



# KINDERGARTEN SUPPLEMENT

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## Set A2 Number & Operations: Fractions

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### Skills & Concepts

- ★ understand and represent  $\frac{1}{2}$

**Bridges in Mathematics Kindergarten Supplement**

**Set A2** 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 A2 ★ Activity 1



## ACTIVITY

### Charlie's Snack

#### Overview

Each student colors a paper square to resemble a piece of bread spread with jam or peanut butter. Students then fold and cut their squares in half and glue them onto a paper "plate".

#### Skills & Concepts

- ★ understand and represent  $\frac{1}{2}$

#### You'll need

- ★ Paper Plate (page A2.3, run a class set)
- ★ 1 three-and-a-half inch square of white or tan paper for each student, plus a few extra
- ★ crayons
- ★ glue sticks
- ★ scissors
- ★ *Eating Fractions* by Bruce McMillan (optional)

#### Instructions for Charlie's Snack

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

*Yesterday when Charlie got home from school, he found a slice of whole wheat bread on a plate, a jar of peanut butter, and a knife sitting on the kitchen table. There was also note from his mom that said, "Hi, Charlie! I had to go next door for a few minutes. Make yourself a snack."*

*So Charlie opened the jar and spread a nice, thick layer of peanut butter on the bread. Then he said, "Hmmm... this looks really good. I think I'll cut it in half so I can share it with Mom when she comes back."*

*He took the knife and cut very carefully. Here's how the piece of bread looked when he 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 Charlie cut his piece of bread in half? How do you know? (No, he cut it into 2 pieces, but they're not halves.)*

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," "It's not fair if one person gets more than the other," or "One of those is smaller than the other."

3. Then explain that you're going to have each of them make a snack like Charlie did, using paper, crayons, and scissors instead of bread, peanut butter, and a knife. 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.

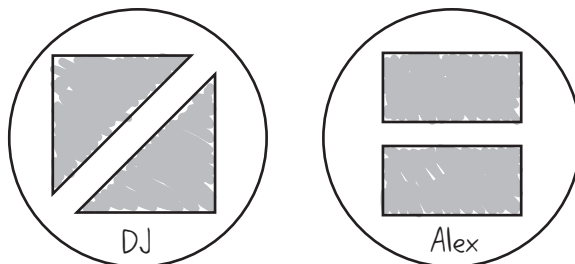
**Activity 1** Charlie's Snack (cont.)

*I'm going to use a brown crayon to color this piece of paper. There....now there's a nice thick layer of peanut butter on my bread. What can I do to cut it in half exactly?*

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:

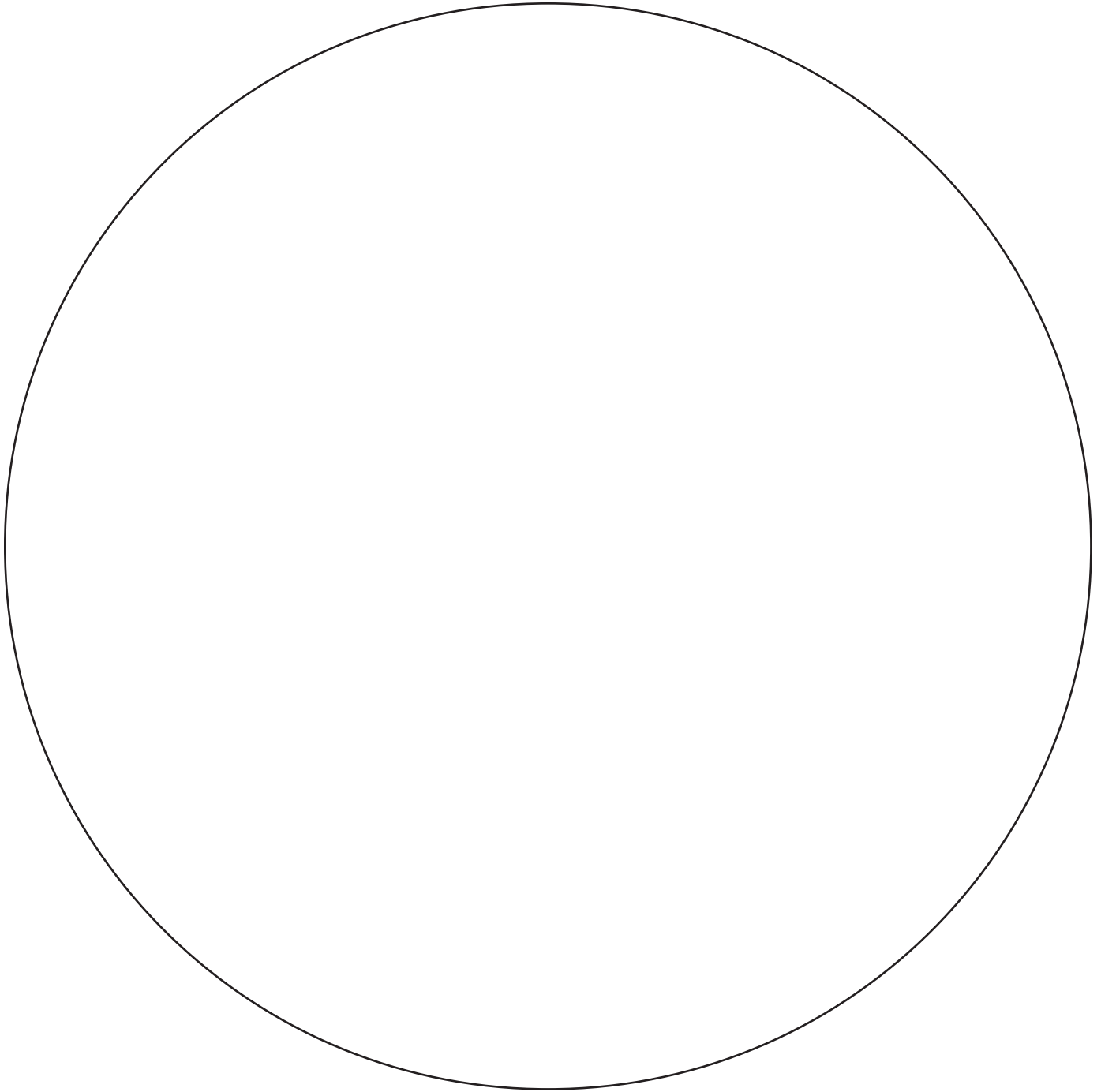
- What can we do to make sure both halves are the same size?
- Why do they have to be the same size? Why can't one be bigger than the other?
- What shape are the halves if I cut the paper sideways? (rectangles)
- What shape are the halves if I fold and cut the paper on the diagonal? (triangles)
- Do you think one of the triangular halves is bigger, smaller, or the same size as one of the rectangular halves? (This is a challenging question. Students' responses will vary, and you may want to leave the question unresolved for some of them to pursue later.)

4. Give each student a paper square. Ask them to return to their tables to color, fold, and cut their squares in half, either sideways or along the diagonal. Let them know that they can color their square red or purple if they'd rather have jelly instead of peanut butter on their bread, or even brown and red or purple if they'd like peanut butter and jelly. Circulate to assist as needed. As students finish, give them each a copy of the Paper Plate blackline. Have them cut out the circle, glue their sandwich halves to it, and write their name on their work.

**Extensions**

- Show children how to write  $\frac{1}{2}$ , and ask them to label each of their "sandwich" halves with the fraction.
- Work with the class to graph their finished work, either by the topping (peanut butter, jelly, or both), or by the shapes of the halves (rectangular or triangular). Discuss the finished graph with students, comparing the number of "plates" in each row or column.
- Read and discuss *Eating Fractions* by Bruce McMillan.

# Paper Plate





# Set A2 ★ Activity 2



## ACTIVITY

### Sharing Cubes

#### Overview

Students work in pairs to share different numbers of Unifix cubes fairly. In doing so, they have an opportunity to explore fractions as parts of a set as well as parts of a whole.

#### Skills & Concepts

- ★ understand and represent  $\frac{1}{2}$

#### Recommended Timing

Anytime after SetA2 Activity 1

#### You'll need

- ★ 6 green Unifix cubes for demonstration purposes
- ★ Unifix cubes (20 cubes all the same color for each student pair)
- ★ 9" × 12" construction paper in any color but green (1 sheet for every 2 students)

#### Instructions for Sharing Cubes

1. Gather students to your discussion circle. When everyone is settled, place 6 green Unifix cubes on a piece of construction paper and set it in the middle of the circle. Explain that two friends were making patterns with Unifix cubes and these were the only green ones left in the tub. Since they both needed greens to finish their patterns, they decided to share the cubes fairly between them.
2. Without giving any further explanations or counting the cubes with the class, ask students to pair-share their ideas about how the two friends could share them. Then call on volunteers to share their thinking to the group. Encourage children to explain their ideas as they share.

**Antea** *Each kid could get 3 cubes.*

**Teacher** *How do you know? How did you figure that out?*

**Antea** *I just could tell by looking.*

**Teacher** *Did anyone have a different way to solve the problem?*

**Lilah** *I said, okay there are 6 cubes, so each kid can have 3.*

**Teacher** *How do you know?*

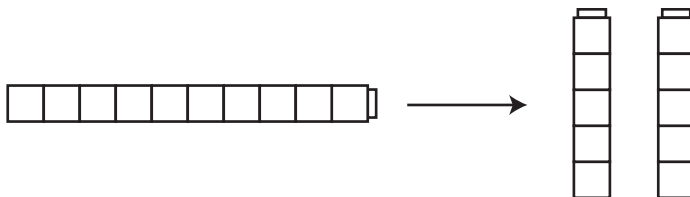
**Lilah** *Because 3 and 3 make 6.*

3. After students have shared their ideas, divide the cubes into two sets of 3. Then ask students to confirm whether or not this is a fair arrangement. Would each friend get *half* the cubes? How do they know?
4. Put the cubes into a single stack. Count them with the class to confirm that there are still 6, and then ask a volunteer to break the stack in half. Are there 3 cubes in each of the smaller stacks? Why?
5. Now give each student pair 20 Unifix cubes all the same color, and one piece of construction paper. Ask each pair to place 10 cubes on the paper and put the other cubes aside for now. If they share the 10

**Activity 2** Sharing Cubes (cont.)

cubes fairly, each taking exactly half, how many will they each get? Ask students to whisper their ideas to each other, and then divide the cubes fairly between themselves. How many did they each get? Why?

6. Once they've divided the cubes and confirmed that they each got 5, ask them to work together to stack the 10 cubes and then break the stack in half. How many cubes are in each half of the stack? Why?



**Students** *It's 5 because 5 and 5 is 10.*

*We went 1 for you, 1 for me. I got 5 and so did Anna.*

*If you put all the cubes together in one big line and then break it, it makes 5 and 5.*

*It's fair! You can see that 5 is half.*

7. Repeat steps 5 and 6 with several other even numbers, including 4, 8 and 12.

**Extensions**

- If students are comfortable with the activity and the concepts, you might also try 14, 16, 18, and 20.
- You might want to keep a written record of the work as you go along. For example,

Half of 6 is 3

Half of 10 is 5 (and so on)

# Set A2 ★ Activity 3



## ACTIVITY

### Paper Pancakes

#### Overview

In this activity, students explore what happens when 2 children share 1 pancake, 4 children share 2 pancakes, and 6 children share 3 pancakes. After working to solve these problems as a group, students work in pairs to share 3 pancakes between them.

#### Skills & Concepts

- ★ understand and represent  $\frac{1}{2}$

#### Recommended Use

Anytime after Set A2 Activity 1

#### You'll need

- ★ 4"-diameter paper circles (page A2.9, 3 circles for each pair of students and 6 circles for the class, see Advance Preparation)
- ★ scissors (class set)
- ★ *Pancakes, Pancakes!* by Eric Carle (optional)

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**Advance Preparation** You can run a copy of the blackline on page A2.9 to use as a template for cutting these circles if you wish. You can also cut 6 larger circles for the whole-group portion of this activity. If you think you may want to do the extension activity on the next page with some or all of your students, you'll need 2 more circles for every 3 students.

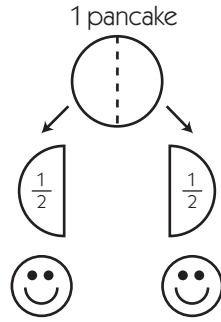
**Note** Consider reading *Pancakes, Pancakes!* or some other story about pancakes to your class before teaching this session to set the stage.

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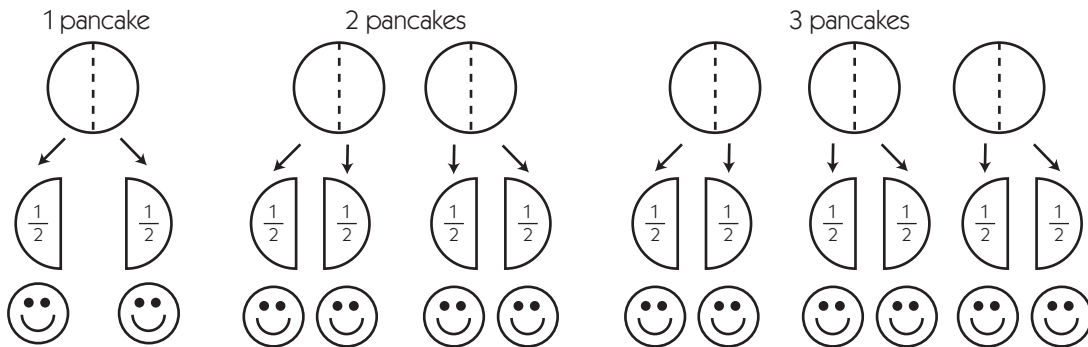
#### Instructions for Paper Pancakes

1. Gather students to your discussion circle, and talk to them briefly about pancakes. Have they ever had pancakes for breakfast? Have they ever helped make pancakes or watched someone do it? What do they like to put on top of their pancakes—butter, syrup, jam?
2. Explain that today, they're going to be sharing some paper pancakes. Call 2 volunteers to come stand by you where everyone in the circle can see them. Hold up a single paper circle "pancake." Ask the class how these 2 children could best share 1 pancake, 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 pancake 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. Use simple sketches and numbers to record the problem on the board.

## Activity 3 Paper Pancakes (cont.)



5. Repeat steps 2–4 with 4 children and 2 pancakes and then with 6 children and 3 pancakes. Be sure students predict how much the children will get each time. Work with input from the class to record the results on the board as you go.



6. Ask students to reflect on the results so far. What do they notice? Why does each child get half a pancake each time? (There is no need to reach conclusions or do any direct teaching around these questions. These are invitations to ponder a bit. While many students may observe that the children keep getting half a pancake each time, you may have a few who are able to verbalize some sort of explanation as to why.)

7. Partner the children and explain that you're going to give each pair 3 paper pancakes to share. Ask them to return to their tables and get out their scissors so they're ready to work, and then distribute the pancakes. 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 pancake each and cut the third one in half, while others may cut all 3 pancakes in half and share the halves equally. Some may even cut their 3 pancakes 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.

8. 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 pancakes among 3 children. (The solution is  $\frac{2}{3}$  of a pancake for each child; literally two divided into three equal parts.)

# Circle Pattern

