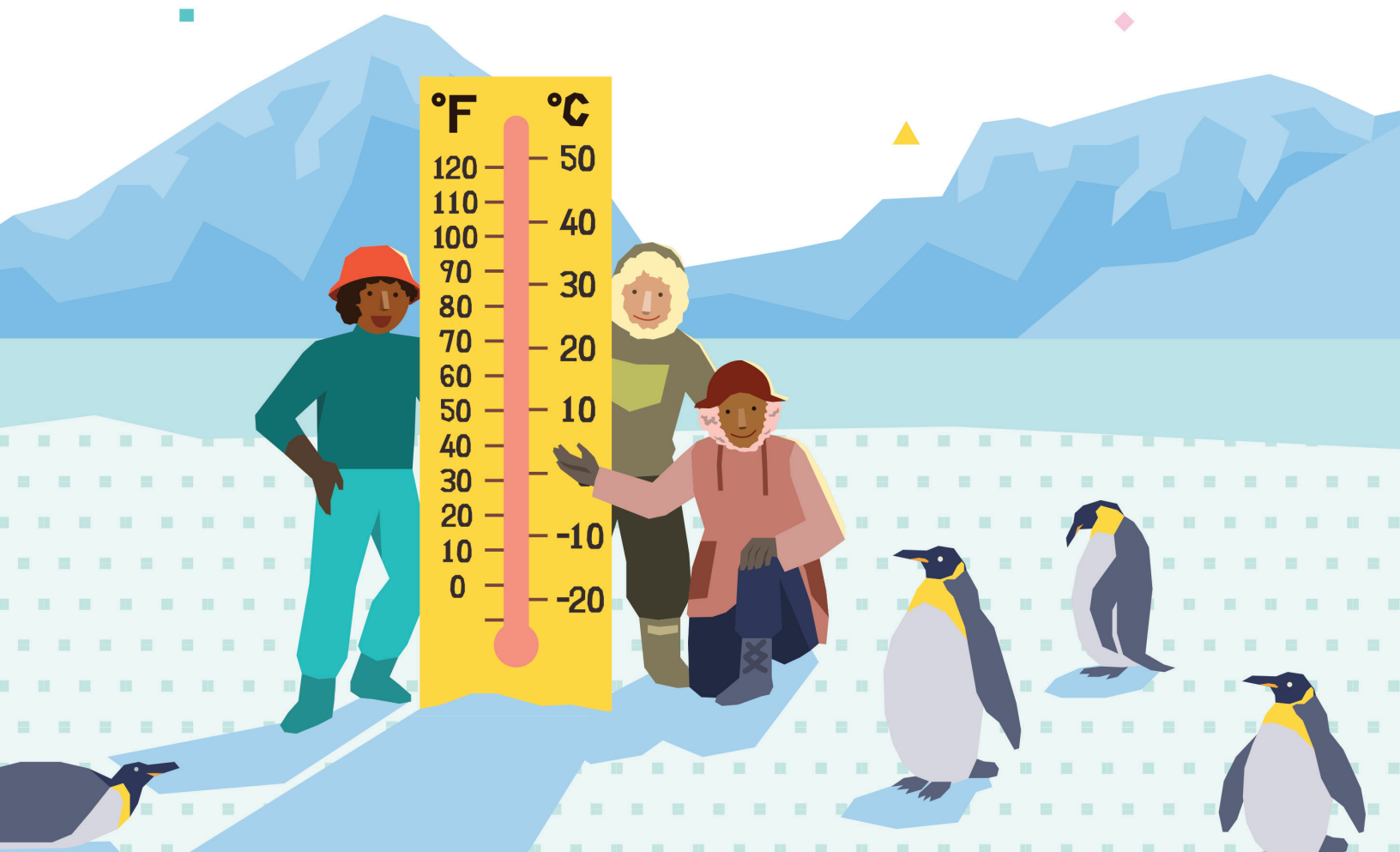


GRADE 6

# Sample lesson





Amplify.

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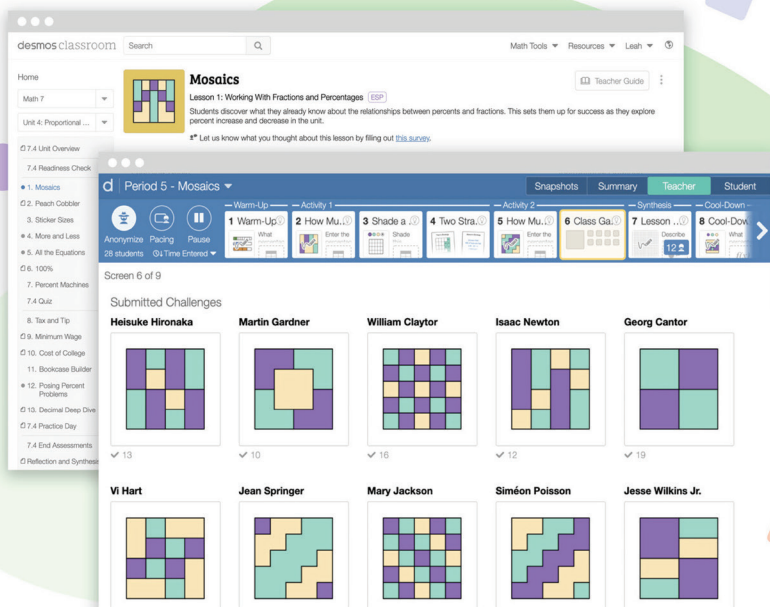


# Welcome to Amplify Desmos Math

Every student is brilliant, but not every student **feels** brilliant in math class. Research shows that students who believe they have brilliant ideas to add to the math classroom learn more.<sup>1</sup> Our aim is for students to see themselves and their classmates as having powerful mathematical ideas. In the words of the NRC report **Adding It Up**, we want students to develop a “productive disposition—[the] habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one’s own efficacy.”<sup>2</sup>

Amplify Desmos Math does this by tapping into students' natural curiosity from the start of every lesson with:

- Low floor, high ceiling tasks
- Relevant, real-world problems
- Diverse mathematical role models
- Collaborative digital experiences



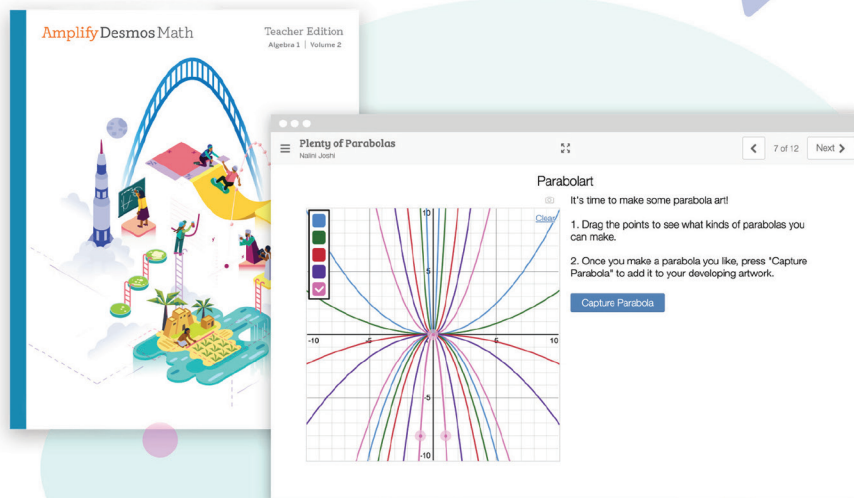
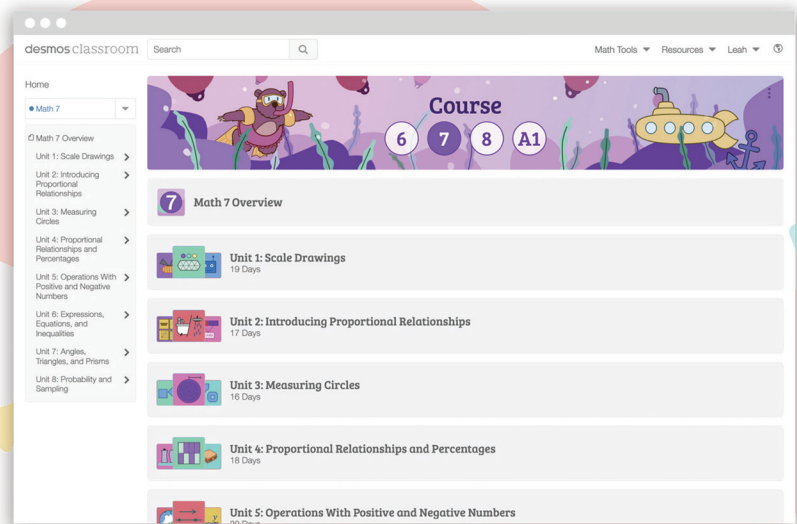
## For students

Every student feels connected and a part of the conversation when participating in an Amplify Desmos Math lesson. And when students are actively engaged with the content, they achieve more.

## For teachers

The program delivers what math educators want and need:

- Standards-aligned print and digital lessons that capture students' interests every day
- The right mix of informal and more substantive diagnostic and summative assessments
- Differentiation support
- Additional practice sets
- Spanish language supports



## For leaders

The program delivers what school and district leaders want and need:

- A coherent core program based on the industry-leading IM K–12 Math™ by Illustrative Mathematics®
- A unified team from Amplify and Desmos Classroom dedicated to making implementation a success

<sup>1</sup> Uttal, D. H. (1997). Beliefs about genetic influences on mathematics achievement: A cross-cultural comparison. *Genetica*, 99(2–3), 165–172. <https://doi.org/10.1007/bf02259520>

<sup>2</sup> National Research Council. (2001). *Adding It Up: Helping Children Learn Mathematics*. Washington, DC: National Academy Press. [doi.org/10.17226/9822](https://doi.org/10.17226/9822)

# What can Desmos Classroom technology do for you?

Our digital lessons (and the technology developed by Desmos Classroom that brings them to life) are designed to make some of the most challenging parts of teaching easier for you. We know it can be difficult to understand what students are thinking while working, and to elevate student voices when there are so many ideas floating around the classroom. If students aren't getting the material, it often feels impossible to keep them engaged.

### Repeated Challenges

The table shows the submarine's starting position and the action taken.

For each challenge, enter the submarine's final position.

Complete as many challenges as you want!

Start	Action	Final
0	Add 2 floats Add 3 anchors	-1


Try Another

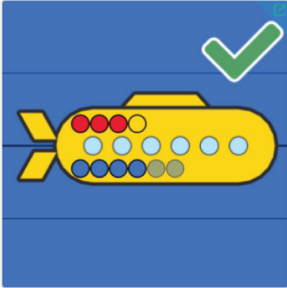
The Desmos Classroom technology found in Amplify Desmos Math works on three different fronts to ensure lessons are memorable and effective:

- 1. Students are given interesting problems that show the power and consequences of their thinking and actions** (and we offer opportunities for them to revise their thinking along the way!). Sometimes that can mean showing whether a response is right or wrong, but often it doesn't. What does that mean? In many lessons, students add their thinking to the activity and, rather than tell them whether it's right or wrong, we show them what it implies for the model, later allowing students to interpret and revise their work. We call this interpretive feedback.

2. **Teachers are given more information about what students are thinking during class to make leading conversations easier.** Selecting and discussing student work can be a really powerful teaching move, but it can feel challenging when students are working privately on worksheets. The Desmos Classroom technology essentially underpins each lesson with the power of Peg Smith and Mary K. Stein's *5 Practices for Orchestrating Productive Classroom Discussions*.

What do you notice?



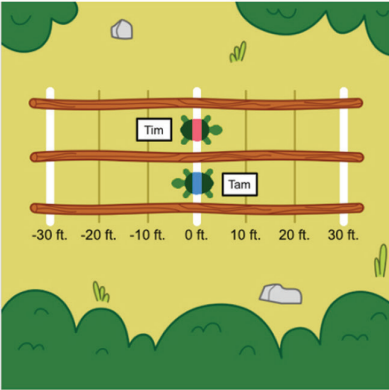


add 5 floats  
take away 5 anchors  
add 6 floats and take away 1 anchor

Remove 100 floats  
Remove 105 anchors

3. **Everyone in the classroom is connected through intuitive interaction tools.** Students can see what others have said on some screens, while teachers can always see where students are and what they're doing, enabling them to make great teaching moves. And, of course, teachers have a lot of control over what students can see and how fast the class is moving.

Screen 1 of 13 Warm-Up: Tell a Story



- Press play to watch a short animation.
- Write a story about Tim and Tam.

Mariel Vázquez

Tim and Tam are like cars on a highway, heading in opposite directions. They might see just the top of a shell over that branch, but only if they're paying attention. Tam is in a bit of a rush, while Tim is cruising and enjoying the ride.

David Blackwell

Tam and Tim are twin turtles. They both start a race at the 0 line. The gun fires and the turtles are off...but in opposite directions, who knows why. Tim is walking slowly and Tam is walking more quickly. After a bit of time, Tim has walked forwards 10 feet and Tam has walked backwards 20 feet. The two turtles are now 30 feet apart from each other.

Elbert Frank Cox

Tim and Tam are brother and sister and they are walking in opposite directions.

# Grade 6 Teacher Edition



# Flour Planner

## How Many Groups?, Part 1

Let's use drawings and diagrams to think about "How many groups?" with fractions.



### Focus and Coherence

#### Today's Goals

- Goal:** Use diagrams to represent and solve a problem asking, "How many groups?" when the size of each group is a fraction.
- Language Goal:** Interpret a division problem as a question asking, "How many groups?" (**Speaking and Listening**)

Students make connections between drawings, tape diagrams, and multiplication and division expressions to answer the question, "How many groups?" Students determine how many scoops are needed to make recipes when the scoop sizes are fractional. (**MP2**)

#### ◀ Prior Learning

In Lessons 1 and 2, students learned about different ways to represent division problems with whole numbers.

#### ▶ Future Learning

In Lesson 4, students will continue to use a variety of strategies to answer the question, "How many in 1 group?"

### Rigor and Balance

- Students build **conceptual understanding** as they use tape diagrams to solve division problems with fractions.

### Standards

#### Addressing

##### 6.NS.A.1

Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem.

#### Building On

##### 5.NF.B.7





#### Math Identity and Community

- In **Activity 2**, celebrate creative responses, such as recognizing that  $\frac{2}{3}$  is twice  $\frac{1}{3}$  and thus, 4 scoops are needed. Ask the author to talk about their inspiration.

# Lesson at a Glance 45 min

## Warm-up

 Independent |  5 min

Students use multiplicative reasoning to determine an unknown number of dots.



### Instructional Routines:

- [Number Talk](#)

6.NS.A.1



## Activity 1



 Pairs |  10 min

Students extend what they know about dividing by a whole number to dividing by a unit fraction to determine an unknown number of groups.

6.NS.A.1  
MP2



## Activity 2

 Pairs |  20 min

Students extend what they know about division to determine an unknown number of groups when the group size is a non-unit fraction.



### Instructional Routines:

- [MLR7: Compare and Connect](#)

6.NS.A.1



## Synthesis and Summary



 Whole Class |  5 min

**Key Takeaway:** There are multiple strategies that can be used to answer the question, “How many in 1 group?”

6.NS.A.1



## Exit Ticket

 Independent |  5 min

Students demonstrate their understanding by solving a problem asking, “How many groups?”

6.NS.A.1




## Pacing Modifications

Consider these modifications if you are short on time.


**Warm-up** • Omit the Warm-up.


**Activity 2** • Omit the card sort.

## Prep Checklist

 All resources are available in print or online.

### Every lesson includes:

 Exit Ticket PDF

 Student Screens

### Additional required materials: \*optional

**Activity 1**  2-cup measuring scoop\*

$\frac{1}{2}$ -cup measuring scoop\*

**Activity 2**  Activity 2 PDF, pre-cut cards, one set per pair

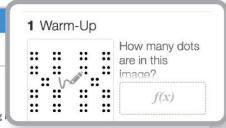
$\frac{1}{1000}$ -cup measuring scoop\*

$\frac{2}{3}$ -cup measuring scoop\*

# Warm-up Counting Dots

**Purpose:** Students use multiplicative reasoning to determine an unknown number of dots.

Warm-up Student Screens



## 1 Launch

Use the **Number Talk** routine. Students may benefit from being explicitly told not to count each individual dot, but instead, to look for helpful structure within the image.

## 2 Connect

**Invite pairs of students to share** their grouping strategy with the class. Invite them to share how many groups they counted and the number of dots in each group.

**Ask,** "How is counting the dots similar to calculating area?"

**Highlight** the connections between this activity and area and any patterns students used to help their thinking.

Unit 4  
Lesson  
**3**

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Log

## Flour Planner

Let's use drawings and diagrams to think about "How many groups?" with fractions.

### Warm-up Counting Dots

How many dots are in the image? Determine the solution mentally.  
Be ready to share your strategy.

72; Sample responses:

$9 \cdot 8 = 72$

$4 \cdot 18 = 72$

$2 \cdot [(4 \cdot 5) + (4 \cdot 4)]$   
 $2 \cdot [20 + 16]$   
 $2 \cdot 36$   
 $72$

Lesson 3 Flour Planner 415

## D Differentiation

### Accessibility: Visual-spatial Processing

As students *interpret visual representations*, provide colored pencils and invite them to use color coding to group sets of dots together. Ask, "How many dots are in your group? How many groups do you see?"

### Extension

Provide multiple copies of the image and invite students to look for unique and efficient ways to count the dots.



## Math Language Development

### Multilingual/English Learners

Provide students time to rehearse and formulate their responses before sharing them with the class.  
**(Speaking and Listening)**

# Activity 1 Fractional Scoops

**Purpose:** Students extend what they know about dividing by a whole number to dividing by a unit fraction to determine an unknown number of groups.

Activity 1 Student Screens



## 1 Launch

Ask, "Have you ever baked or cooked with flour? What recipes does your family make that use flour?"

## 2 Monitor

**Support getting started** by showing a 2-cup measuring scoop and asking students to think about how many scoops they would need.

**Look for a variety of strategies:**

- **Problem 1** Selecting  $6 \div 2 = ?$  and  $2 \cdot ? = 6$
- **Problem 2** Recognizing there are  $12 \frac{1}{2}$ -cup scoops in 6 cups because  $6 \cdot 2 = 12$ .

## D Differentiation

**Look for early student thinking:**

- **Problem 2** Thinking they need 3 scoops because 3 is  $\frac{1}{2}$  of 6. Ask, "How much flour would you have with three  $\frac{1}{2}$ -cup scoops?"

## 3 Connect

**Highlight** that there are many ways to model division problems with fractions, such as tape diagrams, sketching the problem, writing an equation, etc. (MP2)

**Ask:**

- "How is the tape diagram in Problem 2 similar to ones you have seen before? How is it different?"
- "Where do you see the 12 scoops in the diagram?"
- "What other questions might LaShawn's tape diagram be useful for?"

Activity  
**1**

## Activity 1 Fractional Scoops

**1.** Alexis needs 6 cups of flour to make tres leches, a popular cake in Mexico made with three kinds of milk. They only have a  $\frac{1}{2}$ -cup measuring scoop.

**a.** How many scoops do they need?  
**3 scoops**

**b.** Select an equation that you could use to determine how many  $\frac{1}{2}$ -cup scoops make 6 cups of flour. Explain your thinking.

**Sample responses:**

- Equation B because you want to know how many 2s go into 6.
- Equation D because you want to know how many groups of 2 make 6.

<b>Equation A</b> $6 \div ? = 2$	<b>Equation B</b> $6 \div 2 = ?$
<b>Equation C</b> $2 \div 6 = ?$	<b>Equation D</b> $2 \cdot ? = 6$

**2.** LaShawn also needs 6 cups of flour to make tres leches. They only have a  $\frac{1}{2}$ -cup measuring scoop.

**a.** How many scoops do they need?  
**12 scoops**

**b.** Explain how this diagram helped LaShawn figure out that they need 12 scoops.

6											
$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$

They made a tape diagram representing 6 and then figured out how many  $\frac{1}{2}$  cups fit in 6.

416 Unit 4 Dividing Fractions

## D Differentiation

### Accessibility: Conceptual Processing

**Problems 1–2** As students think abstractly, provide access to physical measuring scoops and large containers to help bridge the gap between concrete representations and abstract thinking. Consider bringing in water or flour and demonstrate both scenarios.

### Extension

**Problem 2** Invite students to write an equation that can represent this scenario.  
 $6 \div \frac{1}{2} = 12$

## Math Language Development

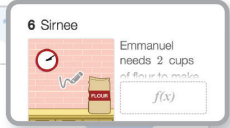
### Multilingual/English Learners

**Problem 2** Provide sentence frames to help students explain their thinking. For example, "LaShawn figured out that they needed 12 scoops by \_\_\_\_." (Reading and Speaking)

# Activity 2 A Bigger Scoop

**Purpose:** Students extend what they know about division to determine an unknown number of groups when the group size is a non-unit fraction.

Activity 2 Student Screens



## 1 Launch

Activate students' background knowledge and share any experiences they have with sirnee or other celebratory dishes. Distribute pre-cut cards from the Activity 2 PDF when students get to Problem 4.

## 2 Monitor

**Support getting started** by showing a  $\frac{1}{3}$ -cup measuring scoop and asking students to think about how many scoops they would need.

**Look for a variety of strategies:**

- **Problem 1** Drawing a tape diagram to model the problem.
- **Problem 4** Solving for the missing value to determine which cards go together.

### Math Identity and Community

Celebrate creative responses, such as recognizing that  $\frac{2}{3}$  is twice  $\frac{1}{3}$  and thus, 4 scoops are needed. Ask the author to talk about their inspiration.

### D Differentiation

**Look for early student thinking:**

- **Problem 3** Thinking that, because  $\frac{2}{3}$  is twice  $\frac{1}{3}$ , the answer would be twice as much. Have students draw sixteen  $\frac{2}{3}$ -cups and count the total amount.

Activity 2 continued >

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

### Activity 2 A Bigger Scoop

Emmanuel needs  $2\frac{2}{3}$  cups of flour to make sirnee, a sweet dish that is often made as part of Islamic celebratory feasts.

1. He only has a  $\frac{1}{3}$ -cup measuring scoop. How many scoops does he need?  
**8 scoops**
2. Here are two different diagrams to determine how many  $\frac{1}{3}$ -cup scoops are needed to measure  $2\frac{2}{3}$  cups of flour.

**Discuss** How does each diagram help you calculate that there are 8 scoops?

Diagram 1	Diagram 2

**Sample responses:**  
**In Diagram 1,** there are three  $\frac{1}{3}$ -cup scoops to make up each cup and there are  $2\frac{2}{3}$  cups, so there are 8 scoops in all.  
**In Diagram 2,** there are 8 sections in the tape diagram, so I need 8 scoops.

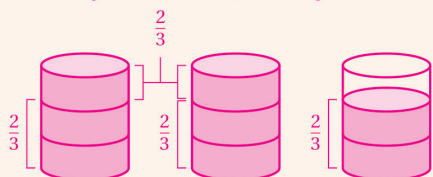
**ML/EL Learners: Emerging, Expanding, Bridging**

3. Emmanuel found a  $\frac{2}{3}$ -cup measuring scoop to use to make sirnee. How many of these scoops would he need to measure  $2\frac{2}{3}$  cups of flour?  
**4 scoops**

## D Differentiation

### Accessibility: Conceptual Processing

**Problem 3** Invite students to draw their own diagrams to help them make sense of the scenario. Consider asking, "How is this scenario similar to Problem 2? How is it different? How could you use or modify the diagrams from Problem 2 to help you?" **Sample response:** I can use the same diagram, but note that there are four groups of  $\frac{2}{3}$  instead of eight groups of  $\frac{1}{3}$ .



### Extension

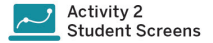
Invite students to write an equation that can represent each scenario.

**Problem 1**  $2\frac{2}{3} \div \frac{1}{3} = 8$

**Problem 3**  $2\frac{2}{3} \div \frac{2}{3} = 4$

# Activity 2 A Bigger Scoop (continued)

**Purpose:** Students extend what they know about division to determine an unknown number of groups when the group size is a non-unit fraction.



## 3 Connect

Invite individual students share their reasoning for Problem 2.

**MLR7** Use the **Compare and Connect** routine.

**Highlight** that each scenario in the card sort had multiple matches indicating there are multiple ways to write an equation for the same problem.

**Ask:**

- “How is determining the number of  $\frac{1}{3}$ -cup scoops similar to and different from  $\frac{2}{3}$ -cups?”
- “What multiplication and division expressions could represent these situations?”

Activity  
**2**

**Activity 2** A Bigger Scoop (continued)

7 Two Strategies

You will be given a set of cards. Sort the cards into groups that represent the same scenario.

4. Record your sorted groups in the table. You will have two cards left over.

Group 1	Group 2
<b>Scenario 1:</b> LaShawn needs $\frac{3}{4}$ cup of flour. They have a 3-cup measuring scoop.	<b>Scenario 2:</b> Alexis needs 3 cups of flour. They have a $\frac{3}{4}$ -cup measuring scoop.
Card B Card E Card G	Card A Card C Card H

Cards D and F do not have a match.

418 Unit 4 Dividing Fractions

## D Differentiation

**Accessibility: Executive Functioning**

**Card Sort** To support students in *carrying out multiple steps*, chunk this task into more manageable parts by inviting them to choose one card at a time and match its equation with a scenario.

**Extension**

Invite students to write their own scenarios that represent the two remaining cards. *Answers may vary.*

## MLD Math Language Development

**MLR7: Compare and Connect**

**Problem 2** Invite students to share their responses with a partner and to make connections between the two diagrams. Consider using these questions to guide their discussion:

**Discussion questions**

- Where do you see the  $\frac{1}{3}$ -cup measuring scoop in each diagram?
- Where do you see  $2\frac{2}{3}$  cups of flour in each diagram?
- Why do the two diagrams lead to the same result of 8 scoops?

# Synthesis and Summary

**Key Takeaway:** There are multiple strategies that can be used to answer the question, “How many in 1 group?”

## Synthesis

Invite students to spend 2 minutes responding to the prompt. Ask them to share their thinking with a partner.

Display several students' responses.

Invite pairs of students to share the connections they see between responses.

## Summary

Invite students to share which strategy, tape diagram, multiplication equation, or division equation they prefer, and why.

Highlight that each strategy produces the same answer.

Ask:

- “What makes sense to you about each strategy? What does not make sense?”
- “What connections do you see between your classmates' strategies?”

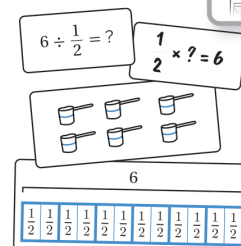
### Synthesis Student Screen

#### Synthesis

How can you use an equation or a diagram to figure out how many  $\frac{1}{2}$ -cup scoops you need to make 6 cups?

Sample responses:

- You can make a tape diagram that is 6 units long and break it into  $\frac{1}{2}$ -unit pieces, then count the number of pieces you need.
- You can write a multiplication equation like  $\frac{1}{2} \cdot ? = 6$  and figure out what the ? needs to be in order to make the equation true.



10 Lesson Synthesis

How can you use an equation or a diagram to...

#### Summary

“How many groups?” can be answered using a tape diagram, a multiplication equation, or a division equation. These tools can be used with whole numbers and with fractions.

For example, consider the problem “How many  $\frac{2}{5}$ s are in 2?” This problem can be represented by a tape diagram, a multiplication equation, or a division equation.

Tape Diagram	Multiplication Equation	Division Equation
	$\frac{2}{5} \cdot ? = 2$	$2 \div \frac{2}{5} = ?$

Because there are 5 groups of  $\frac{2}{5}$  in 2, the value 5 makes both equations  $\frac{2}{5} \cdot 5 = 2$  and  $2 \div \frac{2}{5} = 5$  true.

## Sub-unit Math Story Connection

### Introduction to Dividing Fractions

In the sub-unit story, students read about how fractions are typically used in recipes and when adjusting recipes, knowing how to divide fractions can be helpful.

Consider asking students to reflect on connections between the sub-unit story and what they learned in this lesson. **Sample responses shown.**

- How did the diagrams in Activities 1 and 2 help you reason about fractional quantities related to recipes? **They helped me visualize how many scoops of one measuring tool are needed to measure the indicated amount in each recipe.**
- Look back at Activity 1, Problem 2. If LaShawn only has a  $\frac{2}{3}$ -measuring cup, how can they determine how many scoops they need? **Divide each of the six sections into three equal-sized sections, each representing  $\frac{1}{3}$ . Determine the number of groups of  $\frac{2}{3}$  that are in 6, which is 9.**

# Exit Ticket

**Purpose:** Students demonstrate their understanding by solving a problem asking, “How many groups?”

## Success looks like . . .

- **Goal:** Use diagrams to represent and solve a problem asking, “How many groups?” when the size of each group is a fraction.
  - » Finding the number of  $\frac{3}{4}$ -tablespoon scoops in 6 tablespoons of sugar.
- **Language Goal:** Interpret a division problem as a question asking, “How many groups?” (Speaking and Listening)

## D Differentiation

If students incorrectly calculate the number of scoops needed, consider:

- Reviewing the diagrams used in Activity 2, Problem 2.
- Assigning Practice Problem 9.

### Exit Ticket Student Screen

Name: \_\_\_\_\_
Date: \_\_\_\_\_

## Exit Ticket

**Emmanuel needs 6 tablespoons of sugar to make lemonade. His measuring scoop is  $\frac{3}{4}$  of a tablespoon. How many scoops will he need?**

8 scoops

**11 Cool-Down**

Emmanuel needs 2  $\frac{3}{4}$  tablespoons of sugar.

$f(x)$

### Self-Assess

1

2

3

4

5

**a** I can use diagrams to represent and solve division problems asking, “How many groups?” when the groups are unit fractions.

1 2 3 4 5

**b** I can interpret a division expression as a question asking, “How many groups?”

1 2 3 4 5

Lesson 3 Flour Planner

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# Practice

Provide students with sufficient practice to build and reinforce their conceptual understanding, fluency, and application of mathematical topics including interdisciplinary or STEM connections, assessment practice, and ongoing

## Practice Student Screens

2 Problems 1.1–1.3

Biryani is a rice dish from South Asia. Three students made Alisha's biryani recipe using different-sized scoops. If Alisha's biryani recipe uses 4 cups of rice, how many scoops of rice does each student need?

### Practice

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

**Social Studies** For Problems 1–4, use this information. Biryani is a rice dish from South Asia. Three students made Alisha's biryani recipe using different-sized scoops. If Alisha's biryani recipe uses 4 cups of rice, how many scoops of rice does each student need?



1. Alisha: 2-cup scoop      2. Lukas:  $\frac{1}{2}$ -cup scoop      3. Emma:  $\frac{1}{3}$ -cup scoop  
2 scoops                      8 scoops                      12 scoops

4. Explain why Emma's situation can be represented by the equation  $4 \div \frac{1}{3} = ?$

Sample response: The equation  $4 \div \frac{1}{3} = ?$  can represent "how many  $\frac{1}{3}$ -cup scoops are in 4 cups?"

5. How many  $\frac{1}{2}$ s make 5?

10

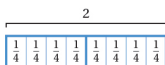
6. How many  $\frac{1}{4}$ s make 3?

12

7. How many  $\frac{3}{4}$ s make 3?

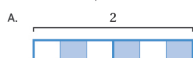
4

8. Lukas drew this diagram to represent "How many  $\frac{1}{4}$ s make 2." Write an equation to represent Lukas's diagram.



$2 \div \frac{1}{4} = 8$

9. Allison has a 2 lb bag of cat food. Her cat eats  $\frac{2}{3}$  cup of cat food per day. Which model represents how many days her 2 lb bag of food will last?



Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

### Spiral Review

For Problems 10–13, shade each fraction of the rectangle.

Sample shading shown from left to right. Students may shade differently.



14. Decide if this statement is *always*, *sometimes*, or *never* true, and then explain your thinking. When you multiply one number by another, the result will be larger than the first number.

- A. Always      B. Sometimes      C. Never

Sample response: When multiplying by a number greater than 1, the product is greater than the number. For example  $4 \cdot 3 = 12$ . When multiplying by a number that is less than 1, the product is smaller than the number. For

15. Which question can be represented by the equation  $? \cdot \frac{1}{8} = 3$ ?

- A. How many 3s are in  $\frac{1}{8}$ ?

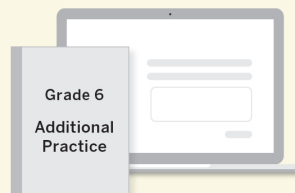
- B. What is 3 groups of  $\frac{1}{8}$ ?

- C. How many  $\frac{1}{8}$ s are in 3?

## Practice Problem Item Analysis

	Problem(s)	DOK	Standard(s)
<b>On-lesson</b>			
Social Studies	1–4	2	6.NS.A.1
Fluency	5–7	1	6.NS.A.1
	8	2	6.NS.A.1
Test Practice	9	2	6.NS.A.1
<b>Spiral Review</b>			
Fluency	10–13	1	3.NF.A.1
	14	3	5.NF.B.5.B
	15	2	5.NF.B.7

## Need more Practice?



Each lesson includes more practice problems in the Additional Practice book and in the online item banks.

# Grade 6

# Student Edition

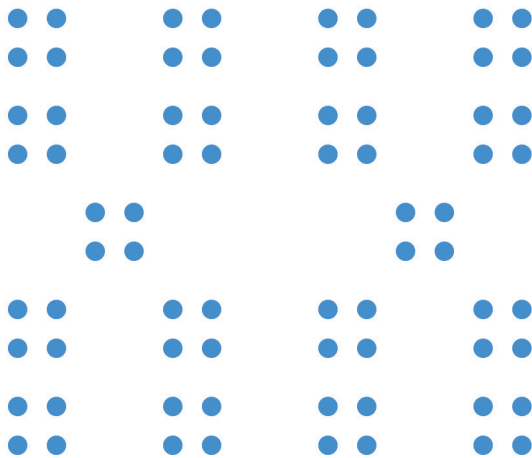
# Flour Planner

Let's use drawings and diagrams to think about "How many groups?" with fractions.



## Warm-up Counting Dots

How many dots are in the image? Determine the solution mentally.  
Be ready to share your strategy.



## Activity 1 Fractional Scoops

1. Alexis needs 6 cups of flour to make tres leches, a popular cake in Mexico made with three kinds of milk. They only have a 2-cup measuring scoop.



- a How many scoops do they need?

- b Select an equation that you could use to determine how many 2-cup scoops make 6 cups of flour. Explain your thinking.

**Equation A**

$$6 \div ? = 2$$

**Equation B**

$$6 \div 2 = ?$$

**Equation C**

$$2 \div 6 = ?$$

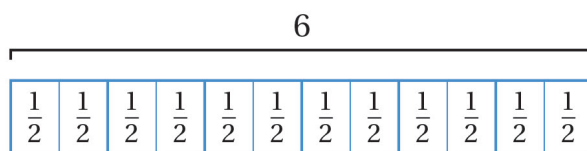
**Equation D**

$$2 \cdot ? = 6$$

2. LaShawn also needs 6 cups of flour to make tres leches. They only have a  $\frac{1}{2}$ -cup measuring scoop.

- a How many scoops do they need?


- b Explain how this diagram helped LaShawn figure out that they need 12 scoops.

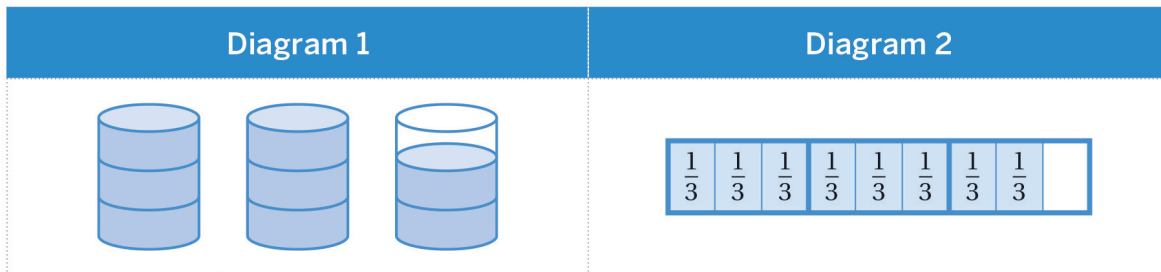


## Activity 2 A Bigger Scoop

Emmanuel needs  $2\frac{2}{3}$  cups of flour to make sirnee, a sweet dish that is often made as part of Islamic celebratory feasts.

1. He only has a  $\frac{1}{3}$ -cup measuring scoop. How many scoops does he need?
2. Here are two different diagrams to determine how many  $\frac{1}{3}$ -cup scoops are needed to measure  $2\frac{2}{3}$  cups of flour.

**Discuss**  How does each diagram help you calculate that there are 8 scoops?



3. Emmanuel found a  $\frac{2}{3}$ -cup measuring scoop to use to make sirnee. How many of these scoops would he need to measure  $2\frac{2}{3}$  cups of flour?

**Activity 2** A Bigger Scoop (continued)

You will be given a set of cards. Sort the cards into groups that represent the same scenario.

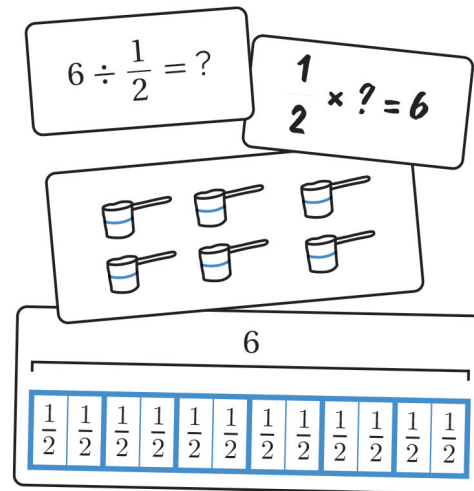
4. Record your sorted groups in the table. You will have two cards left over.

Group 1	Group 2
<b>Scenario 1:</b> LaShawn needs $\frac{3}{4}$ cup of flour. They have a 3-cup measuring scoop.	<b>Scenario 2:</b> Alexis needs 3 cups of flour. They have a $\frac{3}{4}$ -cup measuring scoop.



## Synthesis

How can you use an equation or a diagram to figure out how many  $\frac{1}{2}$ -cup scoops you need to make 6 cups?



## Summary

“How many groups?” can be answered using a tape diagram, a multiplication equation, or a division equation. These tools can be used with whole numbers and with fractions.

For example, consider the problem “How many  $\frac{2}{5}$ s are in 2?” This problem can be represented by a tape diagram, a multiplication equation, or a division equation.

Tape Diagram	Multiplication Equation	Division Equation
	$\frac{2}{5} \cdot ? = 2$	$2 \div \frac{2}{5} = ?$

Because there are 5 groups of  $\frac{2}{5}$  in 2, the value 5 makes both equations  $\frac{2}{5} \cdot 5 = 2$  and  $2 \div \frac{2}{5} = 5$  true.

# Practice

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

## Social Studies

For Problems 1–4, use this information. Biryani is a rice dish from South Asia. Three students made Alisha's biryani recipe using different-sized scoops. If Alisha's biryani recipe uses 4 cups of rice, how many scoops of rice does each student need?



1. Alisha: 2-cup scoop      2. Lukas:  $\frac{1}{2}$ -cup scoop      3. Emma:  $\frac{1}{3}$ -cup scoop

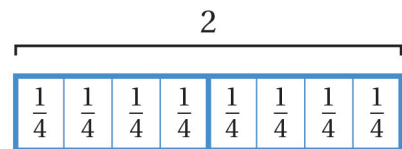
4. Explain why Emma's situation can be represented by the equation  $4 \div \frac{1}{3} = ?$

5. How many  $\frac{1}{2}$ s make 5?

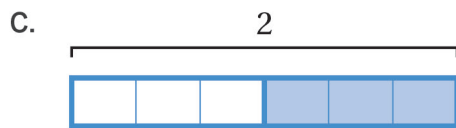
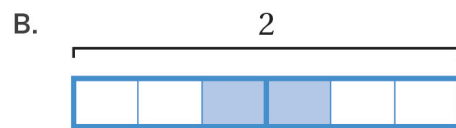
6. How many  $\frac{1}{4}$ s make 3?

7. How many  $\frac{3}{4}$ s make 3?

8. Lukas drew this diagram to represent "How many  $\frac{1}{4}$ s make 2." Write an equation to represent Lukas's diagram.



9. Allison has a 2 lb bag of cat food. Her cat eats  $\frac{2}{3}$  cup of cat food per day. Which model represents how many days her 2 lb bag of food will last?



## Spiral Review

For Problems 10–13, shade each fraction of the rectangle.

10.  $\frac{1}{3}$



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



12.  $\frac{5}{6}$



13.  $\frac{2}{3}$



14. Decide if this statement is *always*, *sometimes*, or *never* true, and then explain your thinking. When you multiply one number by another, the result will be larger than the first number.

- A. Always                      B. Sometimes                      C. Never

15. Which question can be represented by the equation  $? \cdot \frac{1}{8} = 3$ ?

- A. How many 3s are in  $\frac{1}{8}$ ?  
B. What is 3 groups of  $\frac{1}{8}$ ?  
C. How many  $\frac{1}{8}$ s are in 3?

Name: \_\_\_\_\_ Date: \_\_\_\_\_

**1 Warm-Up**

How many dots are in this image?  
 $f(x)$

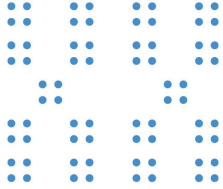


## Flour Planner

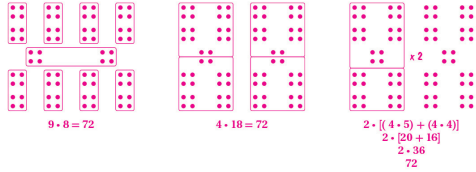
Let's use drawings and diagrams to think about "How many groups?" with fractions.

### Warm-up Counting Dots

How many dots are in the image? Determine the solution mentally. Be ready to share your strategy.



72: Sample responses:



**2 Tres Leches**

Alexis needs 6 cups of flour to make tres leches. How many 2-cup scoops do they need?  
 $f(x)$



**Activity 1**

### Activity 1 Fractional Scoops

1. Alexis needs 6 cups of flour to make tres leches, a popular cake in Mexico made with three kinds of milk. They only have a 2-cup measuring scoop.

- a. How many scoops do they need?  
**3 scoops**

- b. Select an equation that you could use to determine how many 2-cup scoops make 6 cups of flour. Explain your thinking.

**Equation A**  
 $6 \div ? = 2$

**Equation B**  
 $6 \div 2 = ?$

**Equation C**  
 $2 \div 6 = ?$

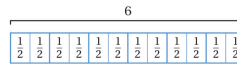
**Equation D**  
 $2 \cdot ? = 6$

- Sample responses:**
- Equation B because you want to know how many 2s go into 6.
  - Equation D because you want to know how many groups of 2 make 6.

2. LaShawn also needs 6 cups of flour to make tres leches. They only have a  $\frac{1}{2}$ -cup measuring scoop.

- a. How many scoops do they need?  
**12 scoops**

- b. Explain how this diagram helped LaShawn figure out that they need 12 scoops.



They made a tape diagram representing 6 and then figured out how many  $\frac{1}{2}$  cups fit in 6.

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

**6 Sirnee**

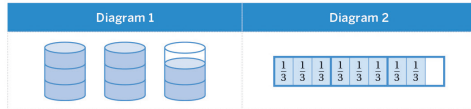
Emmanuel needs 2 cups of flour to make sirnee. How many  $\frac{1}{3}$ -cup scoops do they need?  
 $f(x)$

### Activity 2 A Bigger Scoop

Emmanuel needs  $2\frac{2}{3}$  cups of flour to make sirnee, a sweet dish that is often made as part of Islamic celebratory feasts.

1. He only has a  $\frac{1}{3}$ -cup measuring scoop. How many scoops does he need?  
**8 scoops**
2. Here are two different diagrams to determine how many  $\frac{1}{3}$ -cup scoops are needed to measure  $2\frac{2}{3}$  cups of flour.

**Discuss** How does each diagram help you calculate that there are 8 scoops?



**Sample responses:**  
In Diagram 1, there are three  $\frac{1}{3}$ -cup scoops to make up each cup and there are  $2\frac{2}{3}$  cups, so there are 8 scoops in all.

In Diagram 2, there are 8 sections in the tape diagram, so I need 8 scoops.

**ML/EL Learners: Emerging, Expanding, Bridging**

3. Emmanuel found a  $\frac{2}{3}$ -cup measuring scoop to use to make sirnee. How many of these scoops would he need to measure  $2\frac{2}{3}$  cups of flour?  
**4 scoops**

**7 Two Strategies**



**Activity 2**

### Activity 2 A Bigger Scoop (continued)

You will be given a set of cards. Sort the cards into groups that represent the same scenario.

4. Record your sorted groups in the table. You will have two cards left over.

Group 1	Group 2
<b>Scenario 1:</b> LaShawn needs $\frac{3}{4}$ cup of flour. They have a $\frac{3}{4}$ -cup measuring scoop.	<b>Scenario 2:</b> Alexis needs 3 cups of flour. They have a $\frac{3}{4}$ -cup measuring scoop.
Card B Card E Card G	Card A Card C Card H

Cards D and F do not have a match.

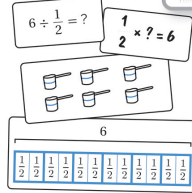


## Synthesis

How can you use an equation or a diagram to figure out how many  $\frac{1}{2}$ -cup scoops you need to make 6 cups?

### Sample responses:

- You can make a tape diagram that is 6 units long and break it into  $\frac{1}{2}$ -unit pieces, then count the number of pieces you need.
- You can write a multiplication equation like  $\frac{1}{2} \cdot ? = 6$  and figure out what the ? needs to be in order to make the equation true.



## 10 Lesson Synthesis

How can you use an equation or a diagram to...

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

## 11 Cool-Down

Emmanuel needs 2 tablespoons of f(x).

## Exit Ticket

Emmanuel needs 6 tablespoons of sugar to make lemonade. His measuring scoop is  $\frac{3}{4}$  of a tablespoon. How many scoops will he need?  
**8 scoops**

## Summary

"How many groups?" can be answered using a tape diagram, a multiplication equation, or a division equation. These tools can be used with whole numbers and with fractions.

For example, consider the problem "How many  $\frac{2}{5}$ s are in 2?" This problem can be represented by a tape diagram, a multiplication equation, or a division equation.

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## Self-Assess



- a I can use diagrams to represent and solve division problems asking, "How many groups?" when the groups are unit fractions.
- b I can interpret a division expression as a question asking, "How many groups?"

1 2 3 4 5

1 2 3 4 5

## Practice

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

**Social Studies** For Problems 1–4, use this information. Biryani is a rice dish from South Asia. Three students made Alisha's biryani recipe using different-sized scoops. If Alisha's biryani recipe uses 4 cups of rice, how many scoops of rice does each student need?



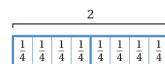
- Alisha: 2-cup scoop **2 scoops**
  - Lukas:  $\frac{1}{2}$ -cup scoop **8 scoops**
  - Emma:  $\frac{1}{3}$ -cup scoop **12 scoops**
4. Explain why Emma's situation can be represented by the equation  $4 \div \frac{1}{3} = ?$   
**Sample response:** The equation  $4 \div \frac{1}{3} = ?$  can represent "how many  $\frac{1}{3}$ -cup scoops are in 4 cups?"

5. How many  $\frac{1}{2}$ s make 5?  
**10**

6. How many  $\frac{1}{4}$ s make 3?  
**12**

7. How many  $\frac{3}{4}$ s make 3?  
**4**

8. Lukas drew this diagram to represent "How many  $\frac{1}{4}$ s make 2." Write an equation to represent Lukas's diagram.  
 **$2 \div \frac{1}{4} = 8$**



9. Allison has a 2 lb bag of cat food. Her cat eats  $\frac{2}{3}$  cup of cat food per day. Which model represents how many days her 2 lb bag of food will last?

- A.
- B.
- C.
- D.

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

## 2 Problems 1.1–1.3

Biryani is a rice dish from South Asia. Three students made...

## Spiral Review

For Problems 10–13, shade each fraction of the rectangle. Sample shading shown from left to right. Students may shade differently.



14. Decide if this statement is *always*, *sometimes*, or *never* true, and then explain your thinking. When you multiply one number by another, the result will be larger than the first number.

- A. Always **B.** Sometimes C. Never

**Sample response:** When multiplying by a number greater than 1, the product is greater than the number. For example  $4 \cdot 3 = 12$ . When multiplying by a number that is less than 1, the product is smaller than the number. For

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