BRIDGES IN MATHEMATICS 2

GRADE 2 SUPPLEMENT

Set A10 Number & Operations: Fractions

Includes

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Skills & Concepts

★ understand and represent commonly used fractions, such as ¼, ⅓, and ½

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Bridges in Mathematics Grade 2 Supplement
Set A10 Numbers & Operations: Fractions

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Bridges in Mathematics is a standards-based K–5 curriculum that provides a unique blend of concept development and skills practice in the context of problem solving. It incorporates the Number Corner, a collection of daily skill-building activities for students.

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Set A10 ★ Activity 1

ACTIVITY

Sandwich Fractions

Overview

Students fold paper squares to explore halves and fourths.

Skills & Concepts

★ understand and represent commonly used fractions, such as ¼, ⅓, and ½

You'll need

★ three 4" squares of white copy paper for each student plus extras

★ pastel-colored copy paper, 1 piece for each student

★ scissors

★ glue sticks

★ *Eating Fractions* by Bruce McMillan (optional)

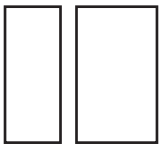
Instructions for Sandwich Fractions

1. Gather students to your discussion circle. Tell the story below.

Last Saturday, Kendra's mom had to go to the store. She said to Kendra, "I'll be back in about an hour. Your big sister's upstairs doing her homework, so you'll have to make your own lunch today. You know where to find everything you'll need in the kitchen, right?"

"Right!" said Kendra. As soon as her mom left, Kendra thought, "Hmmmm. I think I'll make a peanut butter and jelly sandwich. I just love peanut butter and jelly!" She got the bread out of the cupboard and took 2 pieces out of the bag. She spread peanut butter on one and grape jelly on the other. Then she put them together and set her sandwich on a plate. She looked at it and said, "Mom always cuts my sandwiches in half. I'm going to do the same thing!"

She cleaned off the knife and cut her sandwich very carefully. Here's how it looked when she was done.



2. On your whiteboard, draw a picture similar to the one shown above. Have students pair-share some of the things they notice. Then ask:

Did Kendra cut her sandwich in half? How do you know?

Children's explanations will vary, and may include comments like, "When you cut something in half, it has to be fair," "Both pieces have to be just the same size," "If she shared that with her sister, one of them would only get the small part," and "One of those is smaller than the other."

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Activity 1 Sandwich Fractions (cont.)

3. Hold up one of the paper squares you've prepared for the lesson and ask the children to tell you how to cut it in half. Follow students' suggestions to cut the paper in half. (Use additional squares to demonstrate if they have more than one solution.) Children may suggest that you fold the paper in half before you cut. Some may advise you to fold up and down or sideways, while others may suggest that you fold it along the diagonal before you cut. As you work, pose the following questions:

- What can we do to make sure both halves are the same size?
- Why do they have to be the same size? Why can't one be bigger than the other?
- What shape are the halves if I cut the paper sideways? (rectangles)
- What shape are the halves if I fold and cut the paper on the diagonal? (triangles)

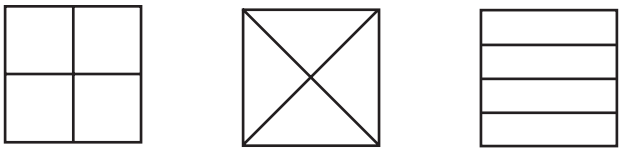
4. Then give students each a paper square and ask them to fold it in half, either sideways or on the diagonal. Write $\frac{1}{2}$ on the board. Read it with the class and explain that this is what people write to describe each of the pieces they get when they divide one object (like a piece of paper or a sandwich) into 2 equal parts. Each piece is 1 out of 2 equal parts.

5. Ask them to set their paper square in front of them and continue with the story.

After awhile, Kendra's big sister came downstairs to make herself a sandwich. By then, Kendra was finished with her lunch, but she was still in the kitchen. As she watched, Tiffany made a grilled cheese sandwich and cut it into 4 equal pieces. "I always cut my sandwiches in fourths," she said to Kendra. Kendra thought to herself, "That looks really good. Maybe I'll try that next time, but I still like peanut butter and jelly better."

6. Write $\frac{1}{4}$ on the board. Read it with the class and explain that this is what people write to describe each of the pieces they get when they divide one object into 4 equal parts. Each piece is 1 out of 4 equal parts. Then ask students to fold their second paper square into fourths. After they've had a minute to experiment, ask several volunteers to share their work with the class.

> ***Rosendo*** *First I folded my paper in half, like the first time. Then I opened it and folded it in half the other way.*
>
> ***Michelle*** *My mom always cuts my sandwiches in triangles. I folded my paper my paper in half like this, and then I folded it again. Here's how it looked when I opened it.*
>
> ***DJ*** *I folded mine 2 times. It came out different than the others.*



7. Give students a third paper square and ask them to fold it in fourths again. If they struggled the first time, they may have gotten a new idea by watching their classmates. If they were successful the first time, ask them to try one of the other methods that may have been shared. Encourage them to help one another as they work.

8. Now ask students to take their folded squares back to their tables. Have them recycle one of the squares they folded in fourths so they just have 2 squares in front of them, one folded in half and the other in fourths. Ask them to cut the first square along the fold line and label each of the two parts with

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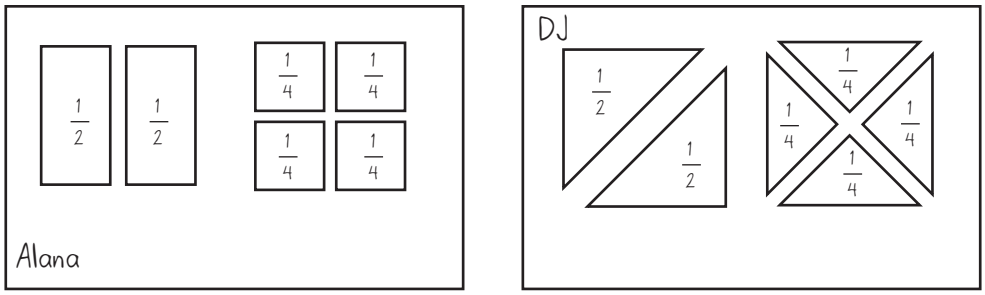
Activity 1 Sandwich Fractions (cont.)

the fraction ½. Then have them glue the two parts to a piece of colored copy paper. Take the opportunity to reinforce the idea that two halves make a whole. Repeat with the paper squares they have folded into fourths.



Extension

- Either before or after this activity, read and discuss *Eating Fractions* by Bruce McMillan. Here are two other fraction books your first graders might also enjoy:
  - *Apple Fractions* by Jerry Pallotta and Rob Bolster
  - *Give Me Half!* by Stuart J. Murphy

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Set A10 ★ Activity 2

ACTIVITY

Paper Pizzas

Overview

Students explore what happens when 2, 3, and 4 children share 1 pizza, as well as what happens when 4 and 8 children share 2 pizzas. After working to solve these problems as a group, students work in pairs to share 3 pizzas between them.

Skills & Concepts

★ understand and represent commonly used fractions, such as ¼, ⅓, and ½

Recommended Timing

Anytime after Set A10 Activity 1

You'll need

★ 5″-diameter paper circles (page A10.8, 3 circles for each pair of students and 7 circles for the class, see Advance Preparation)

★ tape

★ markers

★ scissors

Advance Preparation If you wish you can run a copy of page A10.8 to use as a template for cutting these circles. You can also cut 7 larger circles for the whole-group portion of this activity. If you think you may want to do the extension activity pages with some or all of your students, you'll need 2 more circles for every 3 students.

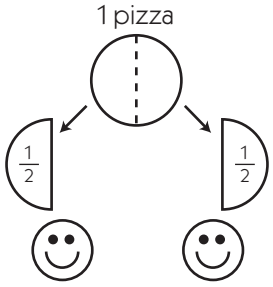
Instructions for Paper Pizzas

1. Gather students to your discussion circle, and talk to them briefly about pizza. Do they ever have pizza for dinner? What are some of their favorite pizza toppings?

2. Explain that today, they're going to be sharing some paper pizzas. Call 2 volunteers to come stand by you where everyone in the circle can see them. Hold up a single paper circle "pizza." Ask the class how these 2 children could best share 1 pizza, and how much each child would get. Have students whisper ideas to their neighbors, and then call on volunteers to share their thinking with the class.

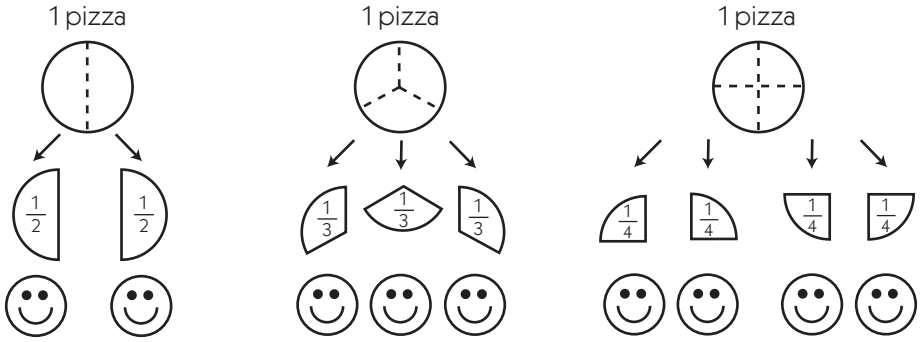
3. Follow students' suggestions for dividing the pizza fairly. After you do, ask 2 or 3 volunteers to explain how they know that each piece is half. If it doesn't come from the class, suggest placing one piece on top of the other to make sure they're both exactly the same size.

4. Record the problem on the board, quickly taping up the pieces you cut and labeling them with fractions.



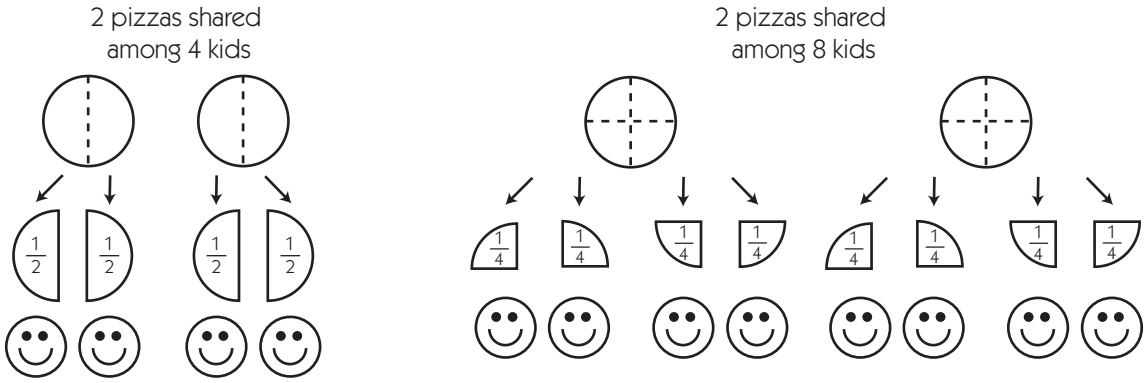
Activity 2 Paper Pizzas (cont.)

5. Repeat steps 2–4 with 3 children and then with 4 children. Ask students to predict how much pizza the children will get each time. Record the results on the board as you go. Explain that the fractions $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$ are used to show what happens when you divide 1 into 2, 3, and then 4 equal parts. $\frac{1}{2}$ means 1 divided into 2 equal parts. $\frac{1}{3}$ means 1 divided into 3 equal parts. $\frac{1}{4}$ means 1 divided into 4 equal parts.



6. Ask students to reflect on the results so far. What do they notice? What happens to the size of the piece each child gets as you add more children to the group? What would happen to the size of each piece if you divided 1 pizza among 8 or even 12 children? Why?

7. Now call 4 volunteers up to stand by you. Hold up 2 "pizzas." Ask the class how these 4 children could best share the 2 pizzas and how much each child would get. Have students whisper ideas to their neighbors, and then call on volunteers to share their thinking with the class. Record the results on the board and discuss them with the class. Then work with students to find out what happens when 8 children share 2 pizzas.



8. Partner the children and explain that you're going to give each pair 3 paper pizzas to share. Ask them to return to their tables and get out their scissors so they're ready to work, and then distribute the pizzas. Give students time to solve the problem in any way they can as you circulate to observe and converse with them. Some pairs may take 1 pizza each and cut the third one in half, while others may cut all 3 pizzas in half and share the halves equally. Some may even cut their 3 pizzas into tiny pieces (which aren't necessarily equal) and then share them out using the 1-for-you, 1-for-me method. Invite pairs to share and compare their results as they're working.

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Activity 2 Paper Pizzas (cont.)

9. After a reasonable amount of time, ask volunteers to share their solutions and strategies with the class. Understanding levels will vary from one student to the next, but all will have had some more exposure to concepts about one-half during the lesson.

Extension

- You may want to have a few students tackle the much more challenging problem of figuring out how to share 2 pizzas among 3 children.

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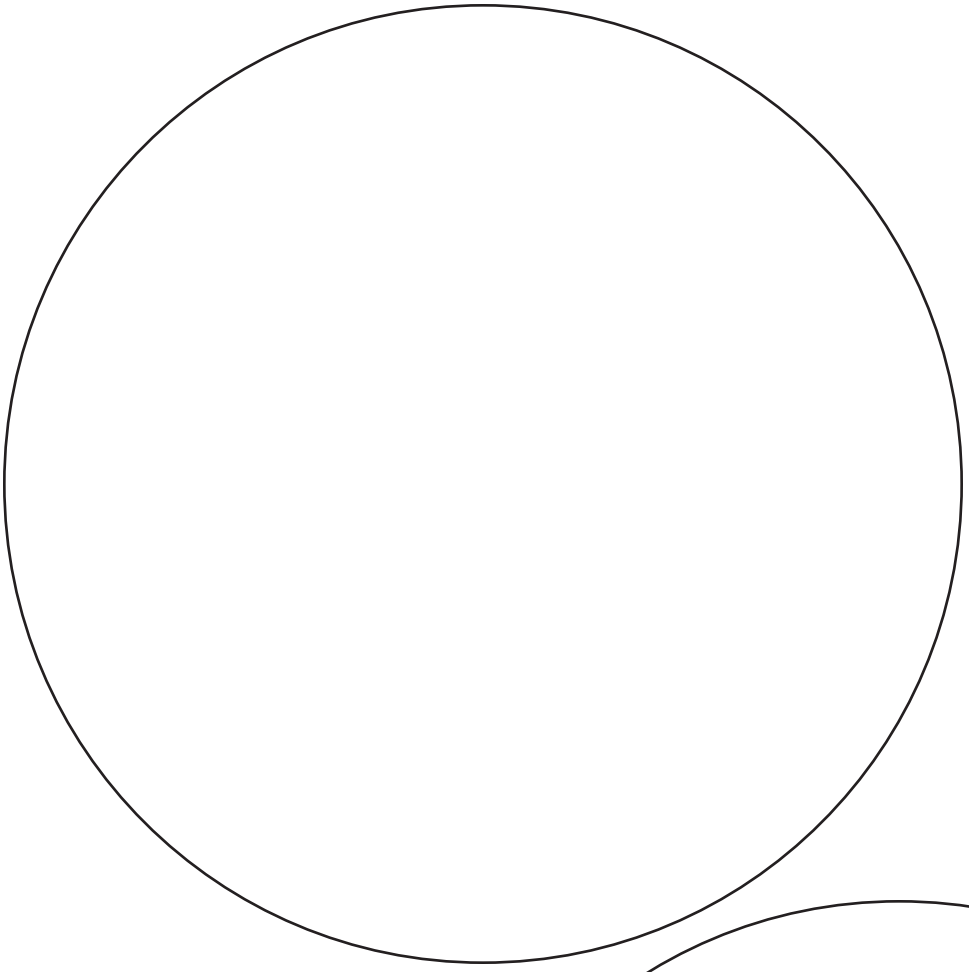

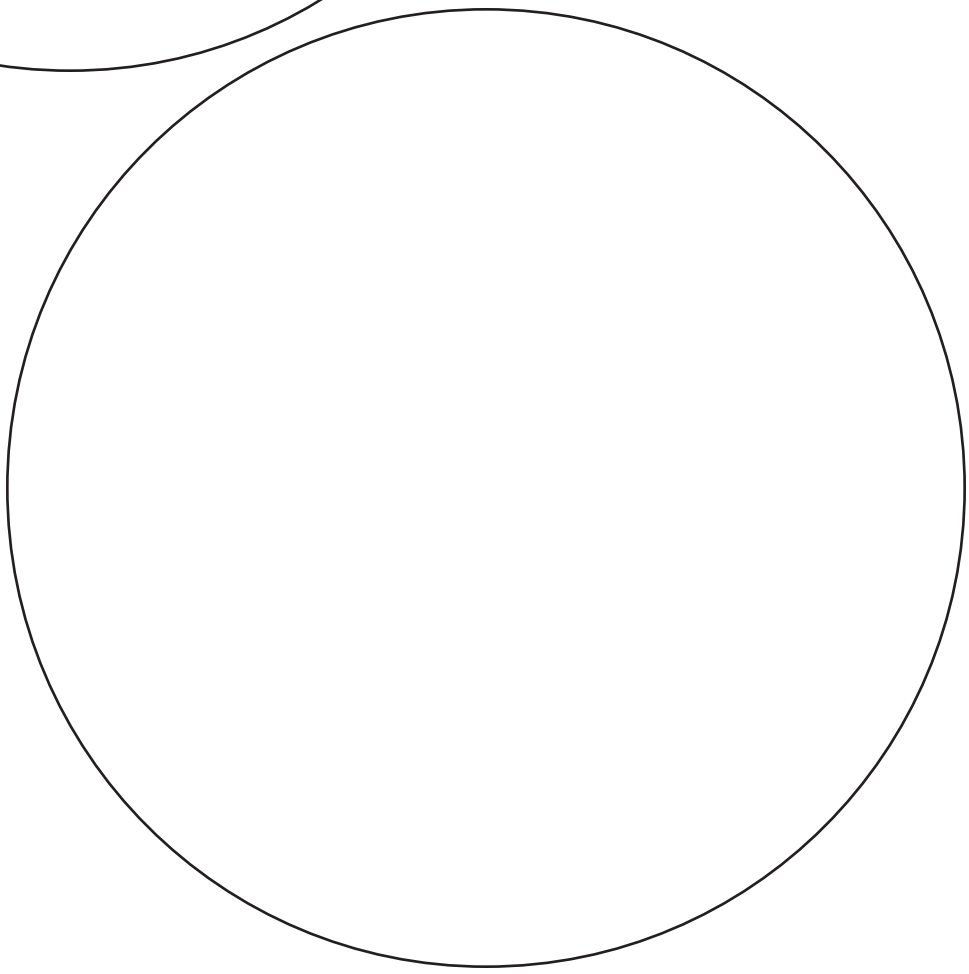

Circle Pattern

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Set A10 ★ Activity 3

ACTIVITY

Fraction Bingo

Overview

Students help the teacher prepare a set of Fraction Bingo calling cards. Then the class divides into 2 teams and plays Fraction Bingo

Skills & Concepts

★ understand and represent commonly used fractions, such as ¼, ⅓, and ½

Recommended Timing

Anytime after Set A10 Activity 2

You'll need

★ Fraction Bingo Cards (pages A10.15–A10.18, 1 copy, see Advance Preparation)

★ Fraction Bingo Boards 1 and 2 (pages A10.13 and A10.14, half-class set of each, see Advance Preparation)

★ markers in black and red (if you decide to laminate the Bingo Cards, use overhead or dry-wipe markers)

★ red crayons, class set

★ pencils

Advance Preparation Run 1 copy of each sheet of Fraction Bingo Cards on cardstock and laminate. Then cut the 16 cards apart. (If your time or materials are limited, run 1 copy of each sheet on white copy paper, cut the cards apart, and *don't* laminate them.) Run a half-class set of Board 1 on white copy paper and a half-class set of Board 2 on light-colored copy paper.

Note You may want to break this activity out over several short periods. For instance, you might have the class help you label half of the cards one day, the other half the following day, and play the game the third day.

Instructions for Fraction Bingo

1. Gather students to your discussion circle. Explain that the class is going to play a game of Bingo, but you need their help to prepare the calling cards first. Show them one of the calling cards that has a fraction written on it already. Read the fraction with the class and work with their input to color in that part of the shape.

> ***Teacher*** *Boys and girls, we're going to play a game of Bingo. I'm going to need your help to get the Bingo Cards ready, though. Here's the first one. What can you tell me about it?*

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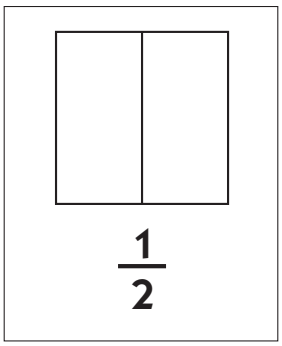
Activity 3 Fraction Bingo (cont.)



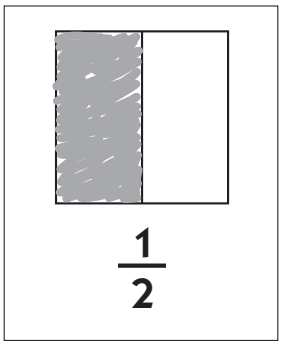
Students *It's a square.*
It's like a sandwich cut in half.

Students *That number says one two.*
It means one-half.

Teacher *The fraction one-half tells us how much of the square to color in. Who can come up and show me how to color in half of this square? K'Sondra?*

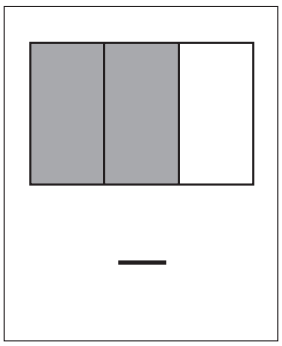
K'Sondra *It's already cut in half. Just color this part here.*

Teacher *Okay. I'm going to color the part K'Sondra showed with a red marker so it's really easy to see.*



2. Continue in this fashion with the other cards in the set. Students may be more engaged if you invite them to help you color some of the cards. The class will notice that the shapes on some of the cards have already been shaded in. On these, you need to solicit students' help to write the matching fraction.

Teacher *Here's a different kind of card. Have a look and tell me what you notice about this one.*



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Activity 3 Fraction Bingo (cont.)

Students *It's a rectangle cut in 3 parts.*
Two of them are colored in already.
There's no number on that one.

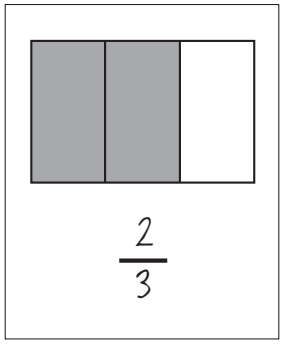
Teacher *We're going to write the fraction on this one. This rectangle is divided into 3 equal parts. Does anyone remember the name of the fraction that tells about one of the parts?*

Esteban *It's one-third. A third is like three.*

Teacher *That's right. And how many of the thirds have been shaded in?*

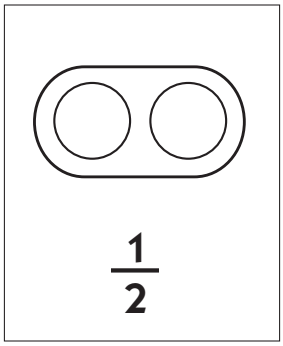
Bianca *2 of them.*

Teacher *So I'm going to write 2 above the line to show that 2 of the 3 parts are shaded in, and 3 below the line to show that there are 3 parts in all. This fraction says two-thirds.*



There are 4 cards that present fractions as parts of a set instead of parts of a whole. Help students use what they already know about fractions to label these cards.

Teacher *Here's a card with two marbles in a loop. It says ½. What is half of 2?*



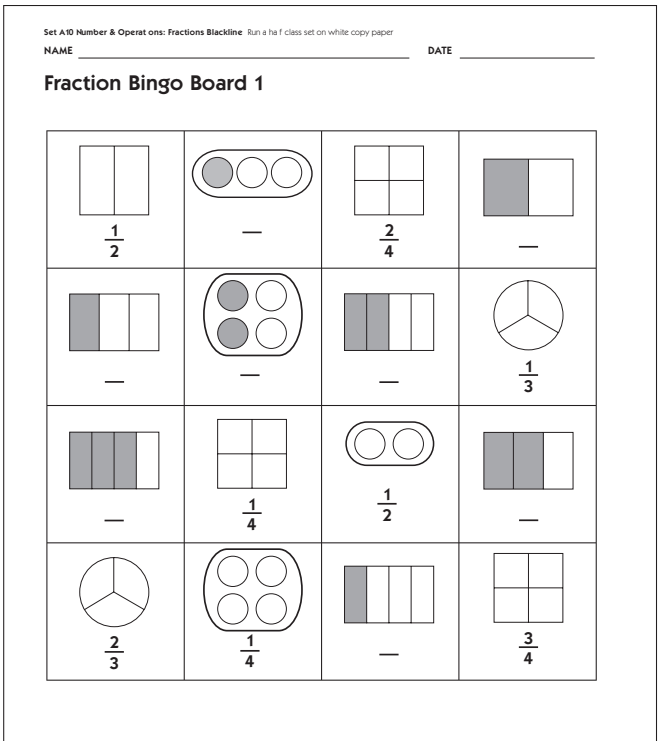
Hector *It's 1, so color in one marble..*

Maria *If you shared the marbles in half, you'd get 1 and your brother would get 1.*

3. After all 16 cards have been prepared, show students the 2 different Bingo Boards. Explain that you're going to mix up the calling cards and place them face-down in a stack. Then you'll take one card at a

Activity 3 Fraction Bingo (cont.)

time from the top of the stack and hold it up for everyone to see. Their job will be to find the box on their Bingo Board that matches the card and either color in or write the fraction, just like you've done on the card.

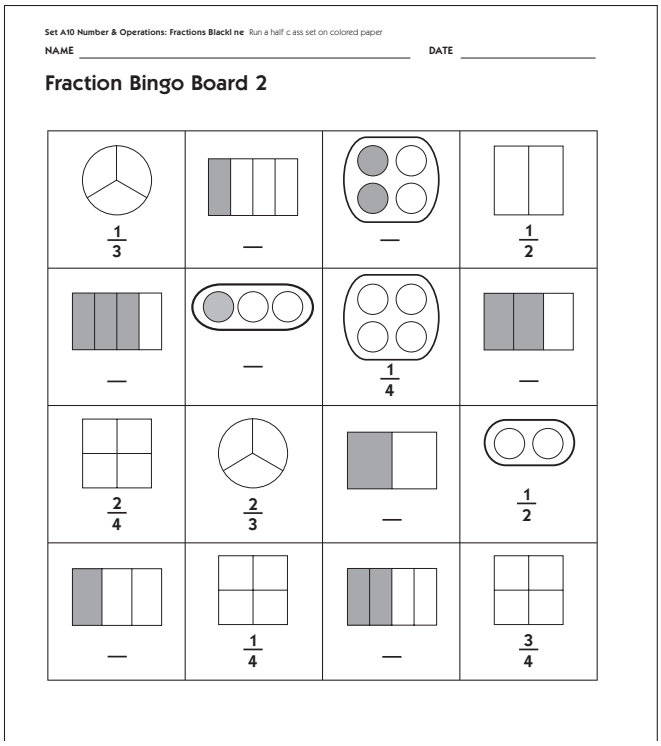


Set A10 Number & Operat ons: Fractions Blackline Run a ha f class set on white copy paper

NAME _____ DATE _____

Fraction Bingo Board 1

$\frac{1}{2}$	—	$\frac{2}{4}$	—
—	—	—	$\frac{1}{3}$
—	$\frac{1}{4}$	$\frac{1}{2}$	—
$\frac{2}{3}$	$\frac{1}{4}$	—	$\frac{3}{4}$



Set A10 Number & Operations: Fractions Blackl ne Run a half c ass set on colored paper

NAME _____ DATE _____

Fraction Bingo Board 2

$\frac{1}{3}$	—	—	$\frac{1}{2}$
—	—	$\frac{1}{4}$	—
$\frac{2}{4}$	$\frac{2}{3}$	—	$\frac{1}{2}$
—	$\frac{1}{4}$	—	$\frac{3}{4}$

4. Send students back to their tables. Divide the class in half and ask each student to get out a pencil and red crayon. Give Bingo Board 1 to the half the children and Bingo Board 2 to the other half. Ask students to write their name on their board. Chances are, most students have played Bingo before. If not, remind them that the first team to mark 4 boxes in a row side-ways, up and down, or diagonally wins. They'll mark some of the boxes by coloring in the fraction and some by writing the fraction to match the parts that have been shaded in.

5. Hold up the Bingo Cards one by one. Each time, have students locate the matching box on their board. If there's a fraction under the shape or set of marbles, they need to color in part of the shape or set to match the fraction. If part of the shape or set has been shaded already, they need to write a fraction to match. Play until one team gets 4 in a row.

Extensions

- Play a blackout version of the game in which you continue to draw cards until both teams have filled their boards entirely.
- Collect the boards at the end of the game. Play the game a second and possibly even a third time, giving the students Unifix cubes to use as game markers.
- You might have students fill in their boards *while* you fill in the Bingo Cards instead of waiting until after the cards have been prepared. If you decide to do this, give each child Unifix cubes to use as game markers.

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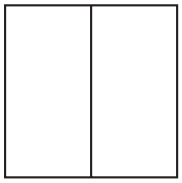
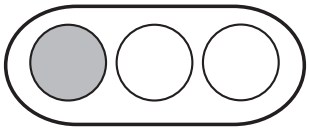
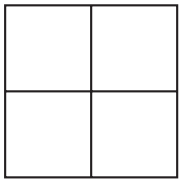
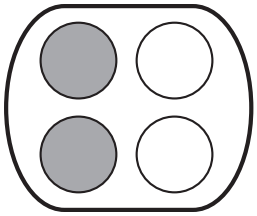
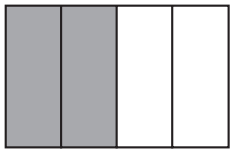
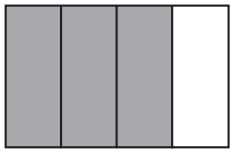
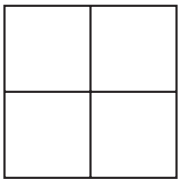
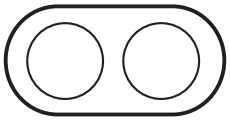
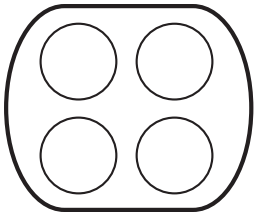
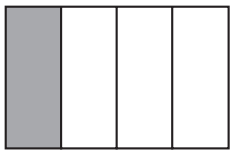
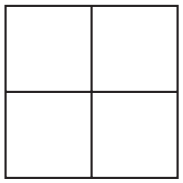
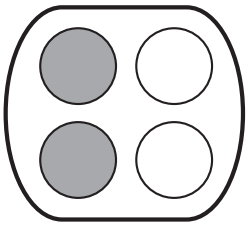
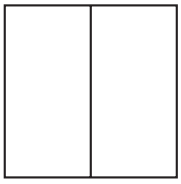
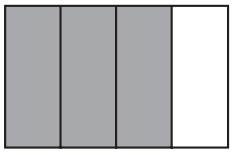
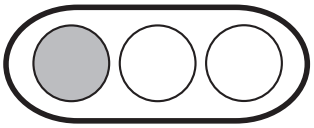
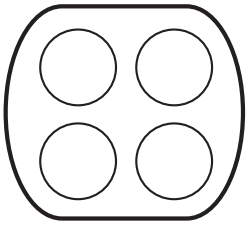
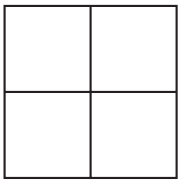
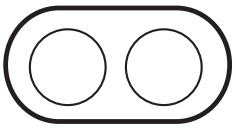
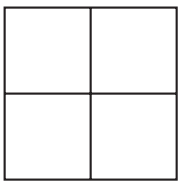
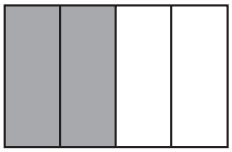
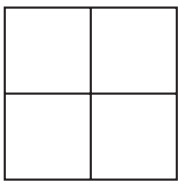
NAME _____ **DATE** _____

Fraction Bingo Board 1

 $\frac{1}{2}$	 ___	 $\frac{2}{4}$	___
___	 ___	 ___	$\frac{1}{3}$
 ___	 $\frac{1}{4}$	 $\frac{1}{2}$	___
$\frac{2}{3}$	 $\frac{1}{4}$	 ___	 $\frac{3}{4}$

NAME _____ **DATE** _____

Fraction Bingo Board 2

$\frac{1}{3}$	___	 ___	 $\frac{1}{2}$
 ___	 ___	 $\frac{1}{4}$	___
 $\frac{2}{4}$	$\frac{2}{3}$	___	 $\frac{1}{2}$
___	 $\frac{1}{4}$	 ___	 $\frac{3}{4}$

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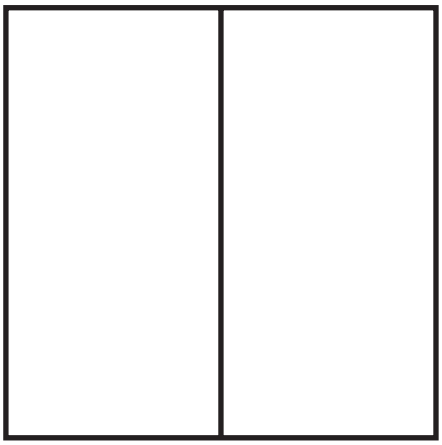

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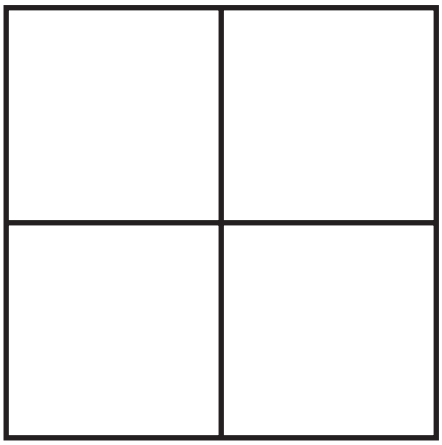
Fraction Bingo Card



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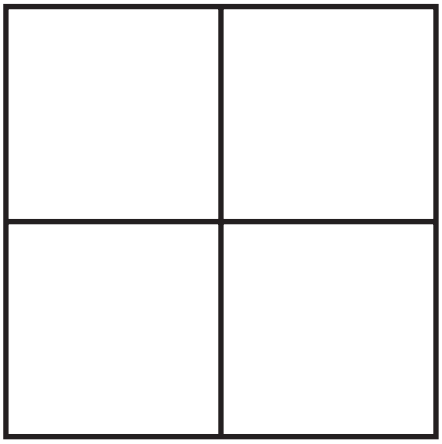

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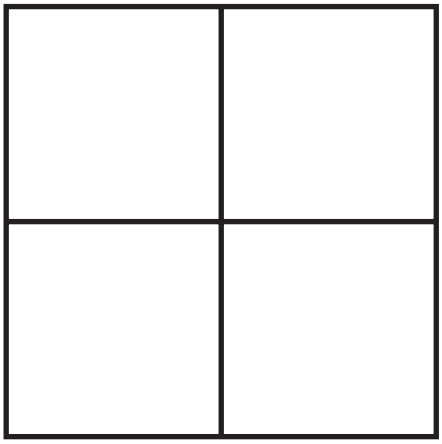

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Fraction Bingo Card

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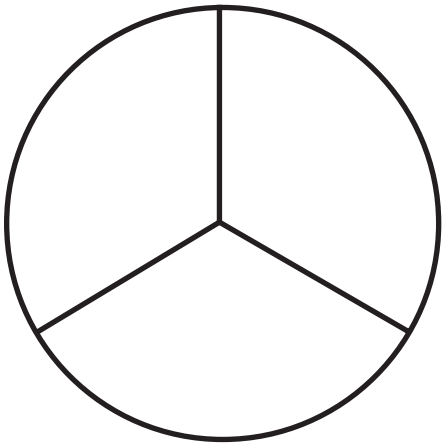

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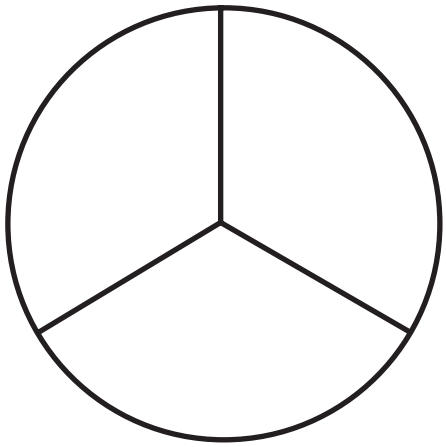
Fraction Bingo Card



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Fraction Bingo Card

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Fraction Bingo Card

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Fraction Bingo Card

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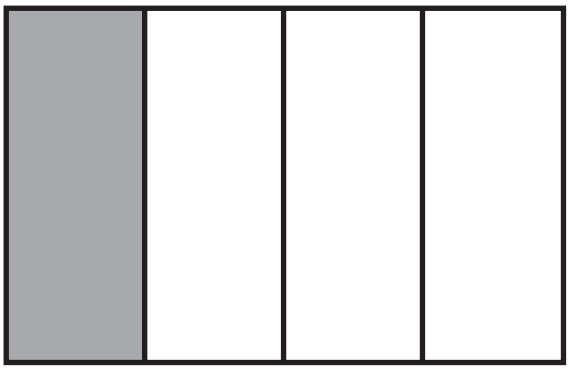
Fraction Bingo Card



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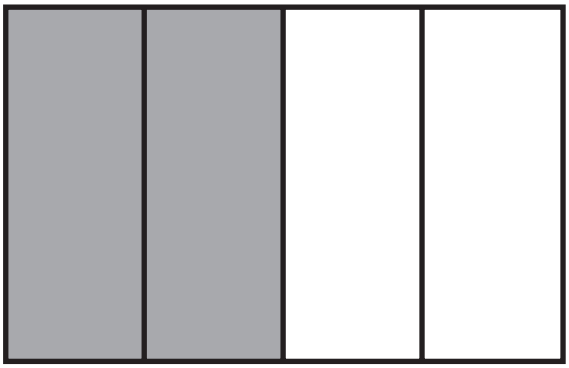
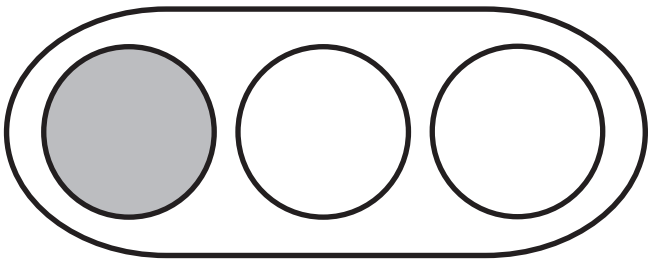


Fraction Bingo Card

Fraction Bingo Card

Fraction Bingo Cards page 4 of 4



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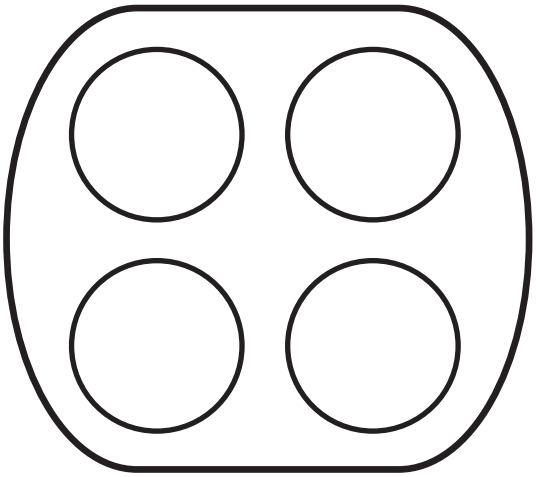

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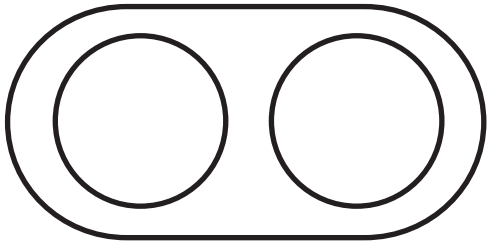

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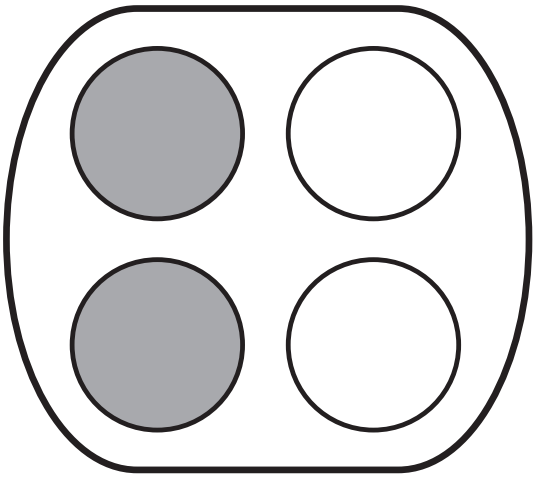

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