Adding Numbers from 1 to 20 Using the Commutative Property

3

Mathematical Goals

- Understand that the order in which two numbers are added does not affect the total

Misconceptions Addressed

- Does not recognize or misapplies the commutative property
- Does not understand the concept of equivalence

Materials Needed

- ✓ Student pages and markers (two colors per student)
- ✓ Response boards
- ✓ Connecting cubes (10 each of two colors for each student)
- ✓ Scissors (one per student)
- ✓ Glue or tape (for each student pair)
- ✓ Show Me Cards AS3-1 through AS3-6

Focus on Language

Model the use of these words and encourage students to use them throughout the lesson. Consider displaying the words so students can see them as they work.

- commutative property
- turn-around facts

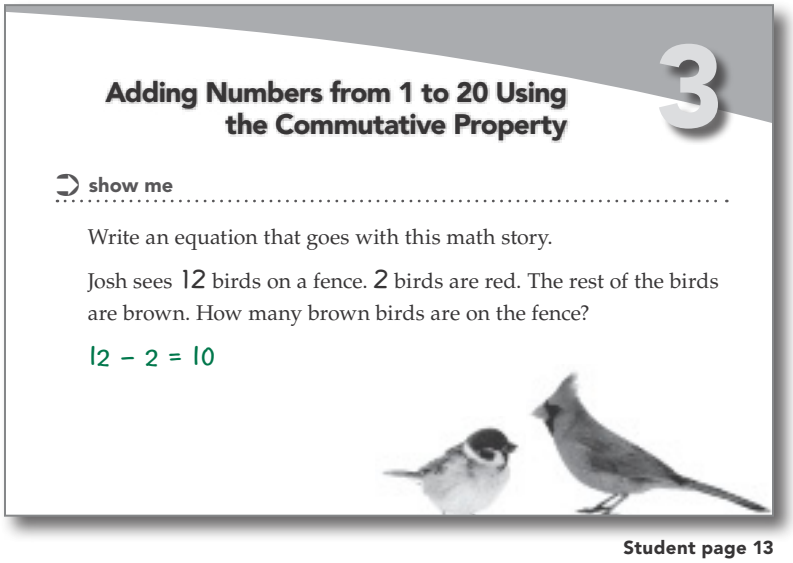
show me

RESPONSE BOARDS

Begin the lesson by using Show Me Cards **AS3-1** through **AS3-6**. During today's show me, students will review selected addition and subtraction facts with sums and minuends of 11 and 12. Have students answer the following questions on their response boards.

- Write the equation and show me your answer.
  - **AS3-1** What number equals 9 plus 3?
    Answer: 12 = 9 + 3
  - **AS3-2** Two plus what number equals 11?
    Answer: 2 + 9 = 11
  - **AS3-3** Eleven equals 8 plus what number?
    Answer: 11 = 8 + 3
  - **AS3-4** Seven plus 5 equals what number?
    Answer: 7 = 5 + 2
- Write an equation and show me your answer.
  - **AS3-5** Mr. Gomez opened a carton that holds 12 eggs. There were 4 eggs left. How many eggs had already been used?
    Answer: 12 – 4 = 8
  - **AS3-6** Josh had some comic books. Gabby took 4. Now Josh has 7 comic books left. How many comic books did he have to start?
    Answer: 11 – 4 = 7

To finish, have students complete the show me problem.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show me

Write an equation that goes with this math story.

Josh sees 12 birds on a fence. 2 birds are red. The rest of the birds are brown. How many brown birds are on the fence?

12 – 2 = 10

Student page 13

teaching strategies

In this lesson, students will do a card sort related to the commutative property. This important property cuts the work of memorizing math facts almost in half! For example, if you know that 7 + 2 = 9, then you also know that 2 + 7 = 9. Pairs of facts like these are sometimes called *turn-around facts*.

setting the direction

Exploring the Commutative Property of Addition

Ask students to represent addition statements by joining cubes to make lengths of 10 cubes. Make sure that each length of 10 cubes is made by at least one student.

Ask a student to describe and show her lengths of 10 cubes. Represent each length of 10 cubes with an equation.

Continue to have students show their cube lengths while you record each one as an equation on the board. When you record the equations, use the number of red blocks first, then the number of blue blocks.

english language learners

Using manipulatives gives ELLs another way to access the mathematics, without interference from the language.

The equations are: 2 + 8 = 10, 0 + 10 = 10, 6 + 4 = 10, 8 + 2 = 10, 10 + 0 = 10, 5 + 5 = 10, 4 + 6 = 10, 9 + 1 = 10, 7 + 3 = 10, 1 + 9 = 10, 3 + 7 = 10.

Take the two lengths with 2 red plus 8 blue, and 8 red plus 2 blue.

- Why do you think I chose these two lengths and put these together?
- Which equations show these sets of cubes?

scaffolding for success

Make sure you provide wait time and acknowledge student responses, both verbally and with gestures.

Write the equations "2 + 8 = 10" and "8 + 2 = 10" next to each other on the board.

- What do you notice about these two equations?

  Possible answer: They have the same numbers (addends), but the numbers are turned around.

english language learners

Be sure ELL students understand the term *switched around*. You may want to use manipulatives to demonstrate this concept.

Ask students to find another pair of cube lengths and identify the equations that represent the chosen cube lengths (for example, 6 + 4 = 10, 4 + 6 = 10). Again, establish that the numbers are the same, only the order is changed.

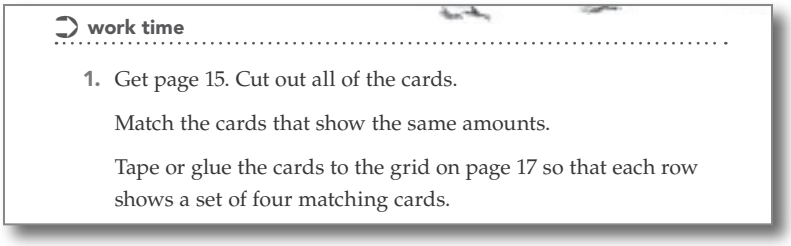
Continue to list the pairs of equations that students identify as having numbers that are turned around.

work time

Presenting the Task

Read problem 1 to students while they follow along on the student page.

Tell students that today they will not be starting out with solo work. They will work with their partners during the entire work time. Since you will also use the work time to conference with students, remind them that if you choose their partner for a conference, they should continue working solo on the task.


work time

1. Get page 15. Cut out all of the cards.

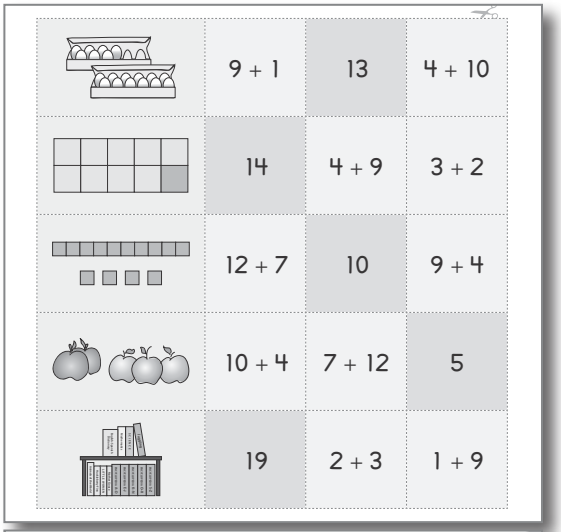
   Match the cards that show the same amounts.

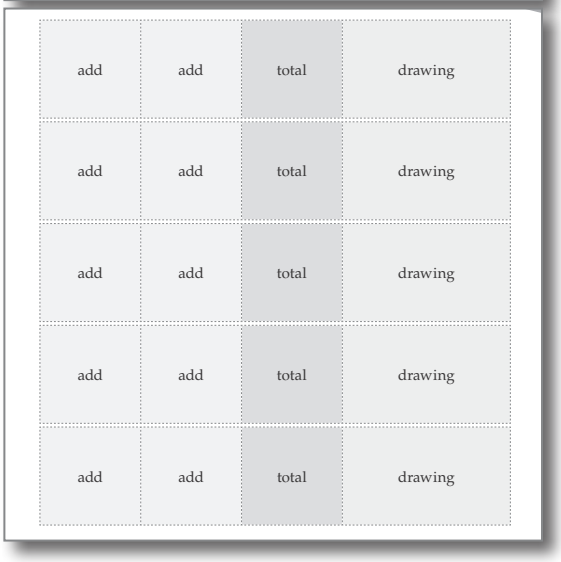
   Tape or glue the cards to the grid on page 17 so that each row shows a set of four matching cards.

Student page 13

Tell students to complete their work on problem 1 with their partners using the partner work ritual.

As students work, spend some time conferencing with one or more students individually.





Student pages 15 and 17

probing for understanding

Initiate a discussion using the following questions:

- Did you have to work out the total for your equations with numbers that were turned around?

  Answer: No.

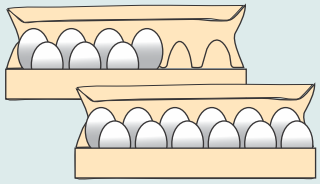
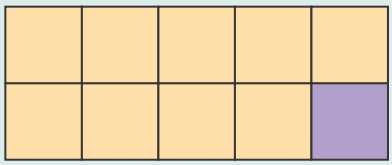
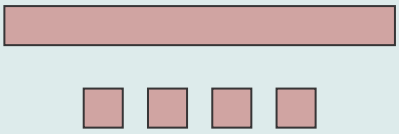
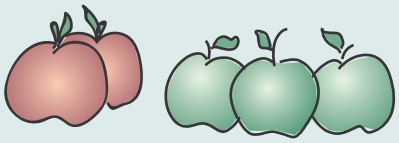
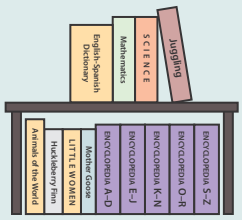
- Why not?

  Possible answer: Because the answer is the same. The order of the numbers does not matter.

- The problems 7 + 12 and 10 + 4 are not the types of problems that we usually call math facts. What strategies did you use to solve them?

Record students' strategies on the board as they are shared.

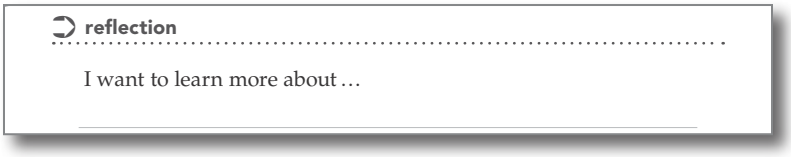
Card Sort Solution

12 + 7	7 + 12	19	
9 + 1	1 + 9	10	
10 + 4	4 + 10	14	
3 + 2	2 + 3	5	
9 + 4	4 + 9	13	

reflection

Writing the Reflection

Have students respond to the reflection prompt.



Student page 14

Adding Numbers from 1 to 20 Using the Commutative Property

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show me

Write an equation that goes with this math story.

Josh sees 12 birds on a fence. 2 birds are red. The rest of the birds are brown. How many brown birds are on the fence?

work time

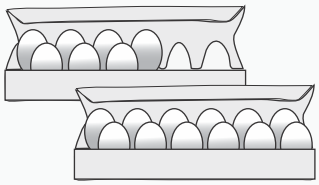
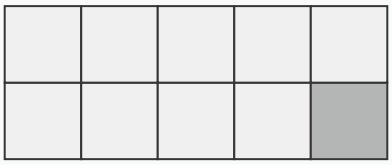
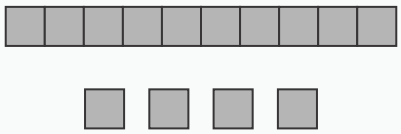
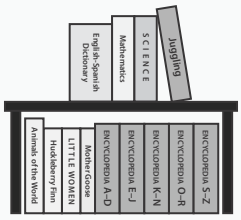
1. Get page 15. Cut out all of the cards.

   Match the cards that show the same amounts.

   Tape or glue the cards to the grid on page 17 so that each row shows a set of four matching cards.

reflection

I want to learn more about …

	9 + 1	13	4 + 10
	14	4 + 9	3 + 2
	12 + 7	10	9 + 4
	10 + 4	7 + 12	5
	19	2 + 3	1 + 9

add	add	total	drawing
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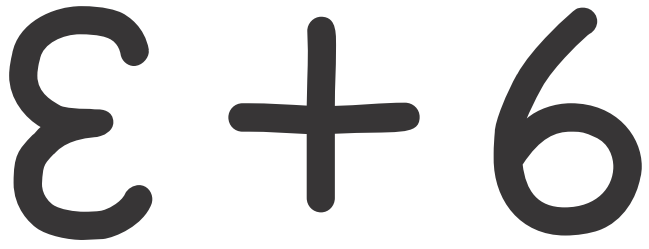


Fold Here

9 + 3

What number equals 3 plus 9? Write the equation and show me your answer.

Correct Answer

$9 + 3 = \underline{12}$

Instructional Strategies

- Count on from 9.
- Count out a group of 9 and a group of 3. Combine the groups and then count all.

11 = ___ + 2

Fold Here

$2 + \_\_ = 11$

Two plus what number equals 11? Write the equation and show me your answer.

Correct Answer

$2 + \underline{9} = 11$

Instructional Strategies

- Count on 9 more from 2.
- Count back 2 from 11.
- Restate the problem with a context. For example: "I have 2 books on top of my desk. The rest of my books are in my desk. If have 11 books in all, how many are in my desk?" Then act out the situation.
- Use a tape diagram.

Fold Here

ADDITION AND SUBTRACTION

SHOW ME CARD **AS 3–3**

$11 = 8 + \_\_$

Eleven equals 8 plus what number? Write the equation and show me your answer.

Correct Answer

$11 = 8 + \underline{3}$

Instructional Strategies

- Count on—think 8 and count 9, 10, 11—using a 100s chart, a number line, objects, or fingers.
- Count back from 11.
- Count out a group of 8. Add objects until you reach 11, keeping track of how many you add.
- Use a tape diagram.

7 + 5 = ?

Fold Here

ADDITION AND SUBTRACTION

SHOW ME CARD **AS 3–4**

$7 + 5 = ?$

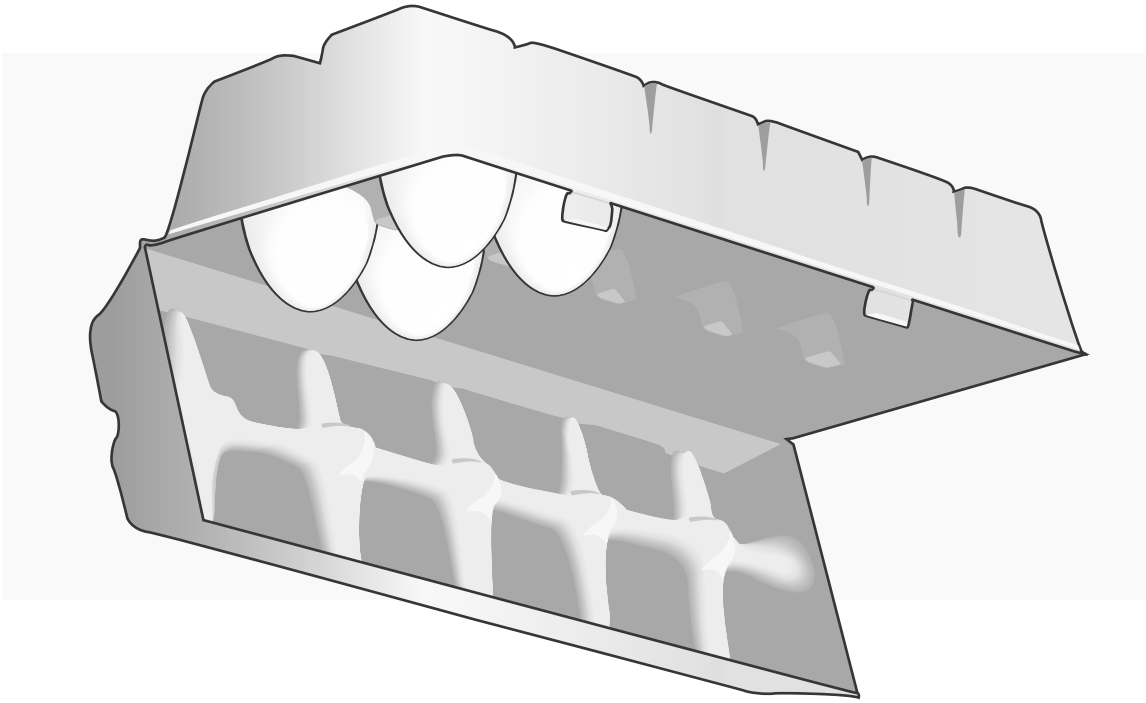
Seven plus 5 equals what number? Write the equation and show me your answer.

Correct Answer

$7 + 5 = \underline{12}$

Instructional Strategies

- Count on from 7.
- Draw a set of 7 circles and another set of 5 circles. Then count all.



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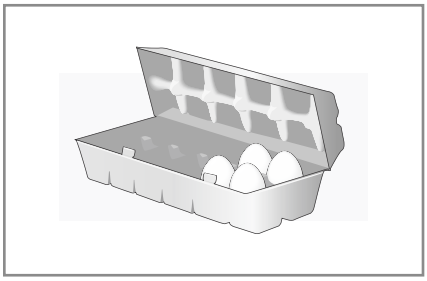


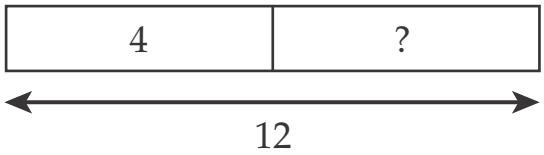
Mr. Gomez opened a carton that holds 12 eggs. There were 4 eggs left. How many eggs had already been used? Write an equation and show me your answer.

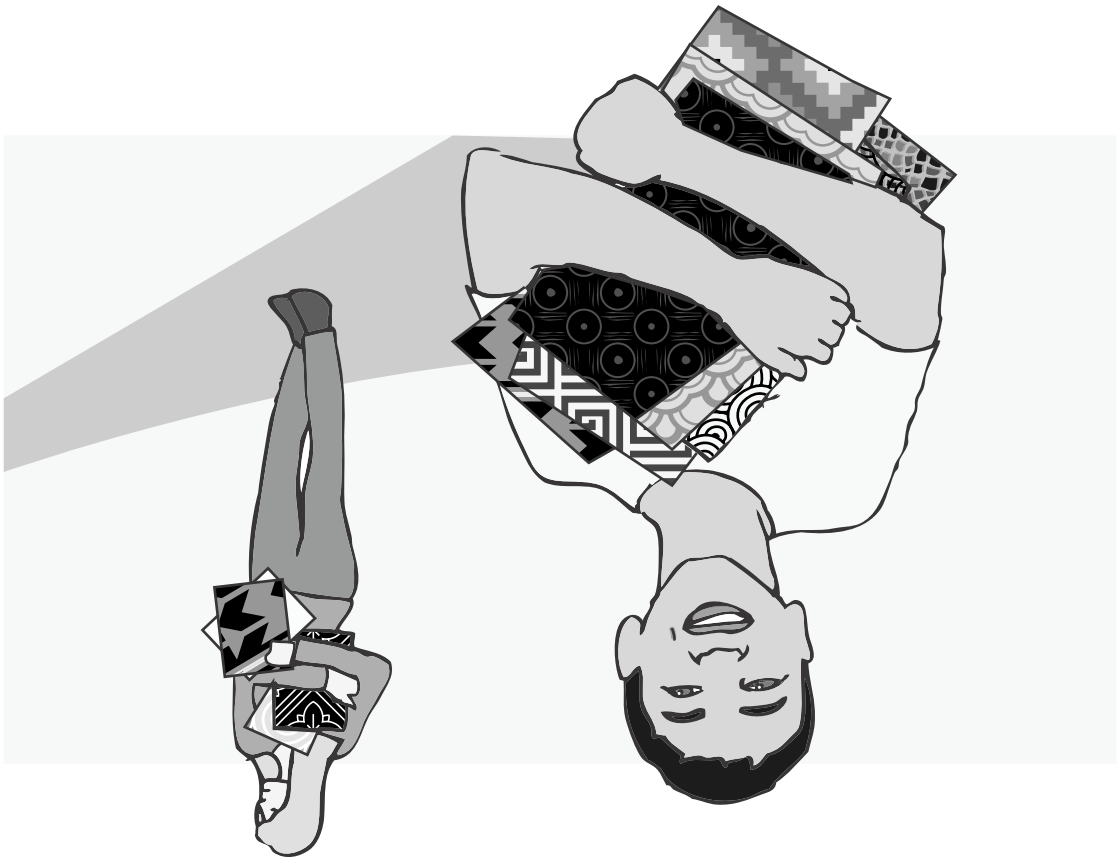
Correct Answers

$12 = \underline{8} + 4$ or $12 - 4 = \underline{8}$

Instructional Strategies

- Act out the story with counters (with or without an egg carton).
- Count up from 4 to 12. Keep track of how many you count.
- Use a tape diagram:





Fold Here

Josh had some comic books. Gabby took 4. Now Josh has 7 comic books left. How many comic books did he have to start? Write an equation and show me your answer.

Correct Answers

$$\underline{11} - 4 = 7 \text{ or } \underline{11} = 7 + 4$$

Instructional Strategies

- Count on from 7.
- Act out the story with magazines or comic books.
- Use a tape diagram: