

Putting It All Together

Grade 3: Unit 8

Standards addressed: 3.NF.A.1, 3.NF.A.2, 3.NF.A.3, 3.G.A.1, 3.MD.B.3, 3.MD.C.7, 3.MD.D.8, 3.NBT.A.2, 3.OA.D.8, 3.OA.A.3, 3.OA.B.6, 3.OA.C.7, 3.MD.B.4, 3.OA.A.1

Unit 8 Progression Overview

Putting It All Together

Section A Lessons 1-3

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

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



Section B Lessons 4-7

3.GA.1, 3.MDB.3, 3.MD.C.7.b, 3.MD.C.7.d, 3.MD.D.8,
3.NBT.A.2, 3.OA.D.8

- Apply concepts of measurement and data to solve problems.



Section C Lessons 8-11

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

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



Section D Lessons 12-15

3.MD.B.4, 3.NBT.A.2, 3.OA.A.1

- Fluently add within 1,000 using algorithms based on place value and properties of operations.
- Fluently subtract within 1,000 using algorithms based on place value, properties of operations and the relationship between addition and subtraction.
- Understand multiplication in terms of equal groups.

Unit 8 Quick Links



L1

L2

L3

L4

L5



L6

L7

L8

L9

L10



L11

L12

L13

L14

L15



Estimation Explorations with Fractions



Let's explore estimations with fractions.

Warm
up

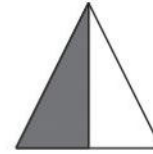
Which One Doesn't Belong: Fractions

Which one doesn't
belong?

A



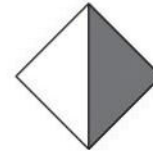
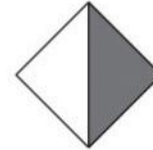
B



C



D



Estimation Exploration: Area

What fraction of the square is shaded?



Record an estimate that is:

Too low	About right	Too high

Estimation Exploration: Fraction Strip

Activity
#2

What fraction of the strip
is shaded?



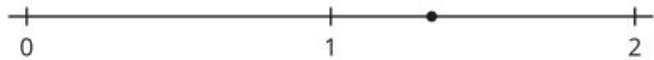
Record an estimate that is:

Too low	About right	Too high

Estimation Exploration: Number Line

Activity
#3

What is the location of
the point on the number
line?

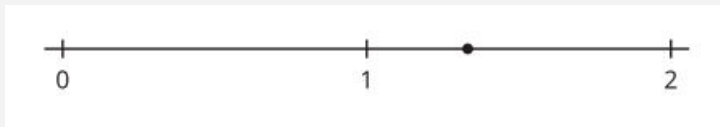


Record an estimate that is:

Too low	About right	Too high

Lesson Synthesis

Today we practiced our estimation skills with fractions. We looked back at several ways to represent fractions. When you were estimating the location of this point on the number line, what were some things you knew right away that would help you.



What did you have
to work a little
harder to think
about?

Create Your Own Number Line



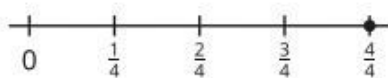
Let's create number lines.

Warm
up

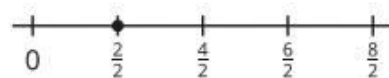
Which One Doesn't Belong: Fractions on Number Lines

Which one doesn't
belong?

A



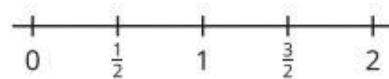
B



C



D



Create Your Own Number Line

Create a long number line on the floor. Locate and label each fraction on the number line.

Be prepared to explain your reasoning.

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

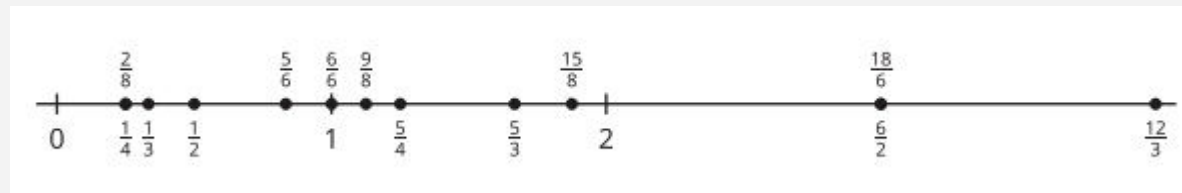
Make a Statement

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

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

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

Lesson Synthesis



This number line shows the location of $\frac{5}{4}$ and $\frac{5}{3}$. What is a fraction that would be in between those 2 fractions? How do you know?



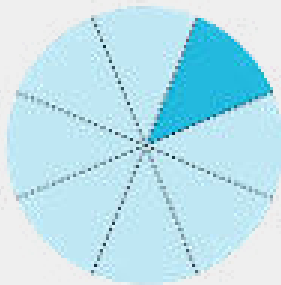
Fractions Round Table



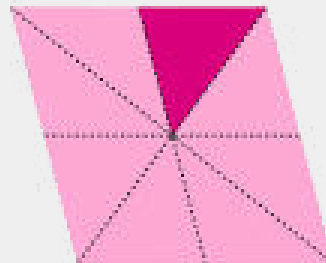
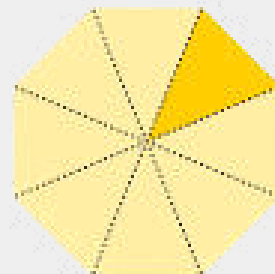
Let's discuss fractions.

What Do You Know About... ?

What do you know
about....



$$\frac{1}{8}$$



Fractions Round Table

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.

statement	round 1	round 2	round 3
The denominator tells us the number of parts.	agree	agree	agree
	disagree	disagree	disagree
	unsure	unsure	unsure
Whole numbers are fractions.	agree	agree	agree
	disagree	disagree	disagree
	unsure	unsure	unsure
Fractions are whole numbers.	agree	agree	agree
	disagree	disagree	disagree
	unsure	unsure	unsure

Fractions Round Table

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.

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The denominator tells us the number of parts.	agree	agree	agree
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	unsure	unsure	unsure
Whole numbers are fractions.	agree	agree	agree
	disagree	disagree	disagree
	unsure	unsure	unsure
Fractions are whole numbers.	agree	agree	agree
	disagree	disagree	disagree
	unsure	unsure	unsure
One half is always greater than one third.	agree	agree	agree
	disagree	disagree	disagree
	unsure	unsure	unsure
Fractions can be used to describe a length.	agree	agree	agree
	disagree	disagree	disagree
	unsure	unsure	unsure

Which statement did your group have the most discussion about and why?



Tiny House: Design and Solve



Let's design a tiny house.

Notice and Wonder: Tiny Houses

Warm
up

What do you notice?



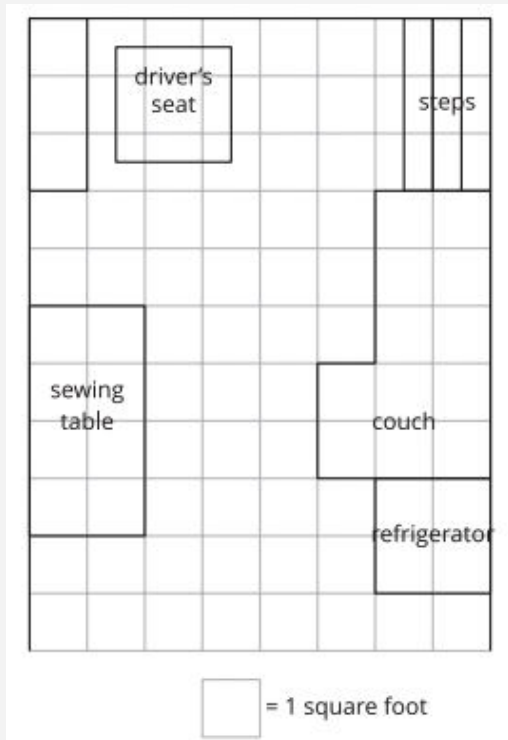
What do you wonder?

Design Your Tiny House



The inside of a converted school bus.

A gridded drawing of the school bus layout.



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

shipping container



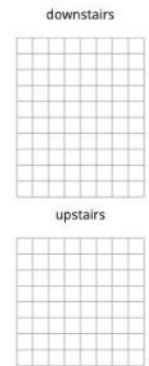
8 ft x 20 ft



cabin



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



school bus



7 ft x 14 ft

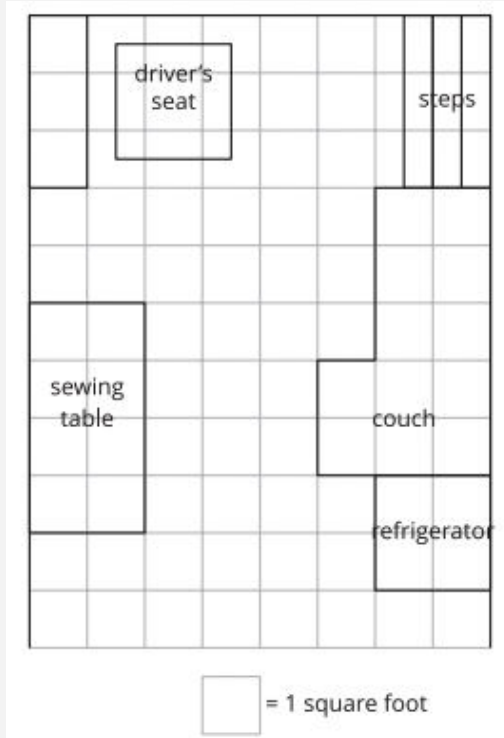


Design Your Tiny House



The inside of a converted school bus.

A gridded drawing of the school bus layout.



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

Ask, Revise, and Answer

1. Write:

a. one question about your tiny house design that involves area

b. one question about your tiny house design that involves perimeter

2. Work with a partner to answer your own questions with your tiny house design. Make any revisions to your questions if needed.

3. Answer your new partner's questions about their tiny house design.

What was something you noticed and something you wondered about the tiny house designs you saw today?



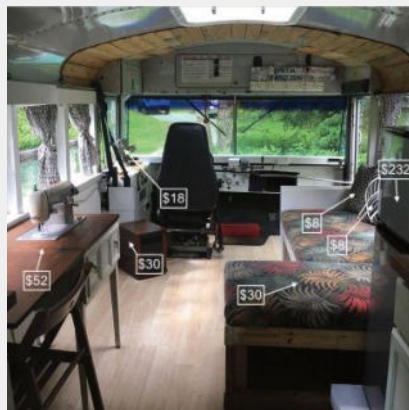
Tiny House: Cost



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

Estimation Exploration: Cost of a Room

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



Record an estimate that is:

Too low	About right	Too high

What's the Cost?

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 per square foot
wood	\$4 per square foot
laminate	\$2 per square foot
carpet	\$2 per square foot
paint	\$25 per gallon (up to 400 square feet)
bathroom plumbing	\$400
toilet	\$150
bathroom sink and faucet	\$100
kitchen plumbing	\$250
kitchen sink and faucet	\$200
cabinets	\$100 per foot
shelving	\$20 per foot
dishes, cups, forks, spoons, etc.	Prices vary. Research or estimate cost.
dishwasher	\$400
propane stove	\$200
furniture	Prices vary. Research or estimate cost.
compact washer/dryer combination	\$200
bed	\$200

Today, you calculated the cost of finishing one of the spaces in your tiny house. What were some of the choices you needed to make as you finished a space in your tiny house?



Survey the Class, Survey the School

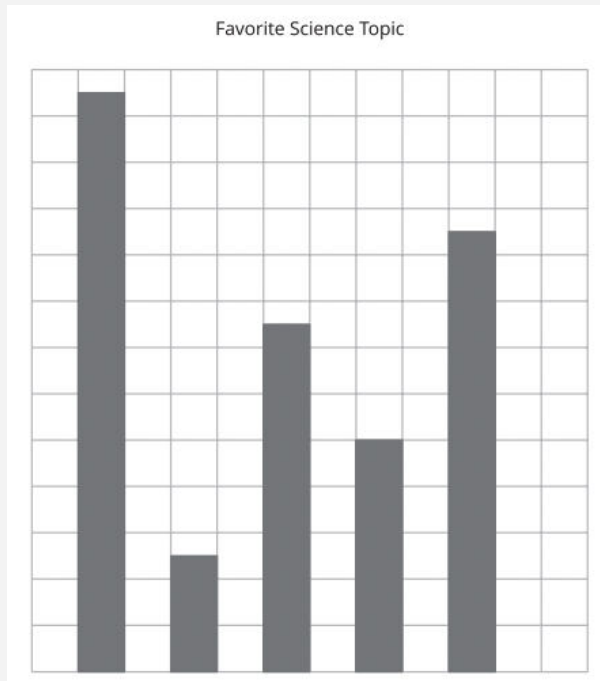


Let's survey a large group.

Notice and Wonder: Survey

Warm
up

What do you notice?



What do you wonder?

Create a Survey

1. Create a survey that you'll use with a large group of students.

It should include:

- a. a question
- b. up to 6 answer choices



Activity #2

[illegible]

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?



Graph and Answer

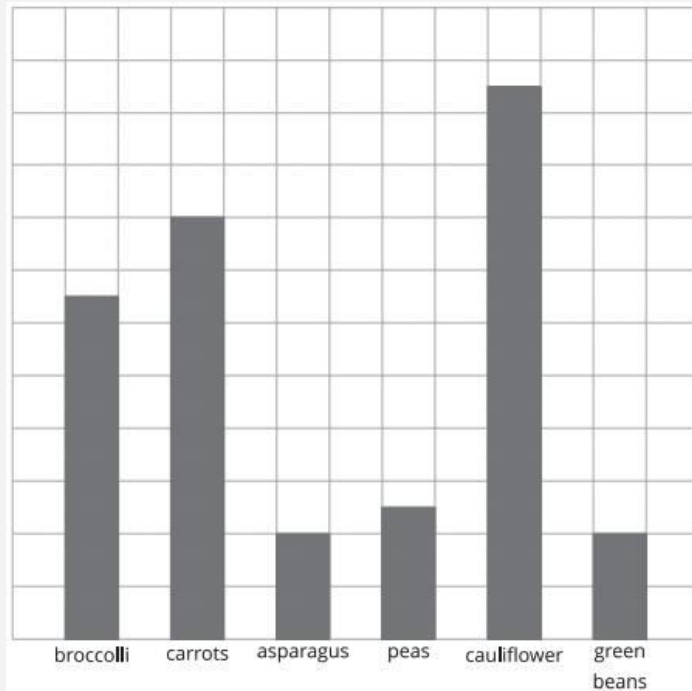


Let's represent our data on scaled graphs and answer questions about the data.

Notice and Wonder: Graph

Warm
up

What do you notice?

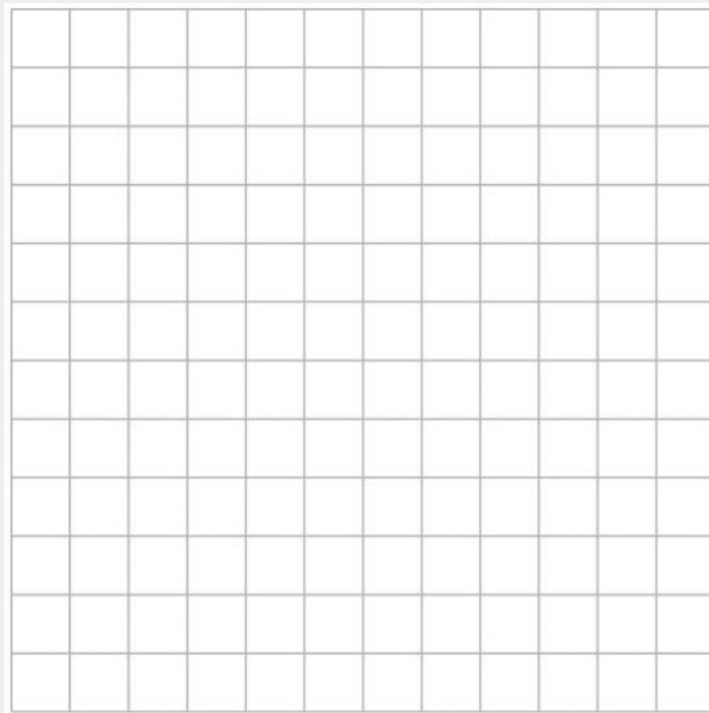


What do you wonder?

Draw Scaled Graphs

Activity
#1

Represent the data from your survey in a scaled picture graph or scaled bar graph.



Ask and Answer Questions

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

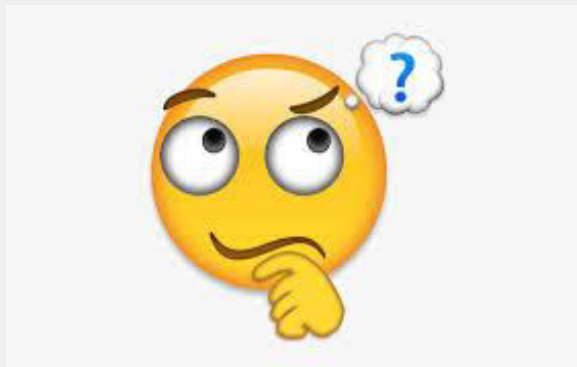
- a. How many students like _____ ?
- b. How many more students like __ than __?
- c. How many fewer students liked __ than __?
- d. How many more students liked __ or __ than __ ?
- e. How many fewer students liked __ or __ than __ ?

2. Use your partner's graph to answer the questions. Show or explain your reasoning.

The answers to the questions from _____'s graph:

- a.
- b.
- c.
- d.
- e.

Today we represented the data you collected with your surveys on scaled picture graphs and scaled bar graphs. How was a scale other than 1 helpful in making your graph?



Multiplication Center Day



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

Number Talk: Products

Find the value of each
expression mentally.

$$2 \times 4$$

Number Talk: Products

Find the value of each
expression mentally.

$$5 \times 4$$

Number Talk: Products

Find the value of each
expression mentally.

$$10 \times 4$$

Number Talk: Products

Find the value of each
expression mentally.

$$17 \times 4$$

Multiplication Fact Sort

Activity
#1

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

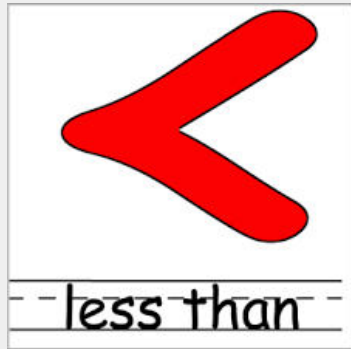
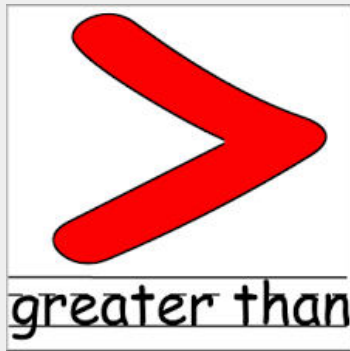
Multiplication expressions I'm going to practice:

Play Compare Expressions

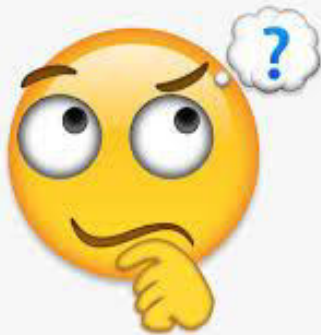
Activity
#2

Play Compare Expressions with 2 players.

1. Shuffle the cards and place them face down.
2. Player 1 draws two cards and determines which of the two has the greatest value.
3. Player 2 gives feedback. If correct, player 1 keeps the cards otherwise the player must return the cards.
4. Take turns and continue steps 2-3 until no cards are left.
5. The player with the most cards wins.



What did you learn about your progress with multiplication fluency during today's lesson?



There will be a few more lessons that focus on developing fluency with multiplication and division. Keep what you learned today in mind because you'll have the chance to choose some of the multiplication games that we'll play over the next few lessons.

Multiplication Games



Let's play some multiplication games.

Number Talk: Multiplying Large Factors

Find the value of each
expression mentally.

$$4 \times 10$$

Warm
up

Number Talk: Multiplying Large Factors

Find the value of each
expression mentally.

$$4 \times 20$$

Number Talk: Multiplying Large Factors

Find the value of each
expression mentally.

$$4 \times 21$$

Warm
up

Number Talk: Multiplying Large Factors

Find the value of each
expression mentally.

$$4 \times 24$$

Choice Time: Multiplication Games

Choose a center to practice multiplying within 100.

- Compare Expressions
- Decide which expression has the greatest value.
- Close to 100
- Choose 2 numbers to multiply to get a product closest to 100.
- Rectangle Rumble
- Multiply numbers to create rectangular areas to fill a grid with the most squares.

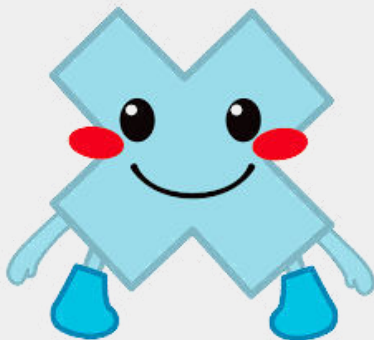
Create a Multiplication Game

Activity
#2

Use the materials your teacher provides to create a multiplication game.

Write out the directions to your game.

Be prepared to explain your game.



Today, we played some multiplication games
and designed a multiplication game.
What did you have to think about when you
designed your games?



Multiplication and Division



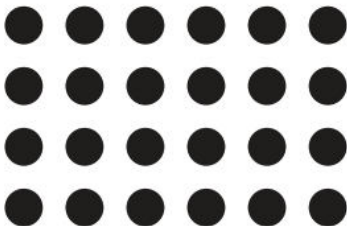
Let's represent equal groups and write equal groups situations.

Warm
up

Which One Doesn't Belong: Multiplication and Division

Which one doesn't
belong?

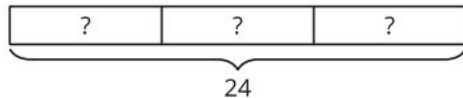
A



B



C



D

$$24 \div 6$$

Find the Match

Activity
#1

1. Your teacher will give you a card. Find the student with the matching card.
Be prepared to explain your reasoning.
2. Work with your partner to create a poster that includes:
 - a. Your cards.
 - b. A diagram that your division equation could represent.
 - c. A situation that your division equation could represent.

Show your thinking. Organize it so it can be followed by others.

Find the Match Gallery Walk

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

1. Describe a representation you saw that was different than one of the representations you used for your poster.
2. Describe how one of the posters showed the relationship between multiplication and division.



Lesson Synthesis

How were we able to see the relationship between multiplication and division in some of the posters?



What were some aspects of the posters you saw that helped make the math your classmates used clear for you?

Division Game Day



Let's play division games.

Number Talk: Divide 48

Find the value of each
expression mentally.

$$48 \div 2$$

Number Talk: Divide 48

Find the value of each
expression mentally.

$$48 \div 3$$

Number Talk: Divide 48

Find the value of each
expression mentally.

$$48 \div 4$$

Number Talk: Divide 48

Find the value of each
expression mentally.

$$48 \div 6$$

Number Talk: Multiply to Divide

Find the value of each
expression mentally.

$$10 \times 5$$

Play Race to 1

These are 2 versions of the game Race to 1.

The directions are the same for both versions.
Use these detailed directions to play the game
with a partner.

Choose a version of the center to play that will
be fun, but challenging.

Version 1:

Divide 12, 16, 18, and 24
by 1, 2, 3, 4, and 6.

Version 2:

Divide 24, 36, 48, and 72
by 1, 2, 3, 4, and 6

Version 1 and Version 2

1. Roll the number cube.
2. Choose a number to divide by the number you rolled. (If you roll a 5 roll again.)
3. Write the division expression and the quotient in the correct column.
4. Take turns rolling the number cube and dividing.
5. First player to 1 wins

Activity #1

You rolled the number 2.

You chose 16.

start number	16
division expression	$16 \div 2$
quotient	8

[illegible]

Activity #1

You rolled the number 4.

start number	24
--------------	----

quotient	6
----------	---

[illegible]

Choice Time: Division Games

Choose a center to practice dividing within 100.

- Compare expressions
- Decide which expression has the greatest value.
- Close to 100
- Choose 2 numbers to divide to get a product closest to 100 and find the related quotient.



Today, we played some division games to practice dividing within 100. How have you made progress in your division fluency this year?



Notice and Wonder



Let's create a Notice and Wonder.

Notice and Wonder: Equal Groups

Warm
up

What do you notice?



What do you wonder?

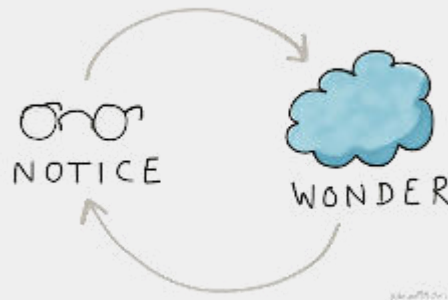
Design Your Notice and Wonder

Activity
#1

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

Students may notice:

Students may wonder:



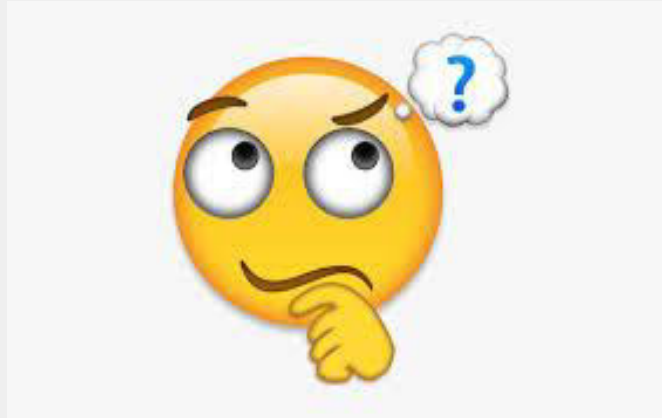
Facilitate Your Notice and Wonder

Activity
#2

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



What were the most important things about your image you had to consider as you created your Notice and Wonder?
Why were these things important?



How Many Do You See?

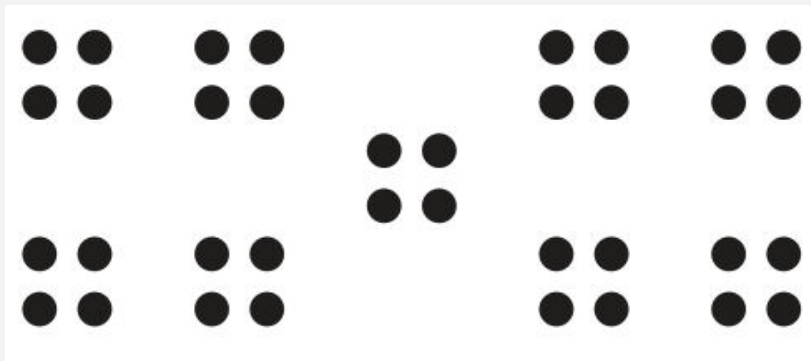


Let's create a How Many Do You See.

Warm
up

How Many Do You See: Equal Groups

How many do you see?



How do you see them?

Design Your How Many Do You See

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

Ways students might see the dots:



Facilitate Your How Many Do You See

Activity
#2

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. Have them share how many they saw and how they saw them.
7. Record their ideas.



What were the most important things about your image you had to consider as you created your How Many Do You See? Why were these things important?



Estimation Exploration



Let's create an Estimation Exploration.

Estimation Exploration: Fractional Measurement

Warm-
up

What is the length of this
earthworm?



Record an estimate that is:

Too low	About right	Too high

Design Your Estimation Exploration

Activity
#1

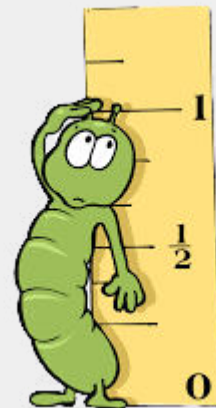
1. Find an object or an image that would encourage your classmates to estimate a length using halves or fourths of an inch.

2. Fill in the possible estimates students might make for the length you are asking them to estimate.

Record an estimate that is:

Too low	About right	Too high

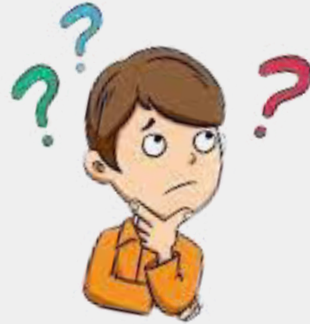
3. Measure the length you are estimating to make sure your estimates make sense. If needed, revise your estimates.



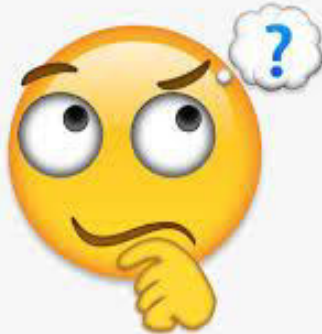
Facilitate Your Estimation Exploration

Activity
#2

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. Have them share estimates.
6. Record their ideas.



What were the most important things about the length you wanted your classmates to estimate that you had to consider as you created your Estimation Exploration? Why were these things important?



Number Talk



Let's create a Number Talk.

Number Talk: Addition

Find the value of each
expression mentally.

$$300 + 400$$

Number Talk: Addition

Find the value of each
expression mentally.

$$300 + 437$$

Number Talk: Addition

Find the value of each
expression mentally.

$$321 + 437$$

Number Talk: Addition

Find the value of each
expression mentally.

$$425 + 514$$

Design 1

Activity
#1

Write an expression to complete the Number Talk.

- $600 - 400$

- $600 - 399$

- $500 - 399$

- _____



Design 2

Activity
#2

Write an expression to complete the Number Talk.

- $500 + 199$

- $504 + 199$

- _____

- _____



Design 3

Activity
#3

Write an expression to complete the Number Talk.

- $900 - 400$

- _____

- _____

- _____



Design 4

Activity
#4

Write an expression to complete the Number Talk.

• _____

• _____

• _____

• _____



What were the most important things about your expressions you had to consider as you created your Number Talk? Why were these things important?

