 6 \times 6$, $36 = 4 \times 9$, $36 = 3 \times 12$, $36 = 2 \times 18$
 iii. $60 = 6 \times 10$, $60 = 5 \times 12$, $60 = 4 \times 15$, $60 = 3 \times 20$, $60 = 2 \times 30$
- c. i. $72 = 8 \times 9$, $72 = 6 \times 12$, $72 = 4 \times 18$, $72 = 3 \times 24$, $72 = 2 \times 36$
 ii. $98 = 2 \times 49$, $98 = 7 \times 14$
 iii. $96 = 8 \times 12$, $96 = 6 \times 16$, $96 = 4 \times 24$, $96 = 3 \times 32$, $96 = 2 \times 48$

Problem 15

Standards Alignments

Addressing 3.MD.C.7, 3.NF.A.3, 3.OA.C.7

Narrative

Students choose plants for a garden. They first answer some specific questions that give them familiarity with the context and then design their own garden. There are many choices students may make for their gardens but the restrictions mean that they need to use one of the plants that only takes up a fraction of a foot of space. They will need to think carefully about where to place each plant so that it has enough distance on all sides.

Implicit in the problem is that students will use the grid to help place the plants. The teacher may wish to highlight this natural modeling assumption. For the plants that need a whole number of feet of space, this means that they will be located at the points where the gridlines meet. For the plants that take up less space they will still be horizontal and vertical rows and columns.

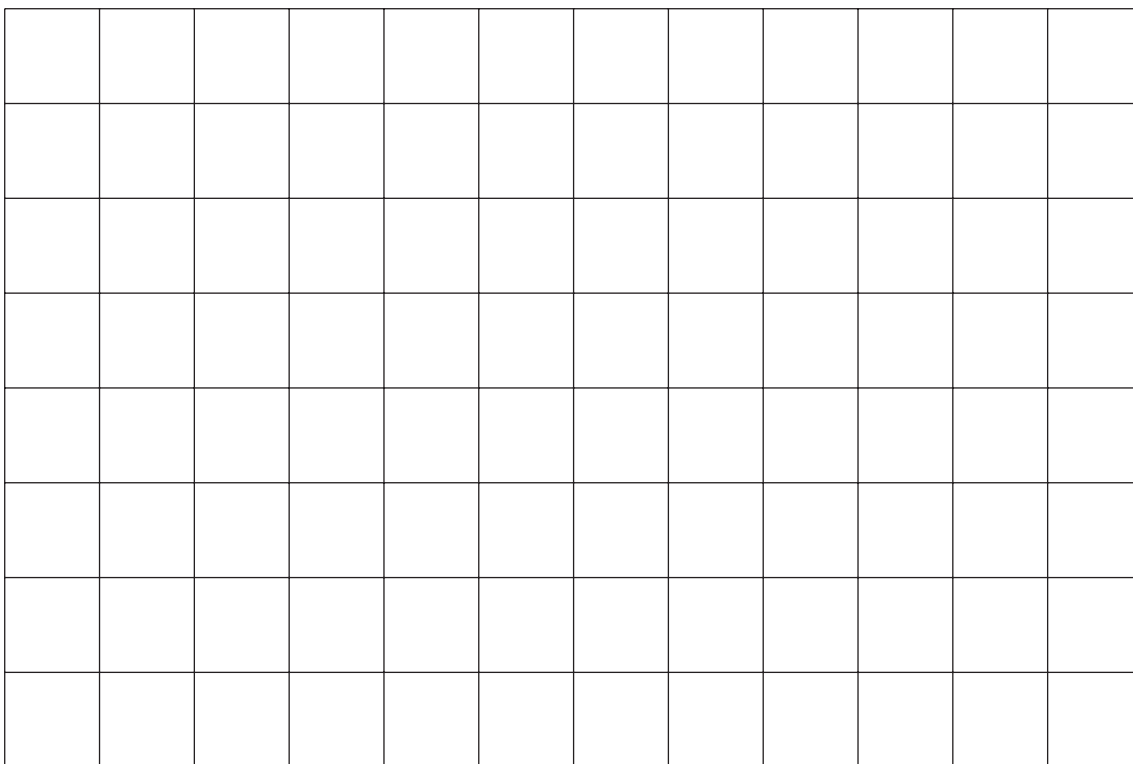
Lin's class is designing a garden at school. Their garden is a rectangle that is 8 feet by 12 feet. The table shows how far some different plants need on all sides to grow well.

plant	space on all sides
tomato	2 feet
lettuce	1 foot
onion	$\frac{1}{2}$ foot
carrot	$\frac{1}{6}$ foot
pumpkin	5 feet

- a. Which plant takes up the most amount of space? Which plant takes up the least amount of

space?

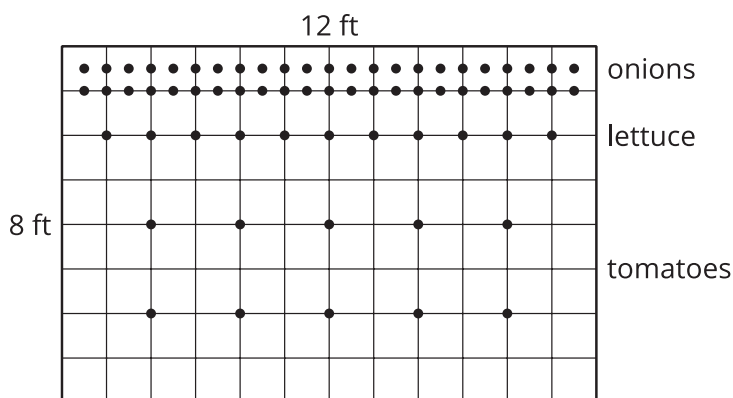
- Andre wants to plant pumpkins. Lin says that there is not enough room. Do you agree with Lin? Explain or show your reasoning.
- How many lettuce plants can the class fit in the garden? Explain or show your reasoning.
- Design your own garden. Make sure to:
 - choose at least 3 different kinds of plants
 - give each plant enough space to grow
 - fit as many of the plants as you can in the garden



Solution

- The pumpkins take up the most amount of space and the carrots take up the least.
- There is not enough room for a pumpkin plant. One side of the garden is only 8 feet so the plant can not be 5 feet from each side of the garden.
- 77, I can make 11 rows of 7 lettuce plants with each one 1 foot from its neighbors and each row 1 foot from the next row or from the garden boundary.
- Sample response: The picture shows the garden with two rows of tomatoes at the bottom. There are 5 plants in each row and they are all at least 2 feet from another plant and from the edge of the garden. Then above the tomatoes is 1 row of 11 lettuce plants, each 1 foot

apart. Finally, there are 2 rows of 23 onions, planted $\frac{1}{2}$ foot apart.



Problem 16

Standards Alignments

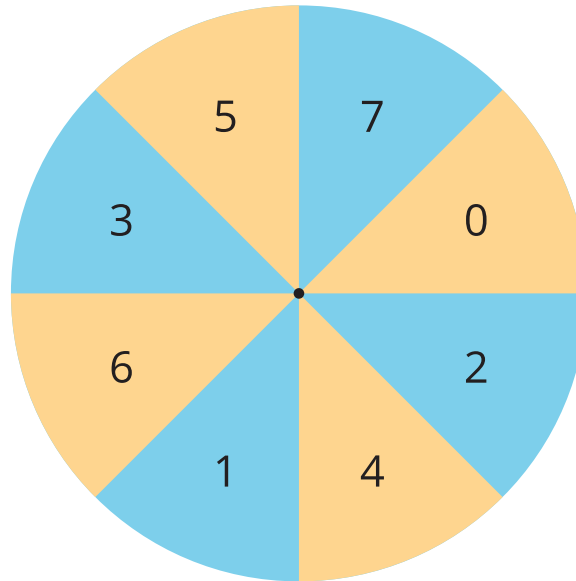
Addressing 3.NBT.A.2

Narrative

Students make sums and differences out of digits which they find using a spinner. This game is intended to be played multiple times as the digits that students spin each time will influence their strategy. The game gives an opportunity for the teacher to observe how students find the values of the sums and difference they decide upon. For students, the strategies that they use to determine which numbers to make out of their digits help to develop number sense as well as mental strategies to estimate the value of each sum or difference. These mental strategies are important to choose the best 3-digit numbers for each situation.

It might be beneficial to play one round with students to communicate the rules of the game before observing them play.

- Spin the spinner 6 times and record the digits.



Use them to write a pair of three-digit numbers that make the largest sum possible without going over 1,000. (You can place the digits you get in any order.)

_____ and _____

- b. Spin the spinner 6 more times and record the digits.

Use them to write a pair of three-digit numbers that make the smallest difference possible. (You can place the digits you get in any order.)

_____ and _____

Solution

- a. Sample response: My 6 numbers were 0, 5, 7, 3, 3, and 1. I wanted to use the 5 and 7 for hundreds but that was going to be too much. So I found $531 + 371$ and that's 902.
- b. Sample response: My 6 numbers were 6, 6, 2, 1, 5, 3. I wanted to use the two 6's for the hundreds and with the other digits I thought 25 and 31 are the closest so I found $631 - 625$ and that's 6.

Problem 17

Standards Alignments

Addressing 3.OA.A.2

Narrative

Students represent two situations with division equations. The situations are different but are represented by the same equation. Students then describe how the situations are the same and how they are different, giving them a chance to discuss the two different interpretations of division as “how many in each group” and as “how many groups.” For the first problem students can write the equation $35 \div ? = 7$ for one or both situations.

- a. Write a division equation for each situation. Use “?” for the unknown quantity.
 - i. There are 35 students in the room. They are seated at 7 tables, with the same number of students at each table. How many students are at each table?
 - ii. There are 35 students in the room. There are 7 students seated at each table. How many tables of students are there?
- b. How are the situations the same? How are they different?

Solution

- a. Sample responses:
 - i. $35 \div 7 = ?$
 - ii. $35 \div 7 = ?$
- b. Sample response: The solution in each case is 5 and the situations can be represented by the same equation. In the first situation, the unknown is the number of students at each table while in the second situation it is the number of tables.

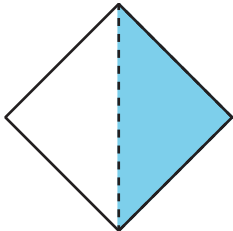
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Lesson
Cool Downs

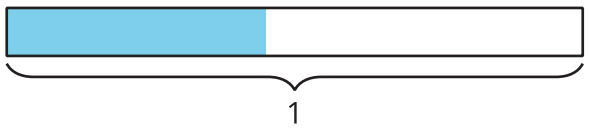
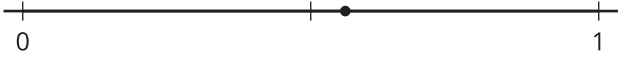
Lesson 1: Estimation Explorations with Fractions

Cool Down: Fraction Representations



Could the shaded part of the shape, the point on the number line, and the shaded part of the diagram all represent the same fraction?

Explain your reasoning.



Lesson 2: Create Your Own Number Line

Cool Down: Where Do I Go?

Locate and label each number on the number line. Explain your reasoning.

0 1 2 $\frac{1}{2}$ $\frac{3}{4}$ $\frac{8}{4}$ $\frac{9}{8}$



Lesson 3: Fractions Round Table

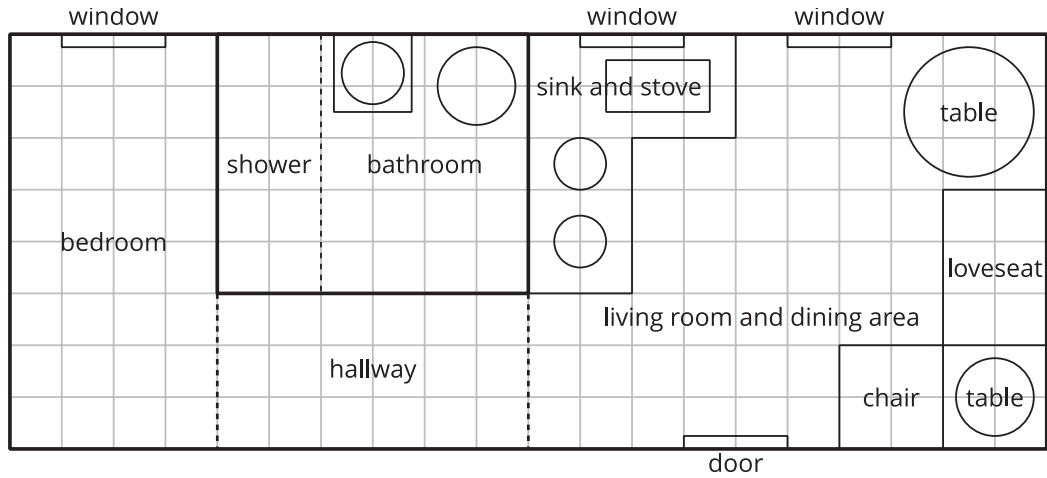
Cool Down: Round Table Reflection

1. Which statement did you feel most sure about? Why?

2. Which statement would you like to spend more time thinking about? Why?

Lesson 4: Tiny House: Design and Solve

Cool Down: Area and Perimeter



Each square on the diagram is 1 square foot.

1. What is the combined area of the hallway and bedroom? Explain or show your reasoning.
2. What is the perimeter of the living room and dining area? Explain or show your reasoning.

Lesson 5: Tiny House: Cost

Cool Down: Find the Cost?

What is the cost of 18 square feet of tile and kitchen plumbing? Explain your reasoning.

item	cost
flooring: tile wood carpet	\$5 for each square foot \$4 for each square foot \$2 for each square foot
paint	\$25 for each gallon (up to 400 square feet)
bathroom plumbing	\$379
toilet	\$138
bathroom sink and faucet	\$112
kitchen plumbing	\$253
kitchen sink and faucet	\$227
cabinets	\$90 for each foot
shelving	\$20 for each foot
dishes, cups, forks, spoons, etc.	Prices vary. Research or estimate cost.
dishwasher	\$389
portable stove	\$174
furniture	Prices vary. Research or estimate cost.
compact washer- dryer combination	\$225
bed	\$189

Lesson 6: Survey the Class, Survey the School

Cool Down: Reflect on Collecting Data

Reflect on your experience surveying others and collecting data.

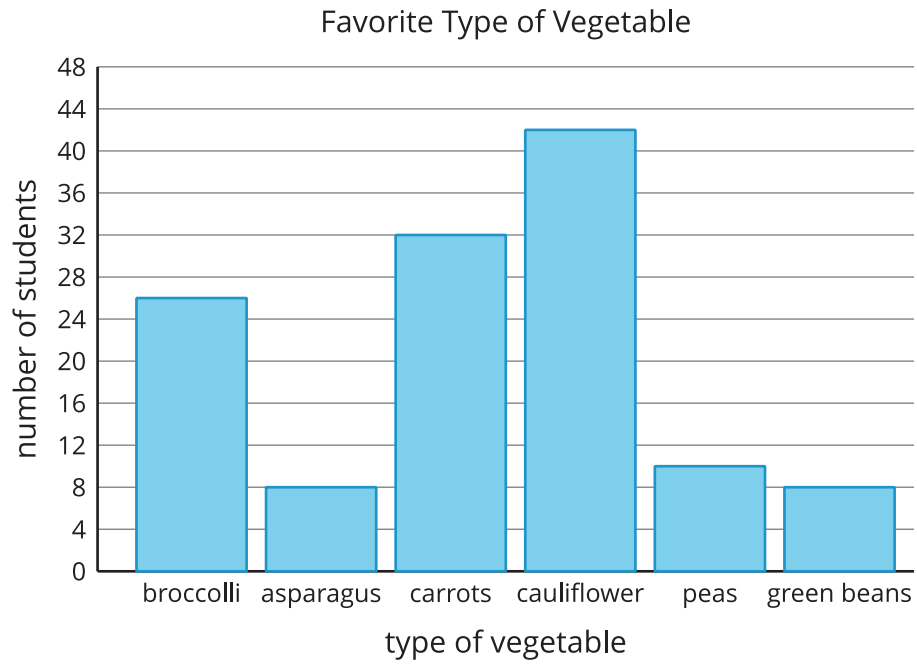
1. What went well? Why do you think it went well?

2. What was challenging or didn't go as well? What might be the reason?

Lesson 7: Graph and Answer

Cool Down: Graph Question

How many more students liked cauliflower than asparagus or peas? Explain your reasoning.



Lesson 8: Multiplication Center Day

Cool Down: Multiplication Reflection

What progress have you made this year with multiplying within 100?

What do you still need to work on?

Lesson 9: Multiplication Game Day

Cool Down: Reflect on Multiplication

What have you learned about multiplication this year?

Lesson 10: Multiplication and Division

Cool Down: Relate Multiplication to Division

Give an example of how multiplication and division are related. Explain or show your reasoning.

Lesson 11: Division Game Day

Cool Down: Reflect on Division Games

1. Which division strategy did you find most helpful as you played division games today?

2. Which division facts do you still need to work on?

Lesson 12: Notice and Wonder

Cool Down: Notice and Wonder Reflection

Respond to one or both of these prompts.

- 1. Describe something you really understand well about equal groups after today's lesson.

- 2. Describe something that was confusing or challenging.

Lesson 13: How Many Do You See?

Cool Down: How Many Do You See Reflection

Describe a time from class today when you heard a classmate explain the dots in a different way than you saw them.

Lesson 14: Estimation Exploration

Cool Down: Estimation Exploration Reflection

Describe a time when you were able to explain your ideas to other people in your class.

Lesson 15: Number Talk

Cool Down: Number Talk Reflection

As mathematicians, we use patterns and things we see happening over and over again to help us reason about new problems. Describe a time today where you did that.

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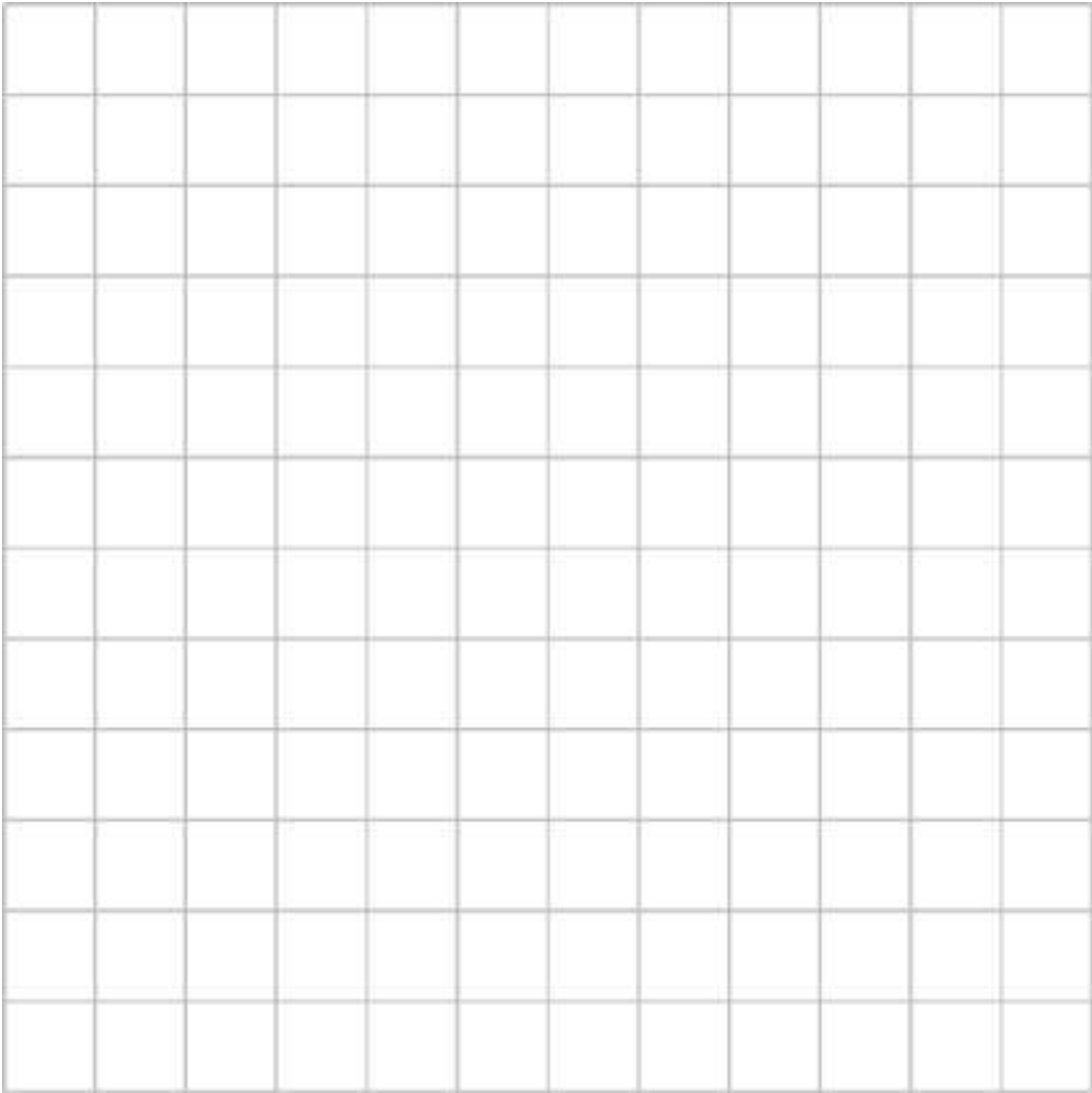


Instructional
Masters

Instructional Masters for Putting It All Together

address	title	students per copy	written on?	requires cutting?	card stock recommended?	color paper recommended?
Activity Grade3.8.7.1	Draw Scaled Graphs	1	yes	no	no	no
Activity Grade3.8.9.1	Rectangle Rumble Stage 3 Grid	2	yes	no	no	no
Activity Grade3.8.10.1	Find the Match	24	no	yes	yes	no
Activity Grade3.8.8.1	Card Sort: Multiplication Recording Sheet	2	yes	no	no	no
Activity Grade3.8.6.2	Survey a Large Group	4	yes	no	no	no
Activity Grade3.8.8.2	Compare Stage 3 Multiplication Cards	2	no	yes	no	no
Activity Grade3.8.8.1	Card Sort: Multiplication	2	no	yes	yes	no
Activity Grade3.8.9.1	Rectangle Rumble Stage 3 Spinners	2	no	no	no	no
Activity Grade3.8.9.1	Number Cards (0-10)	2	no	yes	yes	no
Activity Grade3.8.9.1	How Close? Stage 5 Recording Sheet	1	yes	no	no	no

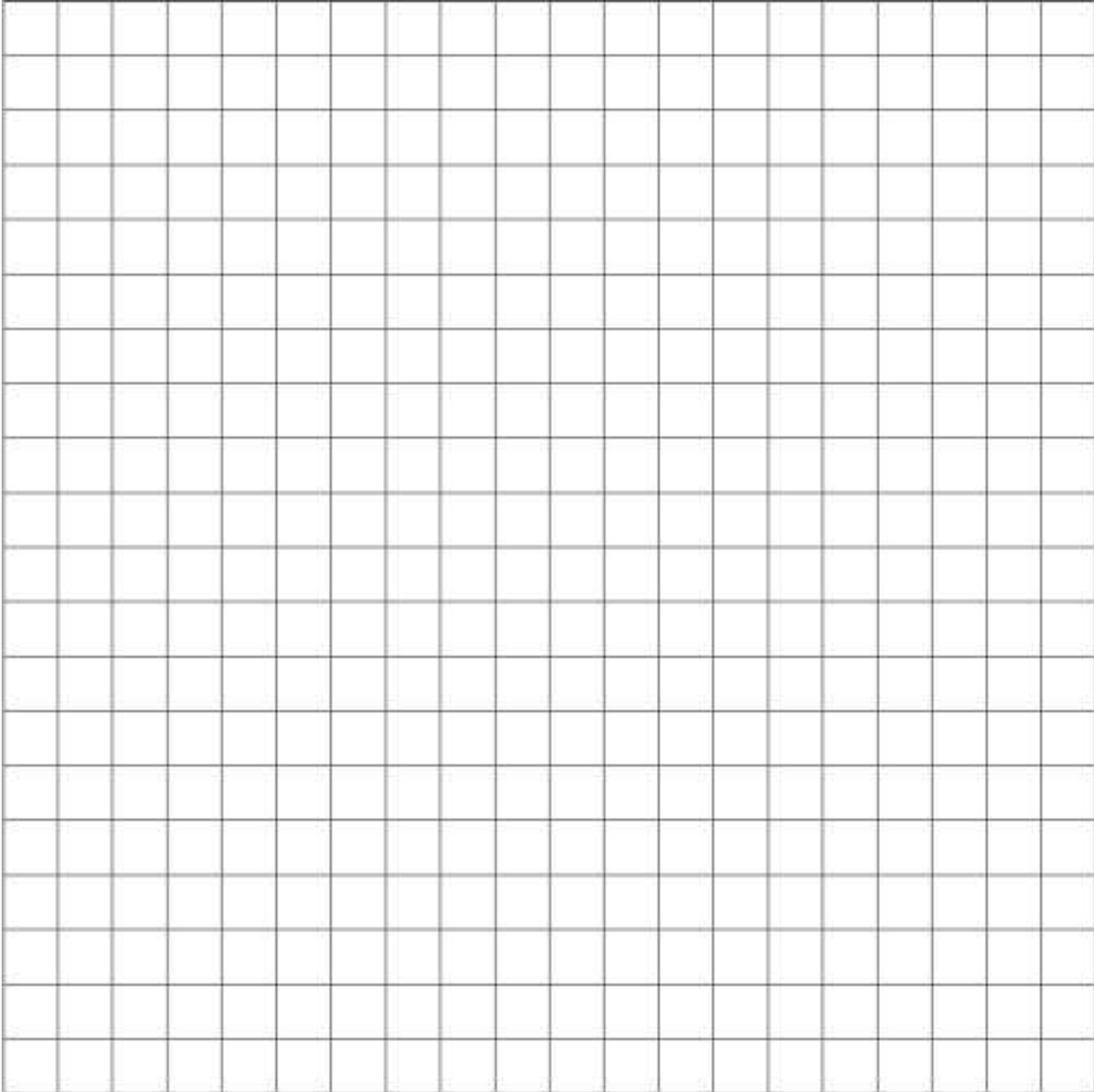
Draw Scaled Graphs



Rectangle Rumble Stage 3 Grid

Directions:

- Choose a color for your rectangles different from your partner.
- On your turn:
 - Spin each spinner.
 - Shade in a rectangular area to represent the product of the two numbers.
- Take turns until the grid can't fit any more rectangles.
- Each partner adds up their total area, the partner with the greatest total square units wins.

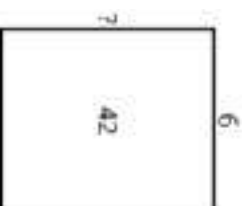


Find the Match

Find the Match
A

$$4 \times ? = 28$$

Find the Match
B



Find the Match
C



Find the Match
D

$$64 \div 8 = ?$$

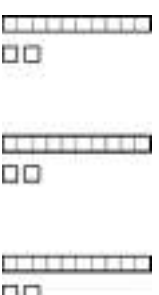
Find the Match
E

$$56 \div 7 = ?$$

Find the Match
F

$$21 \div 3 = ?$$

Find the Match
G



Find the Match
H

$$54 \div 6 = ?$$

Find the Match
I

$$96 \div 24 = ?$$

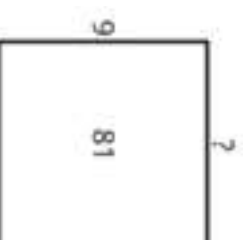
Find the Match
J

$$99 \div 9 = ?$$

Find the Match
K

$$8 \times ? = 64$$

Find the Match
L



Find the Match

Find the Match
M

$$48 \div 3 = ?$$

Find the Match
N

$$36 \div 3 = ?$$

Find the Match
O



Find the Match
P

$$42 \div 6 = ?$$

Find the Match
Q

$$81 \div 9 = ?$$

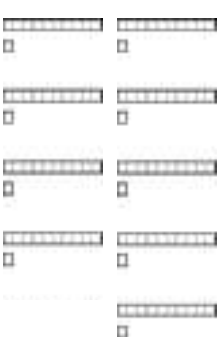
Find the Match
R



Find the Match
S

$$28 \div 4 = ?$$

Find the Match
T



Find the Match
U



Find the Match
V

$$? \times 7 = 56$$

Find the Match
W

$$72 \div 4 = ?$$

Find the Match
X



Card Sort: Multiplication Recording Sheet

- Sort your products into one of these columns:
 - know it right away
 - can find it quickly
 - don't know it yet
- Review your strategies and practice the products that are in the "don't know it yet" column.

know it right away	can find it quickly	don't know it yet

Compare Stage 3 Multiplication Cards

Compare Stage 3

$$12 \times 9$$

Compare Stage 3

$$12 \times 7$$

Compare Stage 3

$$13 \times 7$$

Compare Stage 3

$$14 \times 6$$

Compare Stage 3

$$15 \times 6$$

Compare Stage 3

$$10 \times 20$$

Compare Stage 3

$$21 \times 4$$

Compare Stage 3

$$19 \times 5$$

Compare Stage 3 Multiplication Cards

Compare Stage 3

$$18 \times 5$$

Compare Stage 3

$$17 \times 4$$

Compare Stage 3

$$16 \times 6$$

Compare Stage 3

$$14 \times 7$$

Compare Stage 3

$$31 \times 3$$

Compare Stage 3

$$20 \times 4$$

Compare Stage 3

$$8 \times 9$$

Compare Stage 3

$$9 \times 7$$

Compare Stage 3 Multiplication Cards

Compare Stage 3

$$12 \times 5$$

Compare Stage 3

$$13 \times 4$$

Compare Stage 3

$$15 \times 3$$

Compare Stage 3

$$9 \times 5$$

Card Sort: Multiplication

Card Sort: Multiplication

$$1 \times 10$$

Card Sort: Multiplication

$$2 \times 10$$

Card Sort: Multiplication

$$3 \times 10$$

Card Sort: Multiplication

$$4 \times 10$$

Card Sort: Multiplication

$$5 \times 10$$

Card Sort: Multiplication

$$6 \times 10$$

Card Sort: Multiplication

$$7 \times 10$$

Card Sort: Multiplication

$$8 \times 10$$

Card Sort: Multiplication

Card Sort: Multiplication

$$9 \times 10$$

Card Sort: Multiplication

$$10 \times 10$$

Card Sort: Multiplication

$$1 \times 1$$

Card Sort: Multiplication

$$2 \times 1$$

Card Sort: Multiplication

$$3 \times 1$$

Card Sort: Multiplication

$$4 \times 1$$

Card Sort: Multiplication

$$5 \times 1$$

Card Sort: Multiplication

$$6 \times 1$$

Card Sort: Multiplication

Card Sort: Multiplication

$$7 \times 1$$

Card Sort: Multiplication

$$8 \times 1$$

Card Sort: Multiplication

$$9 \times 1$$

Card Sort: Multiplication

$$10 \times 1$$

Card Sort: Multiplication

$$1 \times 5$$

Card Sort: Multiplication

$$2 \times 5$$

Card Sort: Multiplication

$$3 \times 5$$

Card Sort: Multiplication

$$4 \times 5$$

Card Sort: Multiplication

Card Sort: Multiplication

$$5 \times 5$$

Card Sort: Multiplication

$$6 \times 5$$

Card Sort: Multiplication

$$7 \times 5$$

Card Sort: Multiplication

$$8 \times 5$$

Card Sort: Multiplication

$$9 \times 5$$

Card Sort: Multiplication

$$10 \times 5$$

Card Sort: Multiplication

$$1 \times 2$$

Card Sort: Multiplication

$$2 \times 2$$

Card Sort: Multiplication

Card Sort: Multiplication

$$3 \times 2$$

Card Sort: Multiplication

$$4 \times 2$$

Card Sort: Multiplication

$$5 \times 2$$

Card Sort: Multiplication

$$6 \times 2$$

Card Sort: Multiplication

$$7 \times 2$$

Card Sort: Multiplication

$$8 \times 2$$

Card Sort: Multiplication

$$9 \times 2$$

Card Sort: Multiplication

$$10 \times 2$$

Card Sort: Multiplication

Card Sort: Multiplication

$$1 \times 3$$

Card Sort: Multiplication

$$2 \times 3$$

Card Sort: Multiplication

$$3 \times 3$$

Card Sort: Multiplication

$$4 \times 3$$

Card Sort: Multiplication

$$5 \times 3$$

Card Sort: Multiplication

$$6 \times 3$$

Card Sort: Multiplication

$$7 \times 3$$

Card Sort: Multiplication

$$8 \times 3$$

Card Sort: Multiplication

Card Sort: Multiplication

$$9 \times 3$$

Card Sort: Multiplication

$$10 \times 3$$

Card Sort: Multiplication

$$1 \times 4$$

Card Sort: Multiplication

$$2 \times 4$$

Card Sort: Multiplication

$$3 \times 4$$

Card Sort: Multiplication

$$4 \times 4$$

Card Sort: Multiplication

$$5 \times 4$$

Card Sort: Multiplication

$$6 \times 4$$

Card Sort: Multiplication

Card Sort: Multiplication

$$7 \times 4$$

Card Sort: Multiplication

$$8 \times 4$$

Card Sort: Multiplication

$$9 \times 4$$

Card Sort: Multiplication

$$10 \times 4$$

Card Sort: Multiplication

$$1 \times 6$$

Card Sort: Multiplication

$$2 \times 6$$

Card Sort: Multiplication

$$3 \times 6$$

Card Sort: Multiplication

$$4 \times 6$$

Card Sort: Multiplication

Card Sort: Multiplication

$$5 \times 6$$

Card Sort: Multiplication

$$6 \times 6$$

Card Sort: Multiplication

$$7 \times 6$$

Card Sort: Multiplication

$$8 \times 6$$

Card Sort: Multiplication

$$9 \times 6$$

Card Sort: Multiplication

$$10 \times 6$$

Card Sort: Multiplication

$$1 \times 8$$

Card Sort: Multiplication

$$2 \times 8$$

Card Sort: Multiplication

Card Sort: Multiplication

$$3 \times 8$$

Card Sort: Multiplication

$$4 \times 8$$

Card Sort: Multiplication

$$5 \times 8$$

Card Sort: Multiplication

$$6 \times 8$$

Card Sort: Multiplication

$$7 \times 8$$

Card Sort: Multiplication

$$8 \times 8$$

Card Sort: Multiplication

$$9 \times 8$$

Card Sort: Multiplication

$$10 \times 8$$

Card Sort: Multiplication

Card Sort: Multiplication

$$1 \times 7$$

Card Sort: Multiplication

$$2 \times 7$$

Card Sort: Multiplication

$$3 \times 7$$

Card Sort: Multiplication

$$4 \times 7$$

Card Sort: Multiplication

$$5 \times 7$$

Card Sort: Multiplication

$$6 \times 7$$

Card Sort: Multiplication

$$7 \times 7$$

Card Sort: Multiplication

$$8 \times 7$$

Card Sort: Multiplication

Card Sort: Multiplication

$$9 \times 7$$

Card Sort: Multiplication

$$10 \times 7$$

Card Sort: Multiplication

$$1 \times 9$$

Card Sort: Multiplication

$$2 \times 9$$

Card Sort: Multiplication

$$3 \times 9$$

Card Sort: Multiplication

$$4 \times 9$$

Card Sort: Multiplication

$$5 \times 9$$

Card Sort: Multiplication

$$6 \times 9$$

Card Sort: Multiplication

Card Sort: Multiplication

$$7 \times 9$$

Card Sort: Multiplication

$$8 \times 9$$

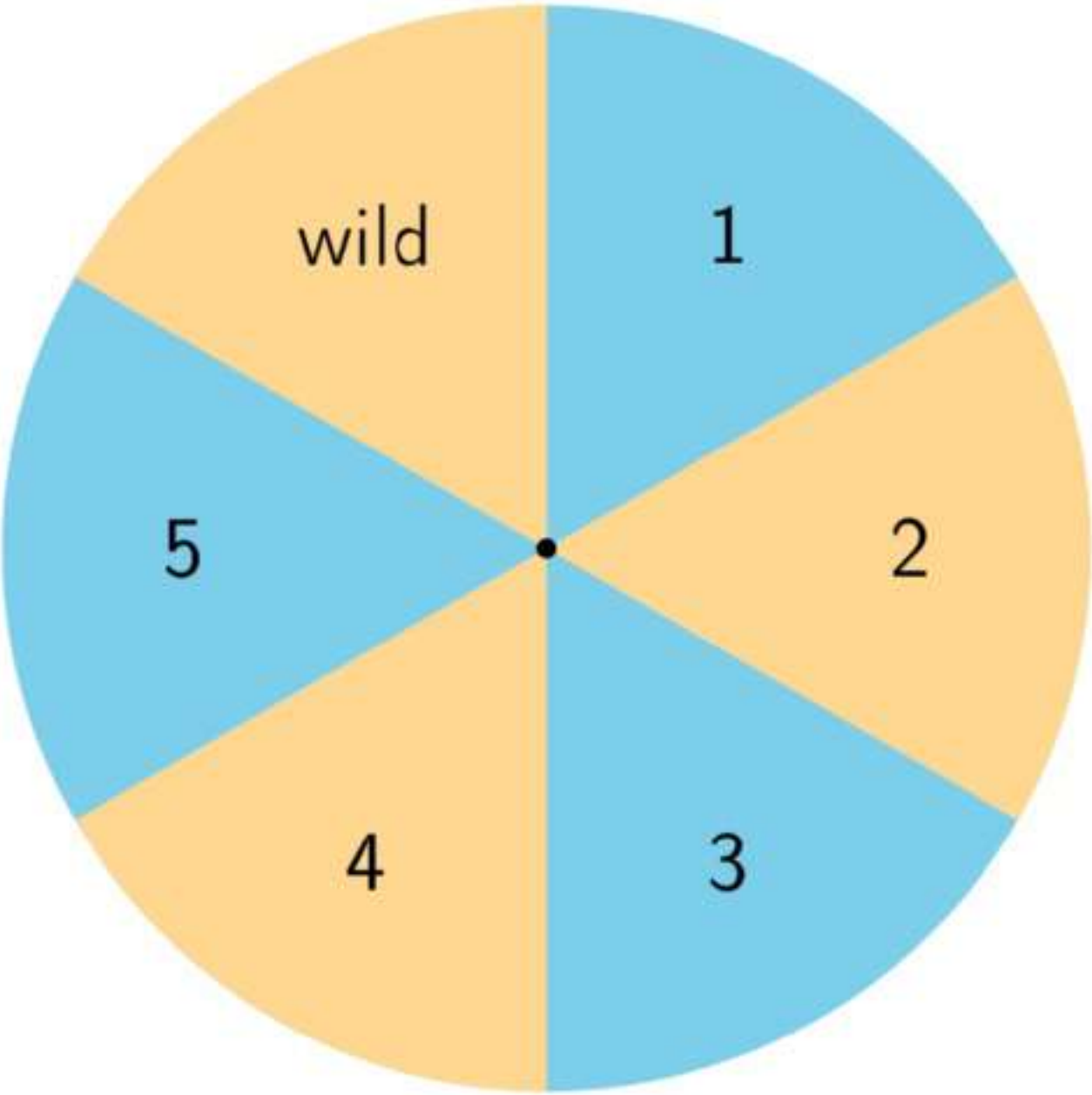
Card Sort: Multiplication

$$9 \times 9$$

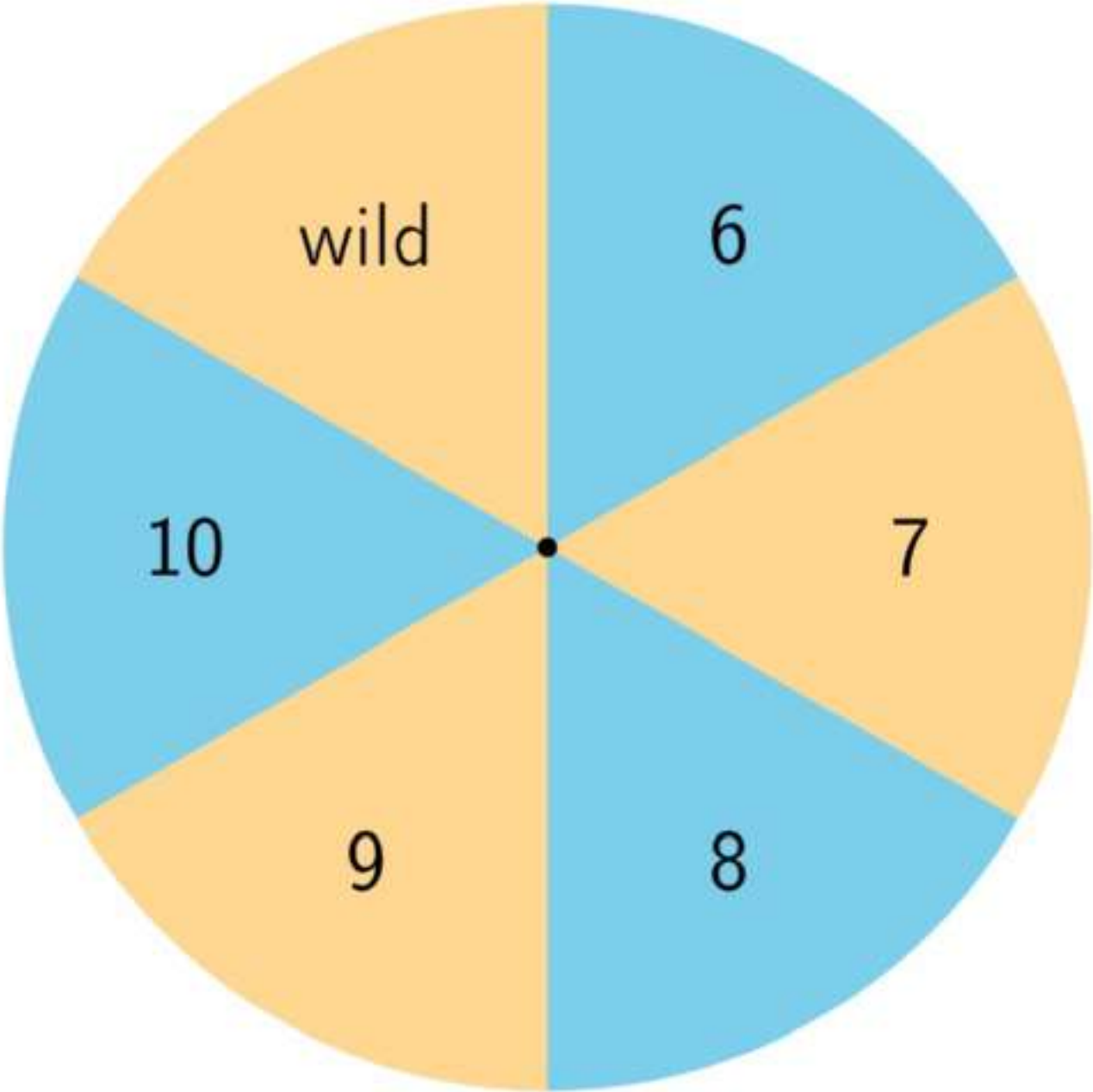
Card Sort: Multiplication

$$10 \times 9$$

Rectangle Rumble Stage 3 Spinners



Rectangle Rumble Stage 3 Spinners



Number Cards (0-10)

1

2

3

4

5

6

Number Cards (0-10)

7

8

9

1

2

3

Number Cards (0-10)

4

5

6

7

8

9

Number Cards (0-10)

0

0

10

10

How Close? Stage 5 Recording Sheet

Directions:

- Each partner:
 - Take 4 cards.
 - Choose 2–3 cards to multiply.
 - Write an equation to show the product of the numbers you chose.
 - Your score for each round is the difference between your product and 100.
- Take new cards so that you have 4 cards to start the next round.
- At the end of the game, add your score for each round. The player with the lowest score wins.

round	multiplication equation	points for the round
1		
2		
3		
4		
5		
6		
7		
8		

Credits

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