Numbers with Sums Between 11 and 20

4

Mathematical Goals

- Reason about addition as putting together, and as adding to
- Reason about subtraction as taking apart, and as taking from
- Explore using adding and subtracting to solve problems with different unknowns: the result, the change, and the starting number

Misconceptions Addressed

- Does not recognize an addition situation
- Does not recognize a subtraction situation

Materials Needed

- ✓ Student pages and markers (two colors per student)
- ✓ Response boards
- ✓ Show Me Cards AS4-1 through AS4-6

show me

RESPONSE BOARDS

Begin the lesson by using Show Me Cards **AS4-1** through **AS4-6**. During today's show me, students will get practice with selected +9 and –9 facts. Have students answer the following questions on their response boards.

- Write the equation and show me your answer.
  - **AS4-1** One plus 9 equals what number?
    Answer: 1 + 9 = 10
  - **AS4-2** What number equals 9 minus 9?
    Answer: 0 = 9 – 9
  - **AS4-3** What number equals 9 plus 5?
    Answer: 14 = 9 + 5
  - **AS4-4** Eighteen minus 9 equals what number?
    Answer: 18 – 9 = 9
  - **AS4-5** Four equals what number minus 9?
    Answer: 4 = 13 – 9
- Write an equation and show me your answer.
  - **AS4-6** Anna had 11 photos in a box. She put 6 of the photos into an album. How many photos were left in the box?
    Answer: 11 – 6 = 5

To finish, have students complete the show me problem.

show me

Maria has 11 sports cards. 9 are baseball cards.
The rest are football cards.
How many football cards does Maria have?

Maria has 2 football cards.

Write an equation that goes with this math story.

Possible answers: 11 – 9 = 2 9 + 2 = 11

Student page 19

setting the direction

teaching strategies

In this lesson, students will reason about addition and subtraction math stories of different types. Making tape diagrams will help them identify what they know and what they do not know (what they want to find out) in each story: the starting amount, the change, or the result. Students will discover that some situations can be thought about using either addition or subtraction—both will work.

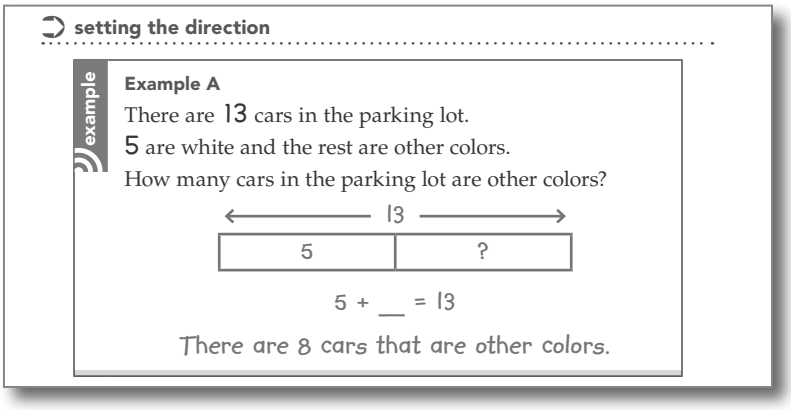
Introducing Today's Lesson

Read the Example A problem as students follow along.

- How does the tape diagram show what we know and what we don't know in this math story?

  Answer: We know how many cars there are in all, 13. And we know about one part of the cars, the 5 white cars. We don't know the other part of the cars, the ones that are other colors. In the tape diagram, we see the 13 for the whole, one part is labeled 5, and the part we don't know yet is labeled with a question mark.

- How would you find the answer? Tell us about your thinking.



Student page 19

The goal of this discussion is to bring out a solution involving subtraction and a solution involving addition. As a student shares her approach, ask her what equation she would write to show her way of thinking.

Sample reasoning using addition:

I thought, 5 plus how much makes 13? Then I added up from 5. I said to myself 5 and 5 is 10, and 3 more is 13. So I added 5 and 3. That's 8.

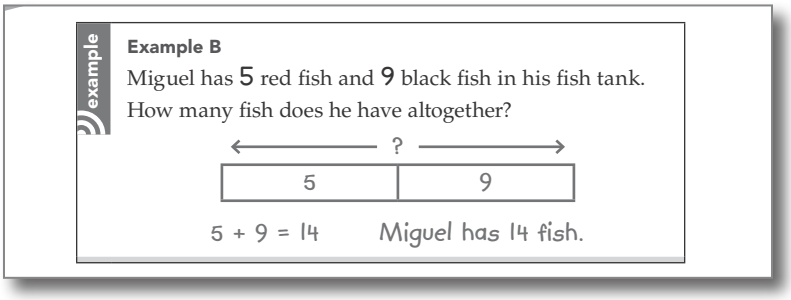
5 + __ = 13 5 + 5 = 10 and 10 + 3 = 13

Sample reasoning using subtraction:

I thought, 13 take away the 5 white cars leaves how many other cars? I split 5 into 3 and 2. Then I took away 3 to get to 10, and 2 more made it 8.

13 − 5 = __ 13 − 3 = 10 and 10 − 2 = 8

Now read the Example B problem as students follow along.



Student page 20

- How does the tape diagram show what we know and what we don't know in this math story?

  Answer: We don't know the total number of fish. The tape diagram has a question mark for the total, the whole amount. We do know both parts that make up all the fish: We know how many red fish and how many black fish. In the tape diagram, both parts that make the whole are labeled with the amounts, 5 and 9.

- How would you find the answer? Tell us about your thinking.

This is a put together situation. Look for students to recognize that they can use addition to find the answer; they would not use subtraction for this story.

Sample reasoning:

I thought, 5 plus 9 is the same as 9 plus 5. I took 1 from the 5 and gave it to the 9. That made 10. Then I added the 4 that were left from the 5, and that made 14.

5 + 9 = 9 + 5 9 + 1 = 10 and 10 + 4 = 14

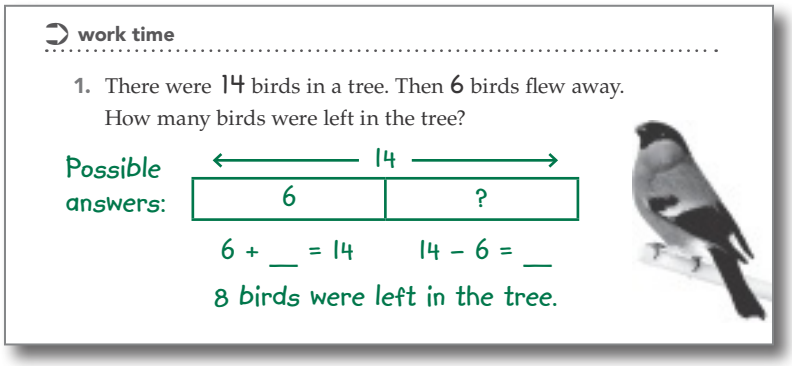
work time

Presenting the Task

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

Tell students to record the following as they work:

- Draw a tape diagram that shows what you know and what you don't know.
- Write an equation that shows how you thought about the problem.
- Write the answer as a complete sentence.



Student page 20

Ask students to begin problem 1 working solo.

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

If time permits, spend some time conferencing with one or more students individually.

probing for understanding

Elicit an addition strategy and a subtraction strategy for thinking about this math story. See the answers on the student pages for equations that represent each approach, as well as a tape diagram representing the story. Ask questions such as the following:

- How does your tape diagram show what you know and what you do not know in this math story?
- Who thought about this problem using addition?
- What equation did you write?
- Did anyone else think about the story this way?
- Who thought about this problem using subtraction?

Sample reasoning using addition:

I thought, 6 plus how much makes 14?
Then I added up from 6: 6 and 4 makes 10, and 4 more is 14. That's 8.

6 + __ = 14 6 + 4 = 10 and 10 + 4 = 14

Sample reasoning using subtraction:

I thought, 14 take away the 6 leaves how many? I split 6 into 4 and 2.
Then I took away 4 to get to 10, and I took away 2. That left 8.

14 – 6 = __ 14 – 4 = 10 and 10 – 2 = 8

teaching strategies

In both sample approaches for problem 1 the student has split one of the numbers in order to "move to 10" (picture moving on the number line) in order to make the computation easier to do in her head. In the addition sample, the student adds up to 10 (6 = 4) and then adds the rest (10 + 4). In the subtraction sample, the student subtracts down to 10 (14 – 4) and then subtracts the rest (10 – 2). This is a useful computation strategy.

scaffolding for success

Students who have difficulty drawing tape diagrams for subtraction situations will benefit from seeing the tape diagrams and hearing the explanations from students who are able to represent the math stories in this lesson. Provide plenty of time for students to explain and for other students to ask questions in order to understand the diagrams and thinking.

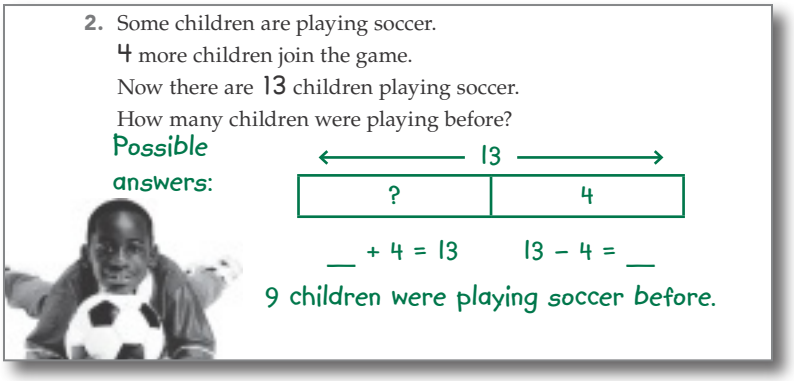
work time

Presenting the Task

Read problem 2 to students while they follow along on the student page.

Remind students to:

- Draw a tape diagram that shows what you know and what you don't know.
- Write an equation that shows how you thought about the problem.
- Write the answer as a complete sentence.


2. Some children are playing soccer.
4 more children join the game.
Now there are 13 children playing soccer.
How many children were playing before?

Possible answers:

13

? | 4

__ + 4 = 13 13 − 4 = __

9 children were playing soccer before.

Student page 21

Ask students to begin problem 2 working solo.

scaffolding for success

Pair students who are having difficulty drawing tape diagrams with students who are using them successfully.

Tell students to complete their work on problem 2 with their partners using the partner work ritual.

If time permits, spend some time conferencing with one or more students individually.

probing for understanding

Again, elicit an addition strategy and a subtraction strategy. See the answers on the student pages. Ask the questions you used in probing for problem 1.

Sample reasoning using addition:

I thought, what plus 4 makes 13? I know that 10 plus 4 makes 14, so I need one less than 10. I need 9. 9 and 4 make 13.

__ + 4 = 13 10 + 4 = 14 → 9 + 4 = 13

Sample reasoning using subtraction:

I thought, 13 take away the 4 that joined means how many at the beginning? I split 3 into 3 and 1. 13 minus 3 is 10, minus 1 more is 9.

13 − 4 = __ 13 − 3 = 10 and 10 − 1 = 9

scaffolding for success

Problems 2 and 3 are problems in which the start number (problem 2) or the change (problem 3) is unknown. Students whose understanding of addition or subtraction has been limited to "result unknown" situations may have difficulty with these problems. It might be useful to act out the situation in each problem with students.

work time

Presenting the Task

Read problem 3 to students while they follow along on the student page.

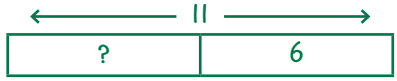
Ask students to begin problem 3 working solo.

Tell students to complete their work on problem 3 with their partners using the partner work ritual.

If time permits, spend some time conferencing with one or more students individually.

3. Anna had 11 quarters.
She spent some quarters playing video games.
Then she had 6 quarters.
How many quarters did she spend playing video games?

Possible answers:



11 − __ = 6 6 + __ = 11

Anna spent 5 quarters playing video games.

Student page 21

probing for understanding

Again, elicit an addition strategy and a subtraction strategy. See the answers on the student pages. Ask the questions you used for probing for problems 1 and 2.

Sample reasoning using addition:

I thought, 6 and how many more make 11? I know that 6 plus 6 makes 12, so I need one less; I need 5. 6 plus 5 is 11.

6 + __ = 11 6 + 6 = 12. So, 6 + 5 = 11

Sample reasoning using subtraction:

I thought, 11 take away the 6 is how much? I split 6 into 1 and 5. Then I said [to myself], 11 take away 1 is 10, and 10 take away 5 is 5.

13 − 4 = __ 13 − 3 = 10 and 10 − 1 = 9

teaching strategies

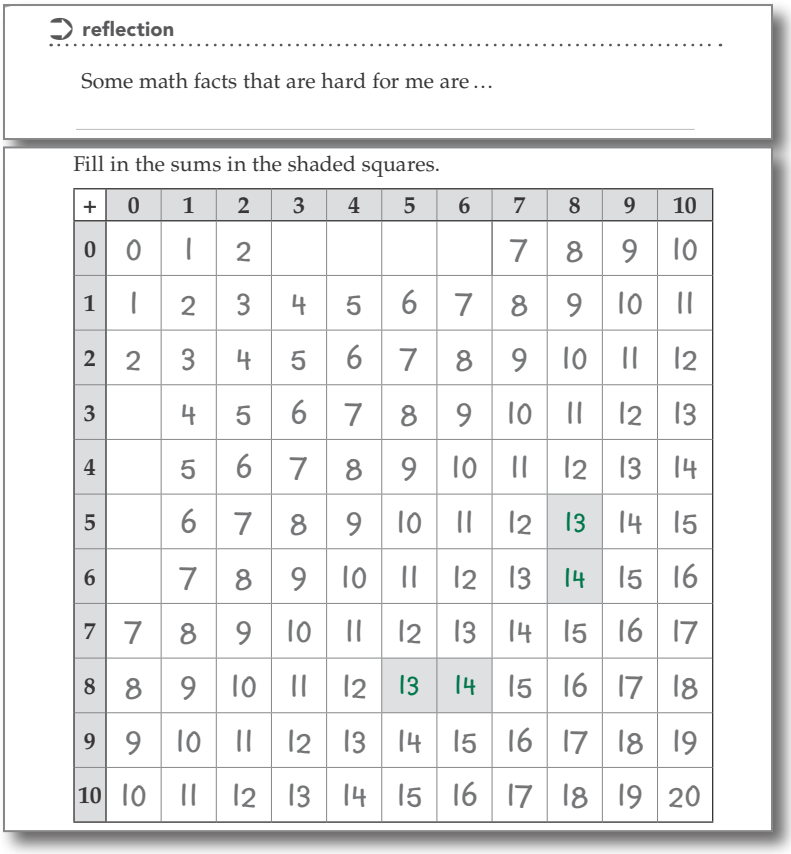
Note that in the sample addition reasoning for problem 3, the student employs the near doubles strategy: 6 + 6 = 12, and 12 is 1 from 11, so the doubles fact is useful here.

reflection

Writing the Reflection

Have students respond to the reflection prompt.

Finally, have students fill in the shaded squares in the addition table.



reflection

Some math facts that are hard for me are …

Fill in the sums in the shaded squares.

+	0	1	2	3	4	5	6	7	8	9	10
0	0	1	2					7	8	9	10
1	1	2	3	4	5	6	7	8	9	10	11
2	2	3	4	5	6	7	8	9	10	11	12
3		4	5	6	7	8	9	10	11	12	13
4		5	6	7	8	9	10	11	12	13	14
5		6	7	8	9	10	11	12	13	14	15
6		7	8	9	10	11	12	13	14	15	16
7	7	8	9	10	11	12	13	14	15	16	17
8	8	9	10	11	12	13	14	15	16	17	18
9	9	10	11	12	13	14	15	16	17	18	19
10	10	11	12	13	14	15	16	17	18	19	20

Student pages 22–23

Numbers with Sums Between 11 and 20

4

show me

Maria has 11 sports cards. 9 are baseball cards.
The rest are football cards.
How many football cards does Maria have?

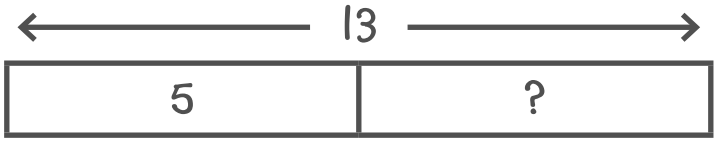
Write an equation that goes with this math story.

setting the direction

example

Example A

There are 13 cars in the parking lot.
5 are white and the rest are other colors.
How many cars in the parking lot are other colors?



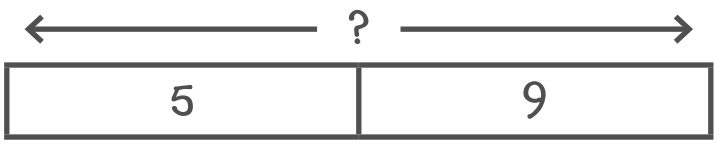
5 + __ = 13

There are 8 cars that are other colors.

Example

Example B

Miguel has 5 red fish and 9 black fish in his fish tank. How many fish does he have altogether?



5 + 9 = 14 Miguel has 14 fish.

work time

1. There were 14 birds in a tree. Then 6 birds flew away. How many birds were left in the tree?

2. Some children are playing soccer.
4 more children join the game.
Now there are 13 children playing soccer.
How many children were playing before?

3. Anna had 11 quarters.
She spent some quarters playing video games.
Then she had 6 quarters.
How many quarters did she spend playing video games?

reflection

Some math facts that are hard for me are …

Fill in the sums in the shaded squares.

+	0	1	2	3	4	5	6	7	8	9	10
0	0	1	2					7	8	9	10
1	1	2	3	4	5	6	7	8	9	10	11
2	2	3	4	5	6	7	8	9	10	11	12
3		4	5	6	7	8	9	10	11	12	13
4		5	6	7	8	9	10	11	12	13	14
5		6	7	8	9	10	11	12		14	15
6		7	8	9	10	11	12	13		15	16
7	7	8	9	10	11	12	13	14	15	16	17
8	8	9	10	11	12			15	16	17	18
9	9	10	11	12	13	14	15	16	17	18	19
10	10	11	12	13	14	15	16	17	18	19	20

6 + 1

Fold Here

ADDITION AND SUBTRACTION SHOW ME CARD **AS 4–1**

1 + 9

One plus 9 equals what number? Write the equation and show me your answer.

Correct Answer

1 + 9 = 10

Instructional Strategies

- Count out a group of 1 and a group of 9; combine the two groups and count all.
- Use the commutative property and count on from 9.

$6 - 6 = \_\_\_$

Fold Here

ADDITION AND SUBTRACTION SHOW ME CARD **AS 4–2**

$\_\_ = 9 - 9$

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

Correct Answer

$\underline{0} = 9 - 9$

Instructional Strategies

- Act out with counters.
- Any number minus itself equals 0.

$5 + 6 = \square$

Fold Here

ADDITION AND SUBTRACTION SHOW ME CARD **AS 4–3**

$\square = 9 + 5$

What number equals 9 plus 5? Write the equation and show me your answer.

Correct Answer

$\underline{14} = 9 + 5$

Instructional Strategies

- Count out a group of 9 and a group of 5; combine the two groups and count all.
- Give 1 to the 9 to make it 10. Think: 10 + 5 = 15. Subtract 1 to compensate (make up for) adding 1 at the start.

18 − 9 = ?

Fold Here

Eighteen minus 9 equals what number? Write the equation and show me your answer.

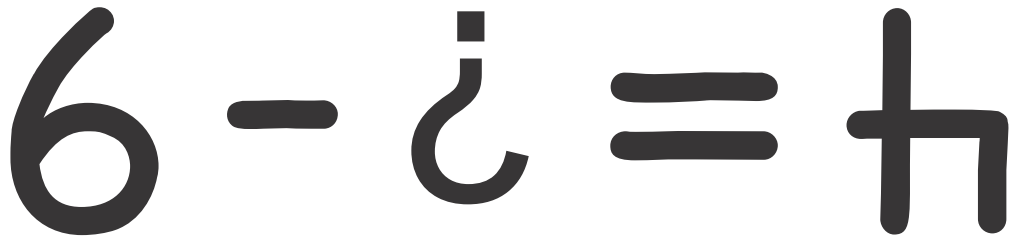
18 − 9 = ?

Correct Answer

$18 - 9 = \underline{9}$

Instructional Strategies

- Subtract 10. Think: 18 − 10 = 8. Then add back 1 to compensate for taking 1 extra away.
- Think addition; recognize "double 9."



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ADDITION AND SUBTRACTION SHOW ME CARD **AS 4–5**

$4 = ? - 9$

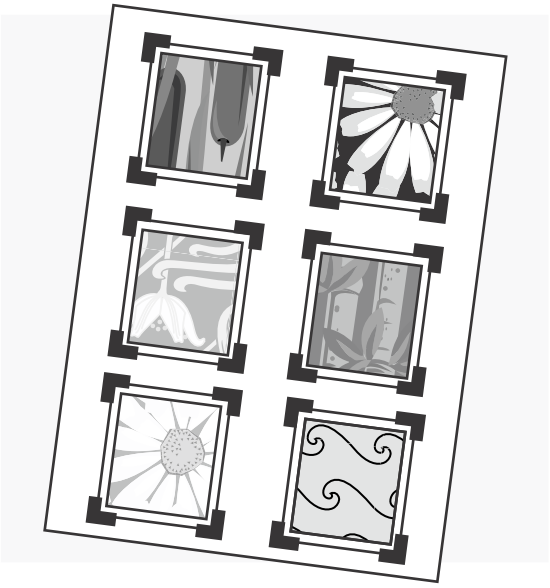
Four equals what number minus 9? Write the equation and show me your answer.

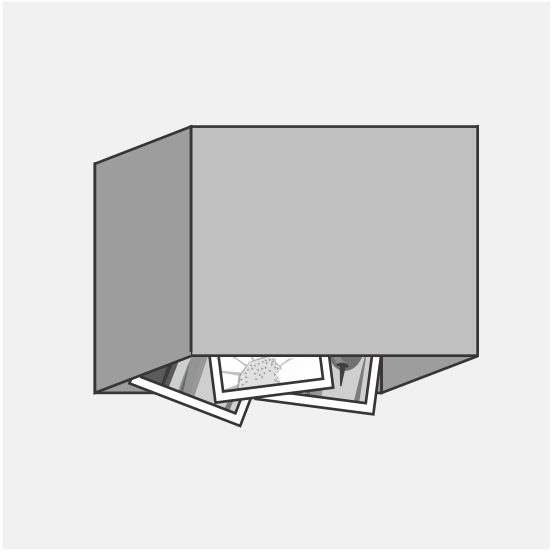
Correct Answer

$4 = \underline{13} - 9$

Instructional Strategies

- Model with counters.
- Think addition: $4 + 9 = ?$





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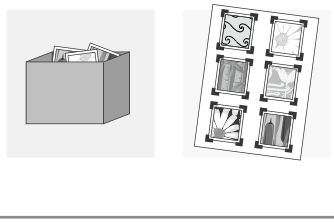
ADDITION AND SUBTRACTION SHOW ME CARD **AS 4–6**



Anna had 11 photos in a box. She put 6 of the photos into an album. How many photos were left in the box? Write an equation and show me your answer.

Correct Answer

$11 - 6 = \underline{5}$

Instructional Strategies

- Act out with cards, photos, or counters.