



# GRADE 1 SUPPLEMENT

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## Set A3 Number & Operations: Addition & Subtraction on the Number Line

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### Skills & Concepts

- ★ represent addition and subtraction using movement on the number line
- ★ connect physical and pictorial representations to addition and subtraction equations
- ★ demonstrate the inverse relationship between addition and subtraction by undoing an addition problem with subtraction and vice versa
- ★ solve and create word problems that match addition or subtraction equations
- ★ use the equal sign and the word *equals* to indicate that two expressions are equivalent

**Bridges in Mathematics Grade 1 Supplement**

**Set A3** Numbers & Operations: Addition & Subtraction on the Number Line

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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 A3 ★ Activity 1



## ACTIVITY

### Hopping Along the Number Line

#### Overview

This simple activity introduces the idea of moving up and down a number line to represent and solve addition and subtraction problems.

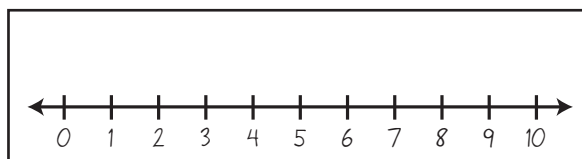
#### Skills & Concepts

- ★ represent addition and subtraction using movement on the number line
- ★ connect physical and pictorial representations to addition and subtraction equations
- ★ demonstrate the inverse relationship between addition and subtraction by undoing an addition problem with subtraction and vice versa
- ★ solve and create word problems that match addition or subtraction equations

#### You'll need

- ★ Number Lines Sheet (page A3.5, run a class set, plus a demonstration copy)
- ★ a 6" x 36" piece of white or light blue butcher paper (see Advance Preparation)
- ★ a plastic frog from the frog bucket or a slightly larger stuffed toy frog if you have one
- ★ chart paper or whiteboard and markers
- ★ a pencil and a hard writing surface for each student

**Advance Preparation** Use a wide-tipped permanent black marker to draw a 33" line across the length of butcher paper. Leave a 1½" margin at each end, and draw an arrow at either end of the line. Make 11 small tic-marks spaced 3" apart all the way down the line, starting and ending 1½" from the arrow tips. Number the marks from 0 to 10. Laminate the strip if you want to save it for use in future years. Post a copy of the Number Lines Sheet on an easel or on the whiteboard right next to your discussion circle.



#### Instructions for Hopping Along the Number Line

1. Gather students to your discussion circle. Lay the number line you've prepared in the middle of the circle, positioned in such a way that you can reach it easily from the edge where you're sitting. As students watch, set your frog on the 0. Explain that this little frog lives at the edge of a long stream and likes to hop from one number to another.
2. Explain that the frog travels one space on each hop. Then take a minute to establish with the class how many hops it takes the frog to get from 0 to several of the numbers on the line. Start by asking students how many hops it would take the frog to get from the 0 to the 3. Some children may say the answer is four, believing that the frog must hop once on the 0, and then three more times to get to the 3. Demonstrate, as students count with you, that it only takes the frog three hops to get to the 3, five hops to get to the 5, eight hops to get to the 8, and so on.

**Activity 1** Hopping Along the Number Line (cont.)

3. Tell the addition and subtraction problems below (or similar problems), as you work with input from the class to act them out by moving the frog on the line. After telling each story, record a matching number sentence on the whiteboard or your chart paper. Then ask a student helper to repeat your original actions with the frog on the line a second time to illustrate the operation.

**Teacher** One day, Little Frog was sitting on the number 0 enjoying the morning sun. Suddenly, she saw a tasty bug fly past. She decided to try to catch it. She made 4 hops. (Where is she now? That's right, she's on the 4.) Then she made 2 more hops. (Where did she land? Right, she's on the 6 now.)

I'm going write numbers on the whiteboard to tell this story. Little frog made 4 hops, and then 2 more, so I'm going to write  $4 + 2$ . Let's put the frog back on the 0 where she started. Who would like to move the frog on the line as we tell the story with numbers? Alex?

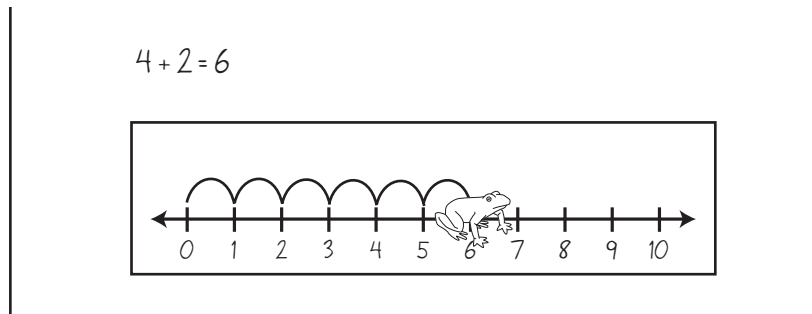
How many hops did Little Frog make first?

**Students** Four! She jumped to the 4.

**Teacher** Then how many more did she make, and where did she land?

**Students** She did 2 more. She got all the way to the 6.

Did she get the bug?

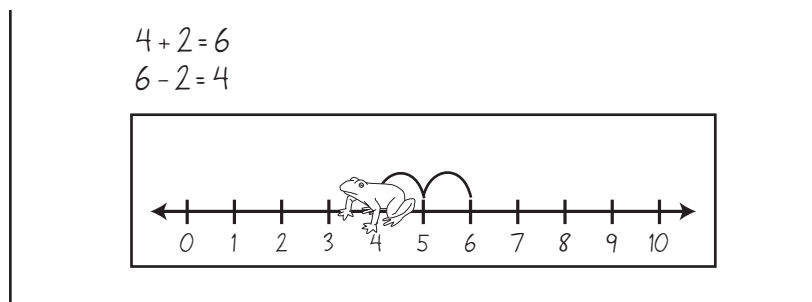


**Teacher** Little Frog helps us see that  $4 + 2$  is 6, but she didn't get the bug. The bug flew right back over her head! Little Frog turned around and took 2 hops back the other way. Where do you think she's going to land?

**Students** On the 2!

No, on the 4 because she's only going 2 hops back.

Can I try?



**Activity 1** Hopping Along the Number Line (cont.)

4. Repeat Step 3 with the following pairs of problems, or problems similar to them. Move the frog back to the 0 each time you tell and act out a new pair of problems.

- *Problem 1* Little Frog was sitting on the 0. She heard her friends playing up the stream, so she decided to join them. First she made 3 hops. Then she made 2 more. Where did she land? ( $3 + 2 = 5$ )
- She was sitting on the 5 when she saw her little brother pop up behind her. She made 2 hops back the other way to get him. Where did she land? ( $5 - 2 = 3$ )
- *Problem 2* Little Frog was sunning herself on the 0. She decided to look for some bugs. First she made 4 hops, but she didn't see any bugs. Then she made 3 more hops. Where did she land? ( $4 + 3 = 7$ ) Do you think she found any bugs there?
- While she was sitting on the 7, she heard her mother call her to come home. She took 7 hops back the other way. Where did she land? ( $7 - 7 = 0$ )

5. Draw students' attention to the Number Lines Sheet you've posted. As they watch, write the expression  $3 + 1$  in the first box. Ask one of your students to tell a story to match this number sentence and act it out on the line with the frog.

Set A3 Number & Operations: Addition & Subtraction on the Number Line Blackline Run a class set

NAME \_\_\_\_\_ DATE \_\_\_\_\_

**Number Lines Sheet**

a

$3 + 1$

**Marco** Little Frog did 3 hops. Then she did 1 more because she was looking for bugs. One, two, three, then 1 more hop. Now she's on the 4.

Show students how to record the frog's action on the first number line, and then work with their input to write the answer to the problem.

Set A3 Number & Operations: Addition & Subtraction on the Number Line Blackline Run a class set

NAME \_\_\_\_\_ DATE \_\_\_\_\_

**Number Lines Sheet**

a

$3 + 1 = 4$

b

6. Give students each a copy of the Number Lines Sheet, a pencil, and a hard writing surface. Have them write the expression  $3 + 1$  in Box A, and then ask a volunteer to tell and act out a different story to match the expression. Have students mark the number line to show the frog's action, and then record the answer.

**Activity 1** Hopping Along the Number Line (cont.)

7. Repeat Steps 5 and 6 three more times, using the expressions  $4 - 1$ ,  $5 + 3$ , and  $8 - 3$ . Each time, write the expression on your sheet as students copy it. Ask a volunteer to tell and act out a story to match, using the frog and the large number line. Record the action and the solution on your sheet as students do the same on theirs.

Set A3 Number & Operations: Addition & Subtraction on the Number Line Blackline Run a class set  
 NAME \_\_\_\_\_ DATE \_\_\_\_\_

**Number Lines Sheet**

**a**

$3 + 1 = 4$

**b**

$4 - 1 = 3$

**c**

$5 + 3 = 8$

**d**

$8 - 3 = 5$

NAME \_\_\_\_\_

DATE \_\_\_\_\_

# Number Lines Sheet

**a**



**b**



**c**



**d**







## Set A3 ★ Activity 2



### ACTIVITY

## The Frog Jump Game

### Overview

This activity makes use of a simple game to reinforce the idea that the number line can be used to model and solve addition and subtraction problems. The teacher plays the game several times with the whole class, and then makes it available to pairs of students to use during Work Places.

### Skills & Concepts

- ★ represent addition and subtraction using movement on the number line
- ★ connect physical and pictorial representations to addition and subtraction equations
- ★ solve and create word problems that match addition or subtraction equations
- ★ use the equal sign and the word *equals* to indicate that two expressions are equivalent

### You'll need

- ★ Frog Jump Game cards (pages A3.10–A3.12, see Advance Preparation)
- ★ 6" × 36" number line from Set A3, Activity 1
- ★ 2 plastic frogs, 1 green and 1 blue
- ★ jar of popsicle sticks with students' names on them
- ★ chart paper or whiteboard and markers
- ★ Frog Jump Game Number Lines (page A3.13, optional, run as needed)
- ★ individual chalkboard/chalk or whiteboard/pen and eraser for each student (optional)

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**Advance Preparation** Run 1 copy of each of the black-lines on cardstock, and cut the cards apart.  
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### Instructions for The Frog Jump Game

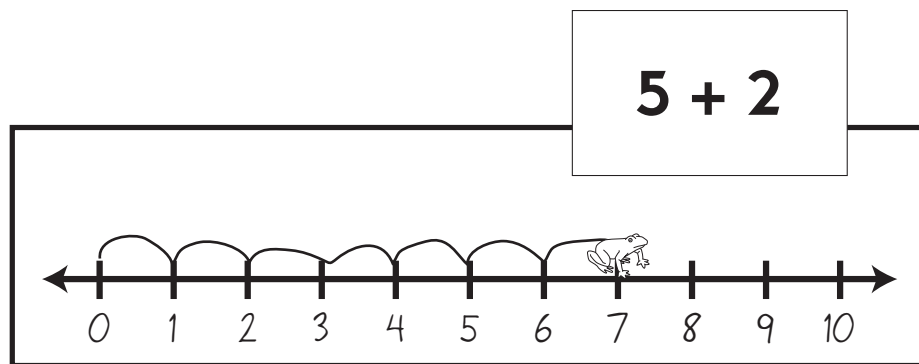
1. Gather students to your discussion circle. Set the number line in the middle of the circle, positioned in such a way that you can reach it easily from the edge where you're sitting. As students watch, set both frogs on the 0. Explain that you're going to play a frog jumping game with them today.
2. Show children the deck of cards you've prepared. As they watch, mix the cards thoroughly and place them in a stack face down. Explain that you're going to take the first turn so they see how to play the game. Draw the card from the top of the pile. Show it to the class and read it with them. Tell a story to match the equation as you move your frog along the line to get the answer.

**Teacher** *Here's the card I got. Let's read it together.*

**Students** *Five and two.*

*You got 5 plus 2. I think that's 7!*

**Teacher** *Let me think of a good story to go with this addition expression. Okay, my little frog went out to find some bugs to eat. First she took 5 hops to the fifth rock. She didn't find any bugs there, so she took 2 more hops. Where did she land?*

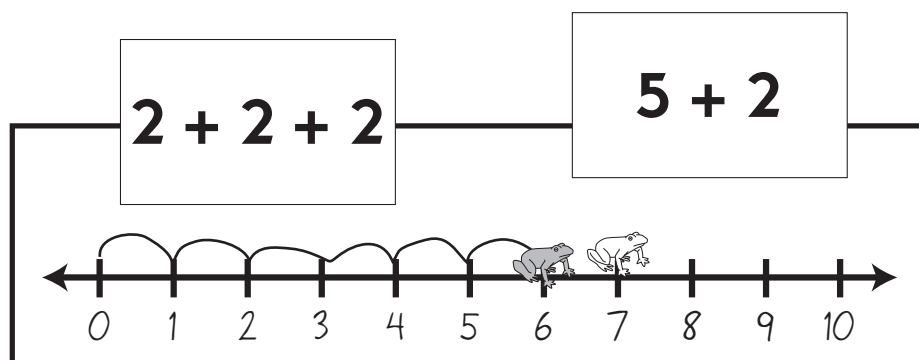
**Activity 2** The Frog Jump Game (cont.)

**Students** *On the 7!*

*I was right— $5 + 2$  does make 7.*

3. Choose a stick from your helper jar and have that student draw the next card from the pile for the class. Ask him or her to show the card to the other children and then tell a story to match while moving the class's frog along the line to get the answer. Encourage other students to help if necessary.

**Eloise** *I got  $2 + 2 + 2$ . Our frog went 2 hops to get some bugs. No bugs. She went 2 more hops. Then she went 2 more and she got some bugs!*

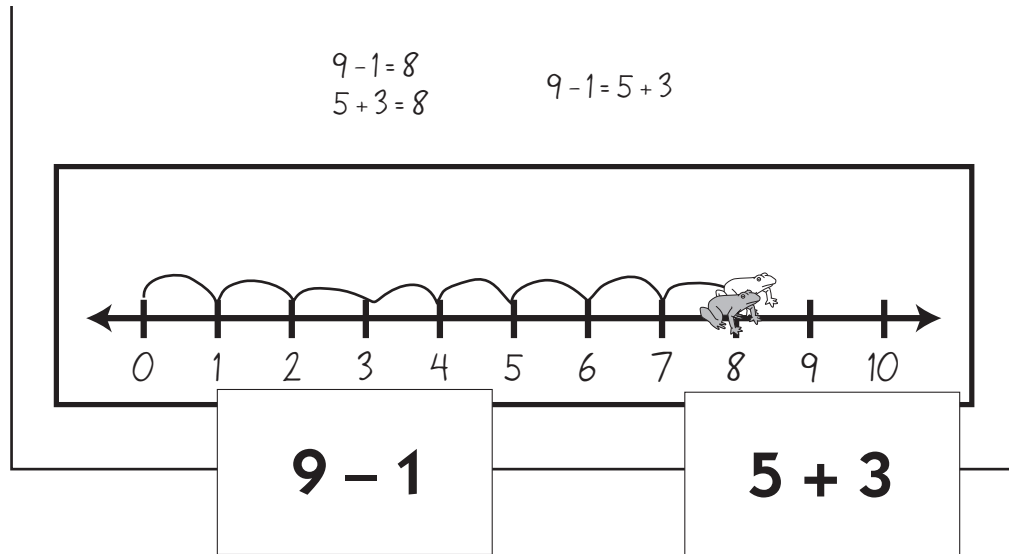


4. Work with the class to determine which answer is greater, and give both cards to that team. In the example above, you would get both cards because 7 is greater than 6. If the two teams draw combinations with the same answer, each team gets to keep its own card.

5. Continue taking turns back and forth with the class until all the cards are used up. Count the cards at the end of the game. The team with more cards wins.

**Extensions**

- Play The Frog Jump Game again several times with your class as you have time in the coming weeks. This game helps students practice basic facts, while giving them opportunities to model the operations on a number line and practice telling stories to match addition and subtraction expressions.
- If both teams draw a card that results in the same answer, explain to the children that there are many different names for the same number. Record the two expressions at the whiteboard or on a piece of chart paper, and take the opportunity to explain that the equals sign means “the same as”. For instance,  $9 - 1$  is the same as  $5 + 3$  because the answer to both is 8.

**Activity 2** The Frog Jump Game (cont.)

- Give students each chalk or a pen, and an individual chalkboard or whiteboard. Have them record some or all of the addition and subtraction equations as you play the game with them.
- Leave the cards, the large number line, and the frogs out so pairs of students can play the game during Work Places. (If the game becomes quite popular for a while, make additional sets of the cards, and run cardstock copies of page A3.13, Frog Jump Game Number Line, so 3 or more pairs of students can play during Work Places.)

## Frog Jump Game cards page 1 of 3

$$2 + 2$$

Frog Jump Game card

$$3 + 1$$

Frog Jump Game card

$$6 - 2$$

Frog Jump Game card

$$7 - 3$$

Frog Jump Game card

$$3 + 2$$

Frog Jump Game card

$$4 + 1$$

Frog Jump Game card

$$2 + 2 + 1$$

Frog Jump Game card

$$6 - 1$$

Frog Jump Game card

## Frog Jump Game cards page 2 of 3

$$4 + 2$$

Frog Jump Game card

$$3 + 3$$

Frog Jump Game card

$$2 + 2 + 2$$

Frog Jump Game card

$$8 - 2$$

Frog Jump Game card

$$5 + 2$$

Frog Jump Game card

$$4 + 3$$

Frog Jump Game card

$$3 + 2 + 2$$

Frog Jump Game card

$$10 - 3$$

Frog Jump Game card

## Frog Jump Game cards page 3 of 3

$$5 + 3$$

Frog Jump Game card

$$6 + 2$$

Frog Jump Game card

$$3 + 1 + 4$$

Frog Jump Game card

$$9 - 1$$

Frog Jump Game card

$$5 + 4$$

Frog Jump Game card

$$6 + 3$$

Frog Jump Game card

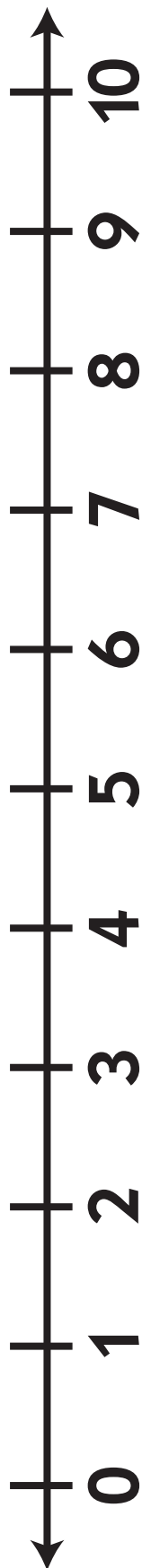
$$4 + 3 + 2$$

Frog Jump Game card

$$10 - 1$$

Frog Jump Game card

### Frog Jump Game Number Line



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### Frog Jump Game Number Line







# Set A3 ★ Activity 3



## ACTIVITY

### Adding & Subtracting on the Number Line

#### Overview

Students use the number line to practice adding and subtracting by counting on and counting backwards. This activity provides opportunities for students to experience and start to understand the relationship between addition and subtraction.

#### Skills & Concepts

- ★ represent addition and subtraction using movement on the number line
- ★ connect physical and pictorial representations to addition and subtraction equations
- ★ demonstrate the inverse relationship between addition and subtraction by undoing an addition problem with subtraction and vice versa

#### You'll need

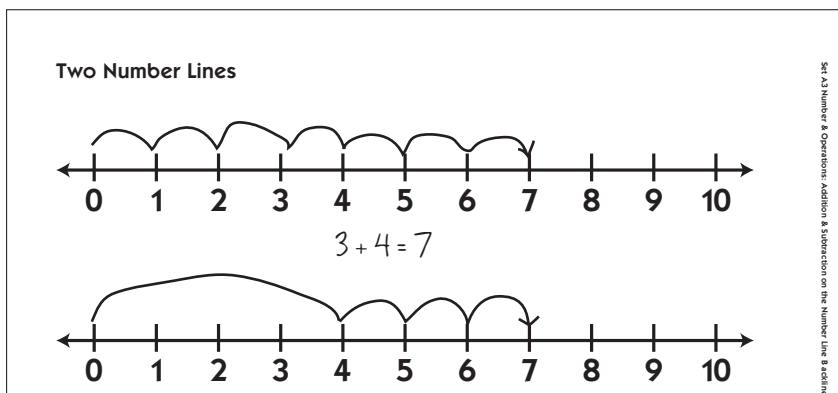
- ★ Two Number Lines (page A3.18, run 1 copy on a transparency)
- ★ Adding & Subtracting on the Number Line (page A3.19, class set, run double-sided)
- ★ overhead pen
- ★ spray bottle and paper towels
- ★ piece of paper to mask parts of the overhead
- ★ Practice on the Line, Addition (page A3.20, optional, run as needed)
- ★ Practice on the Line, Subtraction (page A3.21, optional, run as needed)

#### Instructions for Adding & Subtracting on the Number Line

1. Place Two Number Lines on display at the overhead. Write the expression  $4 + 3$  below the first line. Read it with students. Ask them to think about the answer and discuss it with the person sitting next to them. Then have several volunteers share their solutions and explain their thinking.

**Students** *It's 7. I put up 4 on this hand and 3 on the other, and counted them up. I got 7.*  
*It's 7 because I went 4, then 5, 6, 7.*  
*I know it's 7 because 3 and 3 is 6, and then 1 more is 7.*

2. Use the first number line at the overhead to model a one-by-one counting strategy for finding the sum. Then model a counting-on strategy on the second line by jumping to the 4 and then making 3 more hops. Discuss both strategies with the students. Do both methods work? Which one is faster? Why?



**Activity 3** Adding & Subtracting on the Number Line (cont.)

**Students** You have to take more hops on the first one.

Yeah, you go hop, hop, hop, and keep hopping to every number.

On that other one, you take one big long hop, and then 3 little ones.

They both get to the 7.

**Teacher** How do you know which number to jump to if you use the long hop strategy like we did on the second line?

**Students** Just jump to the number it says.

It says 4 for the first number, so just jump all the way to the 4, and then keep going how many it says.

Go 4, and then hop, hop, hop.

It's 4, then 5, 6, 7, just like I said.

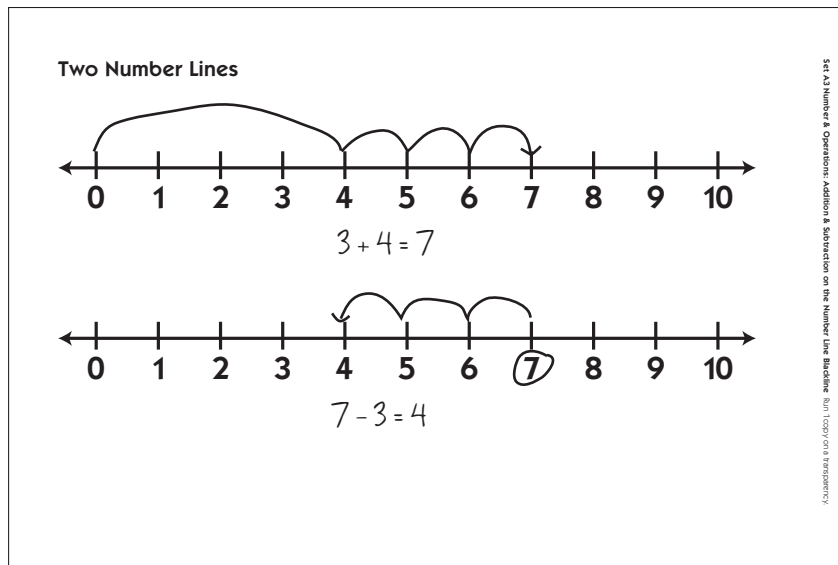
3. Erase the single hops on the first line, and replace them with the long hop and two shorter hops. Then record  $7 - 3$  below the second number line. Read it with your students. Ask them to think about the answer and discuss it with the person sitting next to them. Then have several volunteers share their solutions and explain their thinking.

**Students** I think it's 5 because you go 3 hops back: 7, 6, then 5.

I think 4 because you go backwards 3 times, 6, 5, 4.

It's 4 because if hop back 3 times, you land on the 4.

4. Work with student input to model and solve  $7 - 3$  on the second number line. Reinforce the fact that each hop, including the first, needs to travel. You don't hop up and down on the same number, so it's 6, 5, 4 rather than 7, 6, 5 as you count backwards to solve the problem.



5. Have helpers distribute a copy of Adding and Subtracting on the Number Line to each student as you erase your overhead. Explain that they're going to practice doing some addition and subtraction on the number line with you now. Chances are, most students will agree that the counting on, or "long-hop" method is quicker and easier, so that's what you'll use for addition, and you'll count backwards on the

### Activity 3 Adding & Subtracting on the Number Line (cont.)

line for subtraction. Model and solve the following pairs of addition and subtraction combinations at the overhead as students work with you on their own record sheets.

- 3 + 2 and 5 – 2
- 5 + 2 and 7 – 2
- 4 + 4 and 8 – 4
- 5 + 4 and 9 – 4

By the third or fourth pair, you might have volunteers come to the overhead to lead the class in solving the problems. As you work, continue to discuss the counting on and counting backwards strategies with students, as well as the relationship between addition and subtraction. Although your first graders may not completely understand the inverse nature of the two operations, some may be able to explain that subtraction “undoes” addition.

### Extensions

- Repeat this activity at another time with 4 more pairs of addition and subtraction combinations.
- Assign the practice sheets on pages A3.20 and A3.21 to some or all of your students.

Set A3 Number & Operations: Addition & Subtraction on the Number Line Blackline (Optional, run as needed)

NAME \_\_\_\_\_ DATE \_\_\_\_\_

### Practice on the Line, Addition

1 Solve each problem. Show your work on the number lines.

<b>a</b> $5 + 3 =$ _____	
<b>b</b> $6 + 4 =$ _____	
<b>c</b> $7 + 2 =$ _____	
<b>d</b> $5 + 5 =$ _____	

2 Write an equation to match each number line.

<b>a</b> 	
<b>b</b> 	

3 Add.

$\begin{array}{r} 2 \\ + 2 \\ \hline \end{array}$	$\begin{array}{r} 4 \\ + 2 \\ \hline \end{array}$	$\begin{array}{r} 5 \\ + 2 \\ \hline \end{array}$	$\begin{array}{r} 3 \\ + 5 \\ \hline \end{array}$	$\begin{array}{r} 6 \\ + 3 \\ \hline \end{array}$	$\begin{array}{r} 7 \\ + 3 \\ \hline \end{array}$	$\begin{array}{r} 9 \\ + 0 \\ \hline \end{array}$
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Set A3 Number & Operations: Addition & Subtraction on the Number Line Blackline (Optional, run as needed)

NAME \_\_\_\_\_ DATE \_\_\_\_\_

### Practice on the Line, Subtraction

1 Solve each problem. Show your work on the number lines.

<b>a</b> $7 - 3 =$ _____	
<b>b</b> $9 - 5 =$ _____	
<b>c</b> $6 - 4 =$ _____	
<b>d</b> $8 - 3 =$ _____	

2 Write an equation to match each number line.

<b>a</b> 	
<b>b</b> 	

3 Subtract.

$\begin{array}{r} 6 \\ - 2 \\ \hline \end{array}$	$\begin{array}{r} 4 \\ - 1 \\ \hline \end{array}$	$\begin{array}{r} 5 \\ - 3 \\ \hline \end{array}$	$\begin{array}{r} 3 \\ - 2 \\ \hline \end{array}$	$\begin{array}{r} 7 \\ - 5 \\ \hline \end{array}$	$\begin{array}{r} 8 \\ - 4 \\ \hline \end{array}$	$\begin{array}{r} 2 \\ - 2 \\ \hline \end{array}$
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## Two Number Lines



NAME \_\_\_\_\_

DATE \_\_\_\_\_

# Adding & Subtracting on the Number Line







NAME \_\_\_\_\_

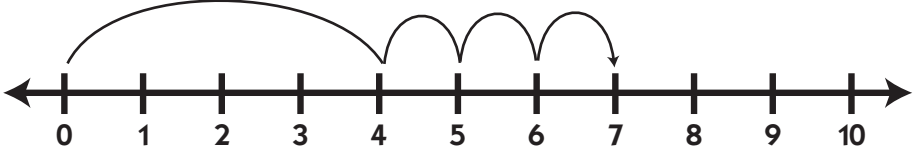
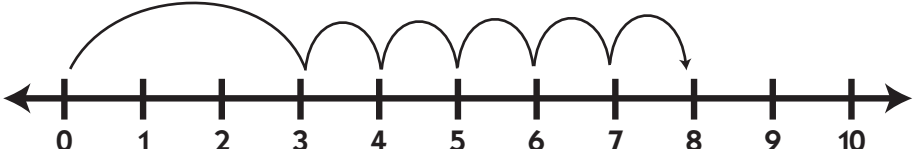
DATE \_\_\_\_\_

## Practice on the Line, Addition

1 Solve each problem. Show your work on the number lines.

<b>a</b> $5 + 3 =$ _____	
<b>b</b> $6 + 4 =$ _____	
<b>c</b> $7 + 2 =$ _____	
<b>d</b> $5 + 5 =$ _____	

2 Write an equation to match each number line.

<b>a</b> 	
<b>b</b> 	

3 Add.

$$\begin{array}{r} 2 \\ + 2 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ + 2 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ + 2 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ + 5 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ + 3 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ + 3 \\ \hline \end{array}$$





$$\begin{array}{r} 9 \\ + 0 \\ \hline \end{array}$$

NAME \_\_\_\_\_

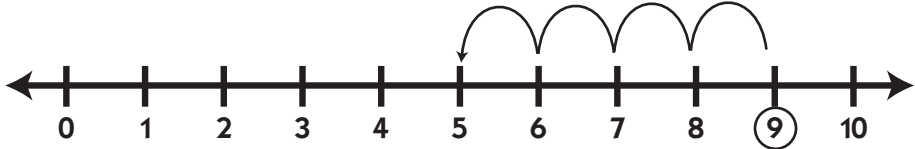

DATE \_\_\_\_\_

# Practice on the Line, Subtraction

1 Solve each problem. Show your work on the number lines.

<p><b>a</b> <math>7 - 3 =</math> _____</p>	
<p><b>b</b> <math>9 - 5 =</math> _____</p>	
<p><b>c</b> <math>6 - 4 =</math> _____</p>	
<p><b>d</b> <math>8 - 3 =</math> _____</p>	

2 Write an equation to match each number line.

<p><b>a</b></p> 	
<p><b>b</b></p> 	

3 Subtract.

$\begin{array}{r} 6 \\ - 2 \\ \hline \end{array}$	$\begin{array}{r} 4 \\ - 1 \\ \hline \end{array}$	$\begin{array}{r} 5 \\ - 3 \\ \hline \end{array}$	$\begin{array}{r} 3 \\ - 2 \\ \hline \end{array}$	$\begin{array}{r} 7 \\ - 5 \\ \hline \end{array}$	$\begin{array}{r} 8 \\ - 4 \\ \hline \end{array}$	$\begin{array}{r} 2 \\ - 2 \\ \hline \end{array}$
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