BRIDGES IN MATHEMATICS 2

GRADE 2 SUPPLEMENT

Set A1 Number & Operations: Addition & Subtraction

Includes

Skills & Concepts

- ★ add and subtract whole numbers on a number line
- ★ find and use patterns to add and subtract (fact families)
- ★ develop fluency with sums to 20 and related subtraction facts

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Bridges in Mathematics Grade 2 Supplement
Set A1 Numbers & Operations: Addition & Subtraction

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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 A1 ★ Activity 1

ACTIVITY

Number Line Race to 10

Overview

Number Line Race to 10 is a simple game that serves to introduce the idea that a line can be used to represent a set of numbers. This activity provides students with opportunities to locate and name points on the line, and also reinforces their understandings of addition and subtraction.

Skills & Concepts

★ add and subtract whole numbers on a number line

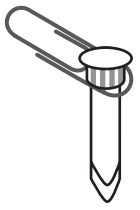
You'll need

★ Number Line Race to 10 Gameboard (page A1.4, see Advance Preparation)

★ a red and a blue game marker

★ black overhead pen

Advance Preparation Use page 4 to make an overhead transparency of the gameboard. Use 1/4" sections of drinking straw, regular paperclips, and brass fasteners as shown below to create an arrow for each spinner on the gameboard. Poke a small hole through the center of each spinner. Keeping the straw and the paperclip on the brass fastener, insert it into the hole. Once it has been pushed through to the back, bend each side of the fastener flat against the underside of the transparency.



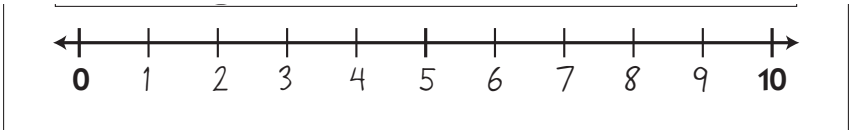
Instructions for Number Line Race to 10

1. Ask children to sit where they can see the screen and show them the Number Line Race to 10 gameboard at the overhead. Give them a moment to pair-share what they notice about the display. Then invite a few volunteers to share their observations with the class.

> ***Students*** *There's a spinner with pluses and minuses on it, and another with numbers.*
> *The numbers only go 1, 2, 3.*
> *There's a line at the bottom with a bunch of marks on it.*
> *The first mark says 0 and the last one says 10.*
> *There aren't any other numbers on that line.*

2. Explain that, in a minute, you'll be using the spinners to play a game with them. The line they see at the bottom of the gameboard is called a *number line*. Call their attention to the heavy mark in the middle of the line, and ask them to pair-share ideas about the number they think you should use to label that mark. Then invite a few of them to share their ideas with the class.

Activity 1 Number Line Race to 10 (cont.)



Students *It should be a 5 because 5 is right in the middle of 0 and 10.*
That mark is halfway, and if you cut 10 in half, it's 5.
If you count the marks before that one, they go 1, 2, 3, 4, and that one is 5.

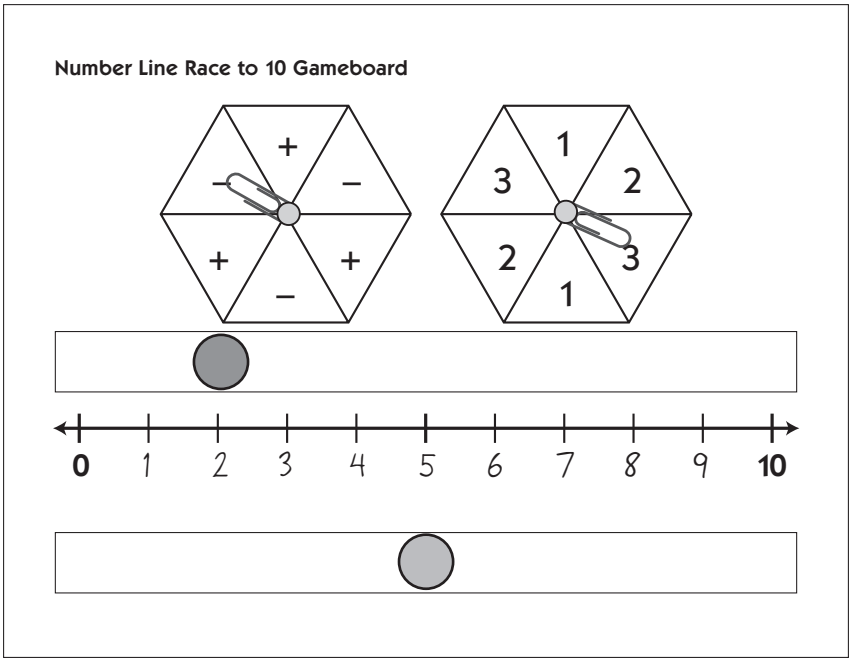
3. When there's general agreement, label the middle mark with the number 5, and then work with student input to label the other 8 marks along the line.

4. Place a blue game marker in the rectangle above the 5 and a red one below the 5. Explain that you're going to take turns with the class spinning the 2 spinners and moving your marker along the line. The first team—you or the class—that lands on 10 wins the game.

5. Spin both spinners and move your marker accordingly.

Teacher *Oh no, I got minus 3! That means I have to hop back 3 numbers on the line. Where will I land?*

Students *You'll land on 2! Now we're closer to 10 than you are!*
I hope we get plus 3 on our turn!



6. Take turns back and forth until either you or the students have landed on 10. Invite a different volunteer to take each of the students' turns. Ask students to predict where the marker will land after each spin and press them to explain their answers. If their marker is on 7, for instance, and they spin minus 3, where will the marker land? Why?

Students *It'll land on 4 because we have to take 3 hops back.*
7 – 3 is 4, so we'll land on 4.

Activity 1 Number Line Race to 10 (cont.)

Throughout the game, ask students to report how far from 10 they are.

> ***Students*** *We're on 4 now. We have to get 6 hops up to get to 10.*
> *4 + 10 is 6, so we have to go 6.*
> *I hope we spin plus 3 and then plus 3 again!*

7. When one team has landed on 10, place both markers back in their starting position, above and below the 5, and play again.

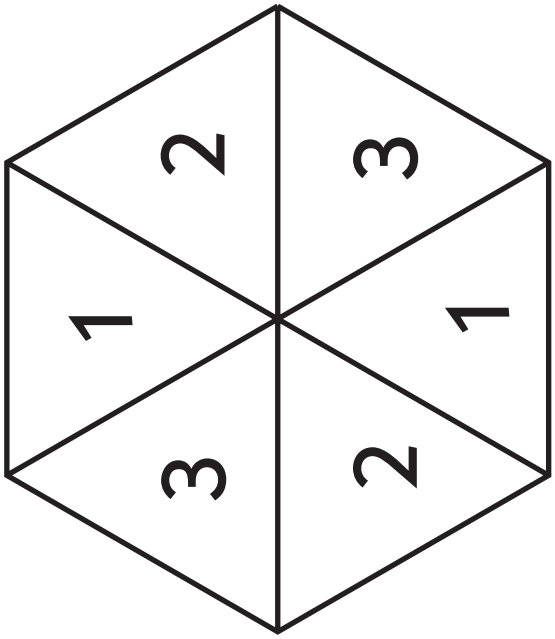
Note *If one team or the other makes a spin that will take them off the line (e.g., their marker is on 9 and they spin plus 3), there are several different ways to handle it. Choose the one you think best suits the needs and strengths of your class.*

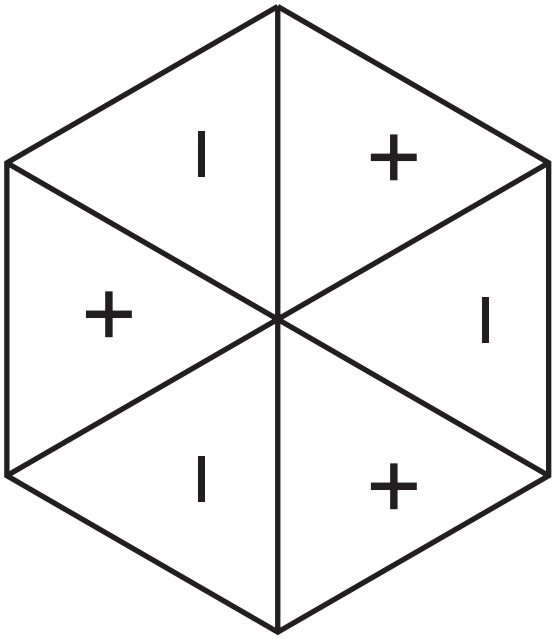
- *That team spins again (and again if necessary) until they make a spin that won't take them off the line.*
- *That team loses their turn, and has to wait until they make a spin that won't take them off the line.*
- *Explain that a number line extends infinitely far in both directions, and add numbers to both ends of the line as needed. This may involve the use of negative numbers, which fascinate many second graders. The one thing you don't want to do is tell the students that there are no numbers less than 0, because that's not true.*

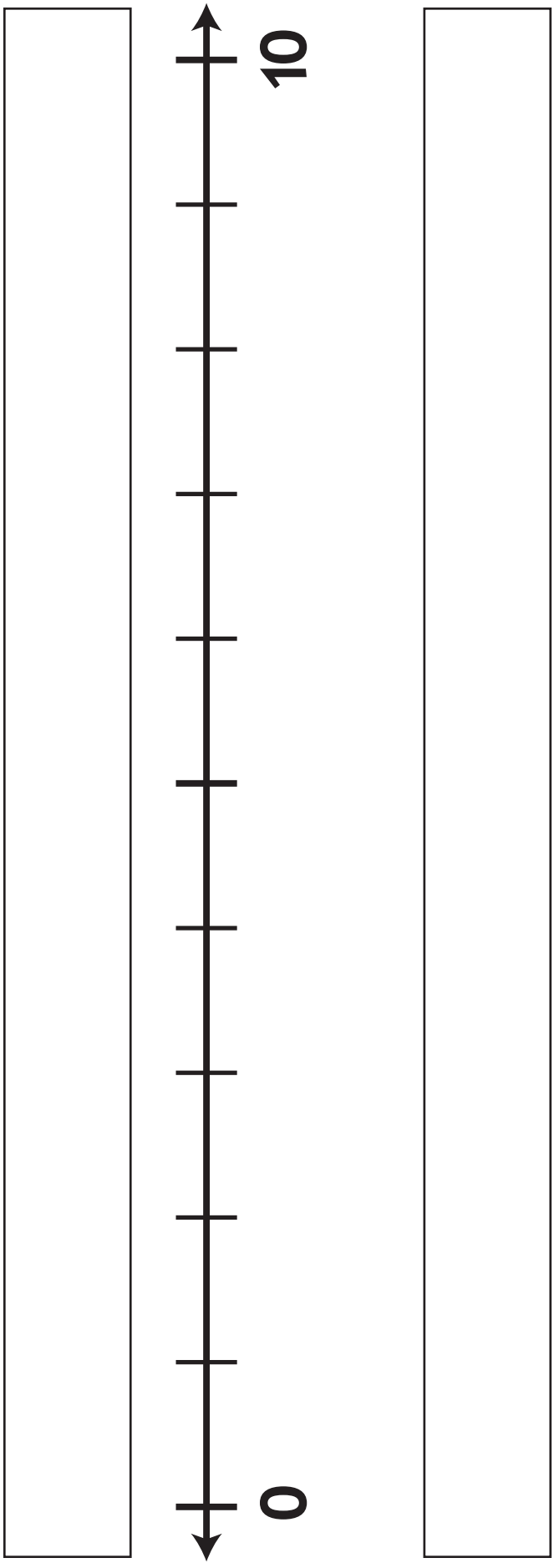
Extensions

- Play the game more than once with your class. This is a great "sponge activity."
- Leave the materials out and encourage pairs of students to play the game at the overhead during Work Places.
- Have students make their own versions of the game to play at school and/or take home to share with their families. Some students may enjoy making number lines that go considerably higher than 10, and spinners that go from 1–6, or even 1–8.

Number Line Race to 10 Gameboard







Set A1 ★ Activity 2

ACTIVITY

Number Line Showdown

Overview

In this whole-group game, students and teacher take turns drawing subtraction cards and entering the answers on a number line that goes from 0 to 20. At the end of the game, both teams add up all the numbers along the line they've entered; high score wins.

Skills & Concepts

★ develop fluency with sums to 20 and related subtraction facts

You'll need

★ Number Line Showdown Gameboard (page A1.11, 1 copy for display)

★ Number Line Showdown Cards (pages A1.8–A1.10, see Advance Preparation)

★ Number Line Showdown Record Sheet (page A1.12, class set)

★ overhead pens in black, blue, and red

★ colored pencils (each student will need a red and a blue)

★ half-class set of calculators

Advance Preparation Run 1 copy of the Number Line Showdown Cards on transparencies. Cut the cards apart and store them in an envelope or resealable plastic bag.

Instructions for Number Line Showdown

1. Ask children to sit where they can see the screen. Place the Number Line Showdown gameboard on display at the overhead as helpers distribute copies of the Number Line Showdown Record Sheet. Let students know that they'll also need a regular pencil and 2 colored pencils, one red and one blue, to play the game.

2. Give students a minute or two to share their observations about the overhead and record sheet. Explain that they'll work together as a team to play against you. Choose or assign team colors, red and blue. Have them color in the boxes beside "Teacher" and "Class" on their record sheets as you do so at the overhead.

3. Call children's attention to the heavy mark in the middle of the number line, and ask them to pair-share ideas about the number that should be used to label that mark. Then invite a few of them to share their ideas with the class.

> ***Students*** *It should be a 10 because 10 is right in the middle of 0 and 20.*
> *That mark is halfway, and if you cut 20 in half, it's 10.*
> *Last time, we used a 5 for the middle mark, but that line only went to 10.*

4. When there's general agreement, use a black pen to label the middle mark with the number 10 at the overhead, as students do so on their record sheets. *Don't label any of the other marks on the line yet.*

Activity 2 Number Line Showdown (cont.)

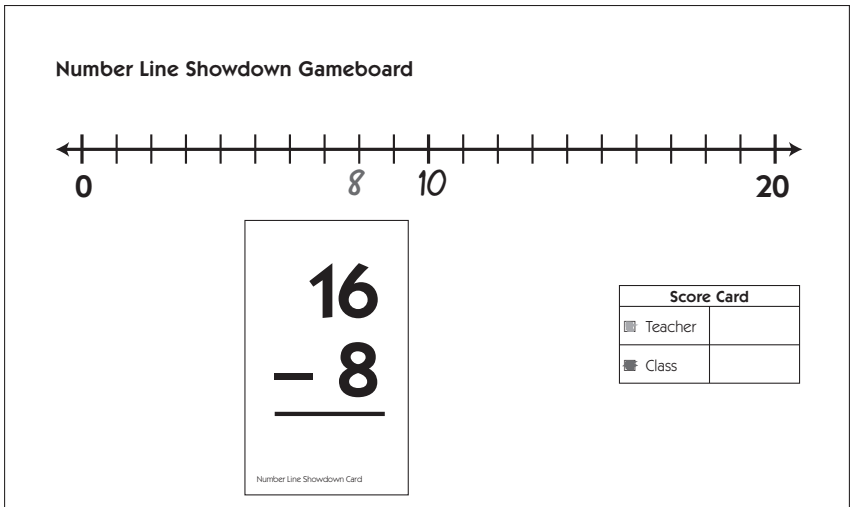
5. Hold up your envelope or bag of Number Line Showdown Cards. Invite a volunteer to come up, draw a card for the class, and place it on display at the overhead. Ask students to give the thumbs-up sign when they have the answer. When most thumbs are up, call on a volunteer to share and explain the answer.

Rachel *16 – 8 is 8 because 8 + 8 is 16.*

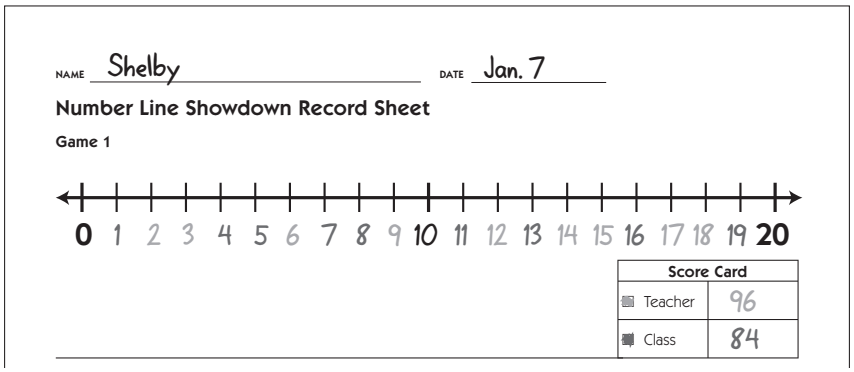
6. Have students write the answer where it belongs along the number line as you do so at the overhead. Remind them to use the pencil that matches their team color. Ask them to share their work with the people sitting next to them, and explain how they found the correct mark to label.

Paulina *I just counted back 2 from 10.*

Sam *I started from the beginning of the line and just counted 'til I got to 8.*



7. Take turns with the class until all the cards have been drawn and all the marks on the line have been labeled with numbers. Then distribute calculators and ask students to work in pairs to add all the numbers their team has entered, while you add yours. Record the scores on the Score Card; high score wins.



Activity 2 Number Line Showdown (cont.)

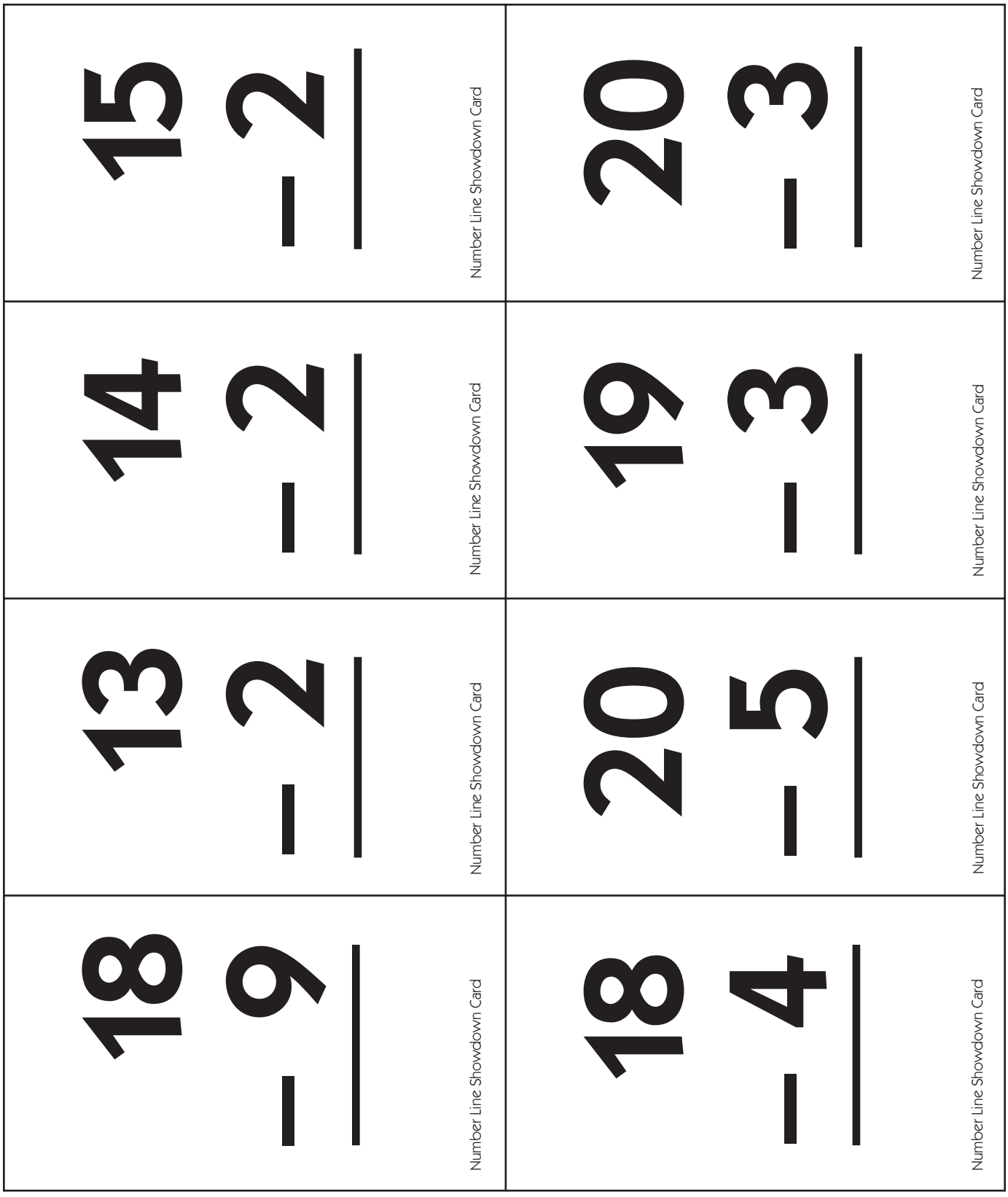
Extensions

- There is room at the bottom of students' sheets to play a second game. Collect their sheets and save them for use another day.
- Return to the game later in the year and challenge students to compute the scores without the help of a calculator.
- Leave the materials out and encourage student pairs to play the game at the overhead during Work Places.

Number Line Showdown Cards page 1 of 3

14 − 10 = ___ Number Line Showdown Card	16 − 8 = ___ Number Line Showdown Card
6 − 3 = ___ Number Line Showdown Card	14 − 7 = ___ Number Line Showdown Card
12 − 10 = ___ Number Line Showdown Card	10 − 4 = ___ Number Line Showdown Card
13 − 12 = ___ Number Line Showdown Card	10 − 5 = ___ Number Line Showdown Card

Number Line Showdown Cards page 2 of 3



Number Line Showdown Cards page 3 of 3

20 − 1 = ___ Number Line Showdown Card	
19 − 1 = ___ Number Line Showdown Card	

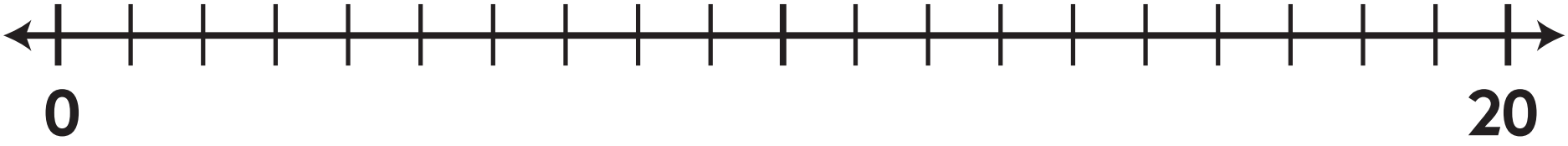
Number Line Showdown Gameboard

Score Card		
☐ Teacher		
☐ Class		

NAME _____ DATE _____

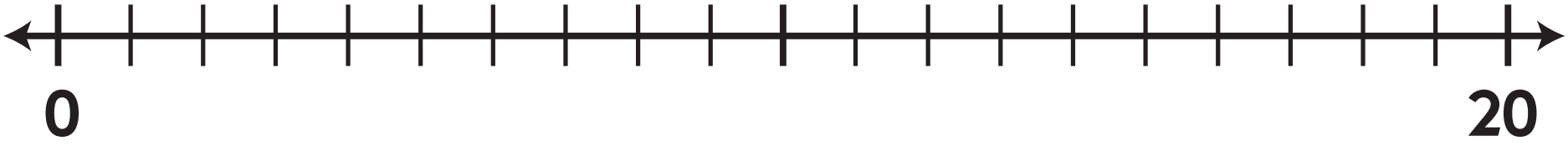
Number Line Showdown Record Sheet

Game 1



Score Card	
☐ Teacher	
☐ Class	

Game 2



Score Card	
☐ Teacher	
☐ Class	

Set A1 ★ Activity 3

ACTIVITY

Unifix Train Fact Families

Overview

Unifix trains are used to introduce the concept of a fact family as 4 related addition and subtraction sentences.

Skills & Concepts

★ find and use patterns to add and subtract (fact families)

★ develop fluency with sums to 20 and related subtraction facts

You'll need

★ Unifix Train Fact Families (pages A1.15 & A1.16, class set)

★ Unifix cubes (class set)

★ crayons

Instructions for Unifix Train Fact Families

1. As students watch and help you count, build a Unifix train with 7 blue and 5 red cubes.

2. Work with input from the class to generate 2 addition sentences to match the train. Record them on the whiteboard.

7 + 5 = 12
5 + 7 = 12

3. Now ask students how many cubes would be left if you subtracted 5 of them from the train. How do they know?

Students *It would be 7 because 7 and 5 are 12.*
Yep! If you take the 5 red ones off, those 7 blue ones will still be left.

4. Remove the 5 red cubes from the train and confirm with students that 7 remain. Record a matching subtraction sentence on the board. Repeat the process a second time with 7 instead of 5.

7 + 5 = 12
5 + 7 = 12
12 – 5 = 7
12 – 7 = 5

5. Explain to students that the 4 facts you've just recorded on the board are called a *fact family*. Can they explain why?

Students *They're all about 12.*
It's kind of like 12 is the mom and 5 and 7 are the kids.
They all fit together, so they're kind of like a family.

Activity 3 Unifix Train Fact Families (cont.)

6. Now build a train of 9 green cubes and 6 brown cubes as the students watch and help you count. Repeat steps 2–4 to generate a fact family for this train.

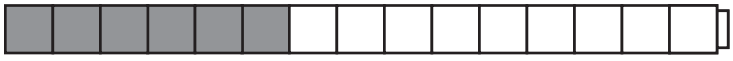
9 + 6 = 15
6 + 9 = 15
15 – 6 = 9
15 – 9 = 6

7. Give each student a copy of the Unifix Train Fact Families sheets. Review the instructions together. When students understand what to do, let them go to work. Circulate to provide assistance as needed. Encourage them to share and compare their answers as they work.

NAME _____ **DATE** _____

Unifix Train Fact Families page 1 of 2

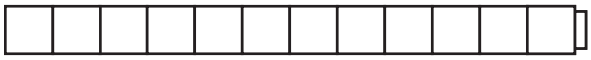
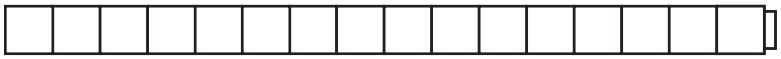
1 Write a fact family to match each Unifix train below. Include 2 addition and 2 subtraction sentences.

Unifix Train	Fact Family
example 	7 + 4 = 11 4 + 7 = 11 11 − 7 = 4 11 − 4 = 7
a 	
b 	
c 	
d 	

NAME _____ **DATE** _____

Unifix Train Fact Families page 2 of 2

2 Color in each train below. Use 2 colors and color in every cube. Write a fact family for each train.

Unifix Train	Fact Family
a 	
b 	
c 	
d 	

Set A1 ★ Activity 4

ACTIVITY

Triangle Fact Families

Overview

This activity provides additional practice with fact families.

Skills & Concepts

★ find and use patterns to add and subtract (fact families)

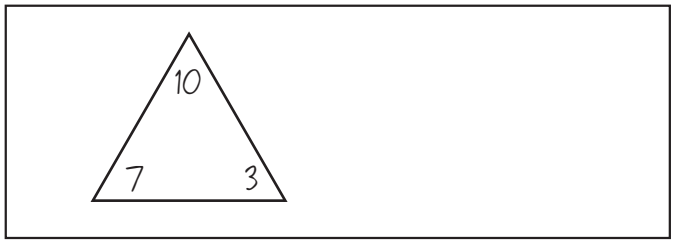
★ develop fluency with sums to 20 and related subtraction facts

You'll need

★ Triangle Fact Families (pages A1.19 & A1.20, run a class set)

Instructions for Triangle Fact Families

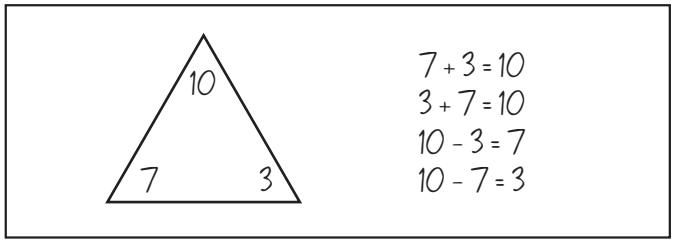
1. Draw a large triangle at the whiteboard as the students watch. Label it with the numbers 10, 7, and 3, as shown below.



2. Explain that a fact family lives in this triangle. Can students explain why? Have them pair-share ideas for a few moments. Then call on volunteers to share their thinking with the class.

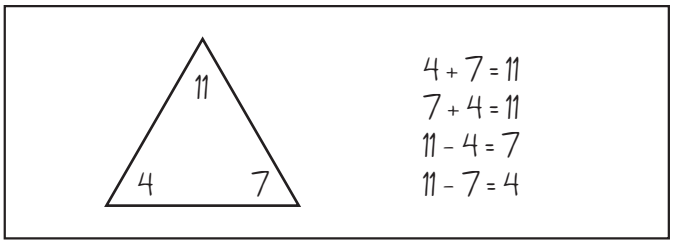
> ***Students*** *It's because 7 + 3 = 10, so they all go in one family.*
> *Also, 3 + 7 go together to make 10.*
> *And if you go 10 – 3, you get 7.*

3. Work with input from the class to write 2 addition and 2 subtraction sentences for the triangle.

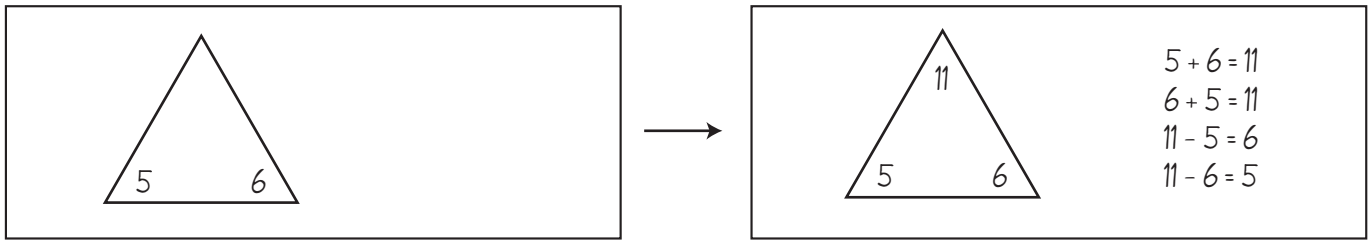


Activity 4 Triangle Fact Families (cont.)

4. Draw a second triangle at the board. Label it with the numbers 11, 4, and 7. Work with input from the class to write 2 addition and 2 subtraction sentences for this triangle.



5. Now draw a third triangle. Label it with the numbers 5 and 6, as shown below. Explain that one of the members of this family is lost. Ask students to help you figure out the missing number. Record it where it belongs on the triangle and then have students help you write the fact family to match.



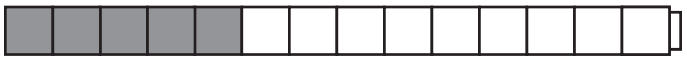
6. Give each student a copy of the Triangle Fact Families sheets. Review the instructions together. When students understand what to do, let them go to work. Circulate to provide assistance as needed. Encourage them to share and compare their answers as they work.

NAME _____ **DATE** _____

Triangle Fact Families page 1 of 2

1 Match each Unifix train to its fact family triangle. Then write 2 addition and 2 subtraction sentences to match. Write them under the train.

example



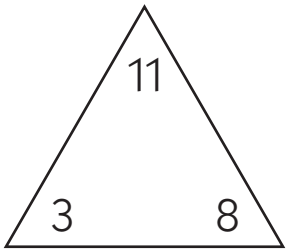
5 + 9 = 14 14 − 5 = 9
9 + 5 = 14 14 − 9 = 5

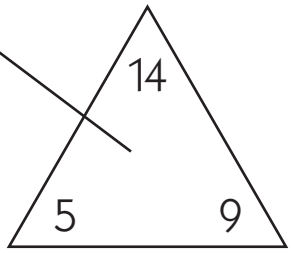
a

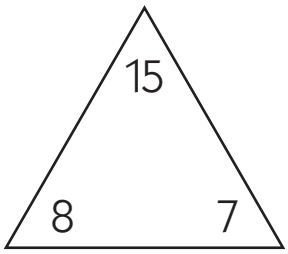
b

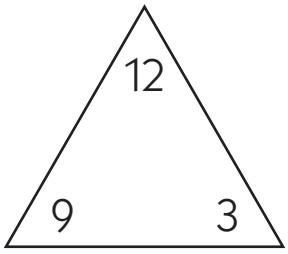
c

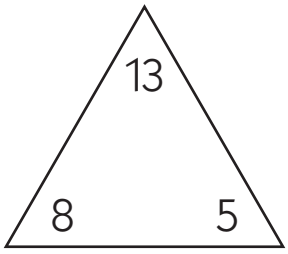
d







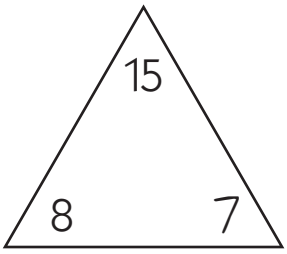
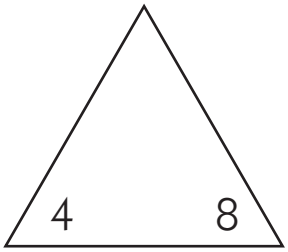
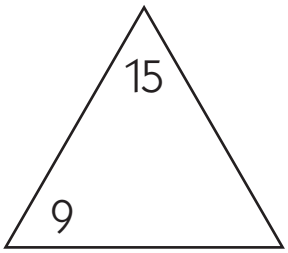
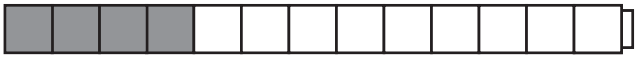
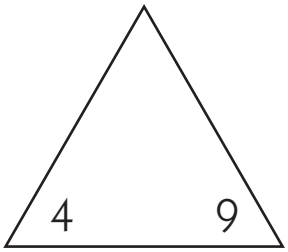




NAME _____ **DATE** _____

Triangle Fact Families page 2 of 2

2 One number from each family is lost! Write the missing number in the triangle. Use the pictures to help. Then write 2 addition and 2 subtraction sentences to match.

Unifix Train	Triangle Fact Family	Fact Family
example 		7 + 8 = 15 8 + 7 = 15 15 - 7 = 8 15 - 8 = 7
a 		
b 		
c 		
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