# Number Partners for 10

## Lesson Objectives

### Content Objectives
- Fluently add and subtract number partners for 10.
- Apply the commutative property as a strategy for adding and subtracting number partners for 10.
- Understand the relationship between addition and subtraction to determine the unknown whole number in an addition or subtraction equation.

### Language Objectives
- Explain how to use visual models, 10-frames, and number bonds to find missing number partners for 10.
- Describe how to record number partners for 10 in a number bond and use it to write up to four related addition and subtraction equations.
- Listen to and evaluate the ideas of others about how finding number partners for 10 is similar to and different from finding number partners for numbers less than 10.

## Prerequisite Skills
- Add and subtract within 9.
- Interpret a number bond.
- Apply the commutative property of addition.
- Solve a missing addend equation.

## Standards for Mathematical Practice (SMP)

SMPs 1, 2, 3, 4, 5, and 6 are integrated in every lesson through the *Try-Discuss-Connect* routine.*

In addition, this lesson particularly emphasizes the following SMPs:

**5** Use appropriate tools strategically.

**7** Look for and make use of structure.

**8** Look for and express regularity in repeated reasoning.

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*See page 1m to see how every lesson includes these SMPs.

## Lesson Vocabulary

There is no new vocabulary. Review the following key terms.
- **doubles** an addition fact that has two addends that are the same, such as $4 + 4$.
- **number bond** a drawing with a total and number partners.
- **total** the number you get when you add two or more numbers.

## Learning Progression

**In Kindergarten** children explore combinations of numbers whose sum is 10 by decomposing them with physical objects and writing corresponding equations.

**In Grade 1** children fluently add and subtract numbers within 10. They move beyond modeling with physical objects and integrate the use of models such as number bonds, number paths, and bar models to develop an understanding of properties and learn strategies for adding and subtracting.

**In this lesson** children gain fluency in identifying number partners for 10 including missing addends by connecting physical and visual models to addition and subtraction equations. This involves applying previously learned strategies and developing an understanding of the relationship between addition and subtraction.

**In Grade 1** children use number partners for 10 to decompose addends when making a ten to add and subtract numbers up to 20.

**In Grade 2** children continue to utilize number partners for 10 as they develop fluency finding sums within 20. These strategies also provide the basis for adding numbers beyond 20. Knowledge of number partners for 10 is extended to adding multiples of 10 to total 100.

# Lesson Pacing Guide

## Whole Class Instruction

| | | |
|---|---|---|
| **SESSION 1** **Explore** *45–60 min* | **Interactive Tutorial\*** *(Optional)* 🖱️ *Prerequisite Review:* Number Partners for 10 ........................................................ **Number Partners for 10** • Start  *5 min* • Try It  *20 min* • Connect It  *15 min* • Close: Exit Ticket  *5 min* | **Additional Practice** Lesson pages 95–96 |
| **SESSION 2** **Develop** *45–60 min* | **Number Partners for 10** • Start  *5 min* • Try It  *15 min* • Discuss It  *10 min* • Model It  *5 min* • Connect It  *10 min* • Apply It  *5 min* • Close: Exit Ticket  *5 min* | **Additional Practice** Lesson pages 101–102 **Fluency** 🖱️ Identify Partners for 10 |
| **SESSION 3** **Develop** *45–60 min* | **Number Partners for 10** • Start  *5 min* • Try It  *15 min* • Discuss It  *10 min* • Model It  *5 min* • Connect It  *10 min* • Apply It  *5 min* • Close: Exit Ticket  *5 min* | **Additional Practice** Lesson pages 107–108 **Fluency** 🖱️ Number Partners for 10 |
| **SESSION 4** **Refine** *45–60 min* | **Number Partners for 10** • Start  *5 min* • Apply It  *35 min* • Close: Exit Ticket  *5 min* | **Additional Practice** Lesson pages 111–112 |
| **SESSION 5** **Refine** *45–60 min* | **Number Partners for 10** • Start  *5 min* • Apply It  *15 min* • Small Group Differentiation  *20 min* • Close: Exit Ticket  *5 min* | **Lesson Quiz** 🖱️ or **Digital Comprehension Check** |

### Lesson Materials

**Lesson** *(Required)*
*Per child:* 10 connecting cubes, 10 two-color counters, whiteboard, markers (two different colors), copy of Start slide (Session 1)
*Activity Sheets:* 🖱️ Number Cards 0 to 11\*\*, Number Bond Mat\*\*, 10-Frames

**Activities**
*Per child:* 20 connecting cubes (10 each of two colors), 10 two-color counters
*Per pair:* 10 two-color counters, colored paper (2 colors)
*Activity Sheets:* 🖱️ Number Cards 0 to 11, Dot Cards, Partners for 10, 10-Frames

**Math Toolkit** connecting cubes, number bond mat, number cards, number bonds, counters

**Digital Math Tool** 🖱️ Counters and Connecting Cubes

\*\*Used for more than one activity.

## Small Group Differentiation

**Teacher Toolbox** 🖱️

### PREPARE

**Ready Prerequisite Lessons**

**Grade K**
• Lesson 10  Make 10
• Lesson 22  Find the Missing Part of 10

### RETEACH

**Tools for Instruction**

**Grade K**
• Lesson 10  Sums of Ten
• Lesson 22  Find Missing Addends for Sums to 10

**Grade 1**
• Lesson 5  Ways to Make Ten

### REINFORCE

**Math Center Activity**

**Grade 1**
• Lesson 5  Match to Make 10

### EXTEND

**Enrichment Activity**

**Grade 1**
• Lesson 5  Addition Grids to 10

**i-Ready**

## Independent Learning

### PERSONALIZE

**i-Ready Lessons\***

**Grade 1**
• Practice: Number Partners for 10
• Practice: Make 10

**Learning Games**
• *Hungry Guppy*
• *Hungry Fish*
• *Match*

\*We continually update the Interactive Tutorials. Check the Teacher Toolbox for the most up-to-date offerings for this lesson.

# Connect to Family, Community, and Language Development

The following activities and instructional supports provide opportunities to foster school, family, and community involvement and partnerships.

## Connect to Family

Use the **Family Letter**—which provides background information, math vocabulary, and an activity—to keep families apprised of what their child is learning and to encourage family involvement.
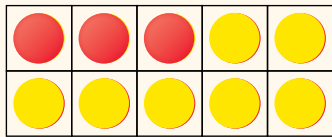
Available in Spanish

Teacher Toolbox

### Number Partners for 10

LESSON 5

**Dear Family,**

This week your child is learning to find number partners for 10.

Your child will practice finding all the ways to make 10. This will help your child use multiple strategies for adding and subtracting one-digit and two-digit numbers.

Your child will use what he or she learns about number partners for 10 to write related addition and subtraction facts such as $6 + 4 = 10$ and $10 - 6 = 4$.
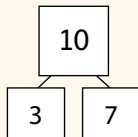
Partners for 10
1 and 9
2 and 8
3 and 7
4 and 6
5 and 5

Adding counters of two different colors to a 10-frame is another way to show partners for 10.

$3 + 7 = 10$

Writing numbers in a number bond is one way to show partners for 10.

10

3   7

$3 + 7 = 10$

Invite your child to share what he or she knows about number partners for 10 by doing the following activity together.

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**Activity** Number Partners for 10

Do this activity with your child to explore number partners for 10.

Ask your child to hold up some fingers to show a number. Then ask your child to tell you the number partner that makes 10. Your child can find the number's partner by unfolding and counting his or her other fingers.

- Start by asking your child to show 6 fingers.
- Your child holds up 6 fingers.
- Ask how many more fingers are needed to make 10.
- Your child unfolds and counts his or her folded fingers one at a time: "1, 2, 3, 4."
- Your child then names the partners of 10: "6 and 4 make 10."

Repeat the activity until your child has named all the number partners for 10.

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## Goal

Children will learn to find number partners for 10 in order to support their understanding of the relationship between addition and subtraction. The letter will explore number partners for 10 by using number bonds, a 10-frame with two-color counters, and fingers to find ways to make 10.

## Activity

Understanding number partners for 10 is an important skill that will help children apply addition and subtraction to daily tasks and activities that involve counting, addition, and subtraction. Look at the *Number Partners for 10* activity and adjust it if necessary to connect with children.

## Math Talk at Home

Ask children to find ten small objects at home and put them in a paper bag. Ask them to get a family member to take some items out of the bag without revealing the number of items taken. The child then counts the objects remaining in the bag to find out how many the family member took out of the bag.

**Conversation Starters** Below are additional conversation starters children can write in their Family Letter or math journal, with your guidance, to engage family members:

- *What are different ways to make 10?*
- *How can we make an addition equation with the number partners?*
- *How can we make a subtraction equation with the number partners?*

## **Connect to** Community and Cultural Responsiveness

Use these activities to connect with and leverage the diverse backgrounds and experiences of all children.

**Session 1** Use with *Try It*.
Many cultures have rich oral storytelling traditions. Support children as they process new information by taking the information and turning it into a narrative. For example, say: *One afternoon ten spaceships were returning home from a mission to Mars. Crowds watched the spaceships land. Some spaceships landed safely on the red landing strip. The crowds cheered! Some spaceships landed in the big blue ocean. One person in the crowd shouted "Oh no! How many spaceships are in the ocean?"* Have children use connecting cubes and blue and red construction paper to model different ways the spaceships could land.

**Session 2** Use with *Try It*.
Have partners use two sets of number cards 1–9 to play *Fish for Partners for 10*. Each partner chooses 4 cards. One player asks the other for a number which pairs with a number in her hand to make 10. For example, if a player has a 6, she may ask, "Do you have a 4?" If yes, the other player gives up the card. If no, the first player draws a card from the pile. Each player sets down any pairs that total 10 and players continue taking turns until cards run out.

**Session 4** Use at the beginning of the session.
This lesson focuses on pairs of numbers that make ten. Brainstorm as a class other things that are commonly grouped together in pairs. For example, common foods that might be paired together include salt and pepper, peanut butter and jelly, beans and rice, and bacon and eggs. After listing eight to ten common pairs, write one item on a separate sticky note. Distribute sticky notes randomly to children and have them walk around the classroom to search for a partner who has the word that completes their pair.

**Session 5** Use at any time during the session.
Have children identify and discuss nonlinguistic representations of number partners for ten using a café-style conversation structure. Have children work in small groups of four or five and have them rotate through tables that have different models of the equation $4 + 6 = 10$. Models might include a number bond for 4, 6, and 10; dot cards showing 4 dots and 6 dots; a 10-frame with 4 red counters and 6 yellow counters, number cards 4 and 6, and an equation $10 - 6 = 4$. At each station have children discuss how the model represents the number partners for 10.

## **Connect to** Language Development

For ELLs, use the Differentiated Instruction chart to plan and prepare for specific activities in every session.

**ELL** **English Language Learners: Differentiated Instruction**

**Prepare for Session 1** Use with *Try It*.

| Levels 1–3 | Levels 2–4 | Levels 3–5 |
|---|---|---|
| **Listening/Speaking** After reading the *Try It* problem, ask children to hold up both hands. Ask: *How many fingers do you have?* Write 10 on the board and draw a rectangle around it. Fold one thumb down. Have children do the same. Ask: *How many fingers are folded down?* Point to your thumb and say: *One*. Have children repeat. Ask: *How many fingers are held up?* Have children repeat: *Nine*. Write 1 and 9 below the 10. Put boxes around them to form a number bond. Provide the sentence frame: _1_ and _9_ make 10. Model the sentence. Have children repeat aloud. In small groups, have children continue folding down one finger at a time. Model using the sentence frame to name the number partners for 10. | **Speaking/Writing** After reading the *Try It* problem, ask children to hold up both hands. Ask: *How many fingers do you have?* Tell children to fold down one thumb. Ask how many fingers are folded down and how many are held up. Say: *One and nine make ten*. Have children work in pairs to continue folding down one finger at a time to make number partners for 10. Provide the sentence frame: _____ and _____ make 10. When partners have formed all of the number partners for ten, point to the workmat on the Student Worktext page and ask: *Could 9 spaceships land on the left side?* [Yes.] *If so, how many spaceships would land on the right?* [1] *How do you know?* Have children share their ideas with a partner. | **Speaking/Writing** After reading the *Try It* problem, ask children to hold up both hands showing all of their fingers. Ask: *How many fingers do you have?* Tell children to fold down one thumb. Ask how many fingers are folded down and how many are held up. Say: *One and nine make ten.* Have children work in pairs to continue folding down one finger at a time to form and say number partners for 10. Have children say and record the number partners in their notebooks using the sentence frame: _____ and _____ make 10. When partners have recorded all number partners for ten, say: *Discuss how the finger activity was like the cube activity and how it was different.* Have partners discuss their ideas. |

**Purpose** In this session children use objects to explore ways to make 10 as they interpret a situation presented in a word problem. Then children use number bonds to model number partners for 10.

## Start

### Connect to Prior Knowledge

*Materials* For each child: copy of printed slide

**Why** Use mathematical reasoning about number partners for 9 in preparation for work with number partners that equal 10.

**How** Write 4 different pairs of number partners for 9 using number bonds.

Complete the number bonds. Use different partners for 9.

**Possible Solutions**
8 and 1; 7 and 2; 6 and 3; 5 and 4; 9 and 0

*Listen for* Number bonds face different directions, but 9 is still the total.

## Try It

*Materials* For each child: 10 connecting cubes, Activity Sheet *Number Cards 0 to 11*

### Model Ways to Make 10

Read the problem aloud together. Invite children to model the problem to find different ways to make 10.

**Ask** *If 9 spaceships land on the blue mat, how many spaceships land on the red mat? How do you know?*

*Listen for* If 9 spaceships land on the blue mat, 1 lands on the red mat since 9 and 1 make 10.

**Ask** *How can you use ideas you already know to find other ways the 10 spaceships could land?*

*Listen for* I can take 1 spaceship off the blue mat and put it on the red mat and keep changing the number partners in that way.

Have children work in pairs to model the problem on the workmats on the Student Worktext page.

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10 spaceships return home.
Some land on the blue mat, and some land on the red mat.
What are five ways the spaceships could land?

### Learning Targets
- Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making ten; decomposing a number leading to a ten; using the relationship between addition and subtraction; and creating equivalent but easier or known sums.
- Apply properties of operations as strategies to add and subtract.

**SMP** 1, 2, 3, 4, 5, 6, 7, 8

## Try It

### 🧰 Math Toolkit
- connecting cubes
- number bond mat
- number cards

**Possible answer:**

| | | |
|---|---|---|
| **1** and **9** make 10. |
| **2** and **8** make 10. |
| **3** and **7** make 10. |
| **4** and **6** make 10. |
| **5** and **5** make 10. |

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### Support Whole Class Discussion

Have children explain how they used the connecting cubes to model the problem. Prompt them to consider how using a pattern is a reasonable strategy for finding different ways to make 10.

**Ask** *What did you do with your connecting cubes to find how the spaceships could land? How did you start? Can you explain why?*

*Listen for* First, I put some cubes on one mat. Then I thought about how many more I needed to make 10. First I put 1 on one mat and 9 on the other mat. I know how to use a pattern to find number partners, so I changed the cubes on the mats to show 2 and 8, 3 and 7, 4 and 6, and 5 and 5.

**Ask** *Could there be other ways to solve the problem? How do you know?*

*Listen for* Yes. For example, I can switch the order of my number partners and put each pair of numbers on the opposite colors.

**Common Misconception** **If** children write the same addends in a different order but omit other addend pairs, **then** they may think the different order represents a unique combination. Use connecting cube trains of two colors to model the distinction between the same addends in a different order and two different addends.

## Connect It

👋 **Materials** For each pair: 10 connecting cubes, 2 copies of Activity Sheet *Number Bond Mat,* Activity Sheet *Number Cards 0 to 11*

### Pose Another Problem

Tell children that they will continue finding ways to make 10. This time they will record partners for 10 in number bonds to solve a problem.

Read the problem aloud together.

### Model the Problem with Number Cards

Have one child show a way to make 10 with connecting cubes on one Number Bond Mat. The other child in the pair then uses the number cards for those number partners on the other Number Bond Mat. (A second "5" card should be added to the number card set in order to make 5 + 5.) Children record the number partners in the number bonds on the Student Worktext page and repeat the process to complete the page.

After children have completed the number bonds, ask them to share strategies they used to find number partners for 10.

*Listen for* I can start with 1 and 9 and then change the partners to 2 and 8 by making one partner 1 more and the other partner 1 less. I can use this pattern to find 3 and 7, 4 and 6, and 5 and 5.

### Support Whole Class Discussion

⋮ **Ask** *What does* number partners for 10 *mean?*

⋮ *Listen for* A way to make 10, or numbers that make 10 when put together.

⋮ **Ask** *How can you use ideas you already know to choose number cards that show five different ways to make 10?*

⋮ *Listen for* I can use a pattern to find five ways to show 10.

Read each of the number partners. Say, for example: *1 and 9 make 10.* Prompt children to recognize that if they used the same addend pair in two different number bonds, then they will not have each of the five different addend pairs represented.

## Connect It

**Mia needs to show two cards that make 10.**

**What are five ways she could show 10?**
Possible answer:
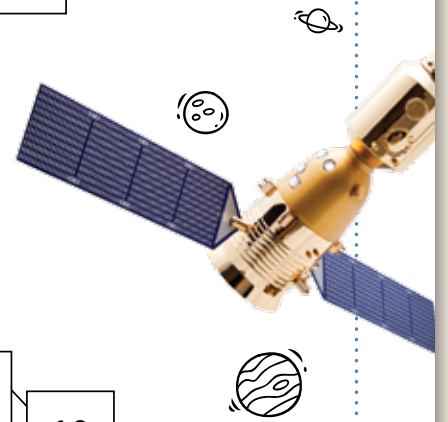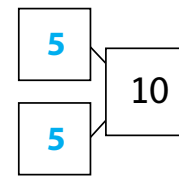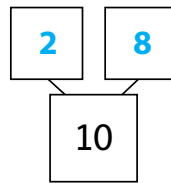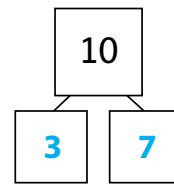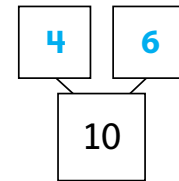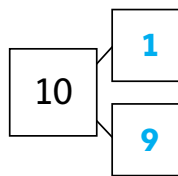
## Close: Exit Ticket

Read the problem and have children solve on paper or using whiteboards.

What are five ways Kai could show 10?

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___ and ___ make 10.
___ and ___ make 10.
___ and ___ make 10.
___ and ___ make 10.
___ and ___ make 10.

**Possible Solutions**

1 and 9 make 10.
2 and 8 make 10.
3 and 7 make 10.
4 and 6 make 10.
5 and 5 make 10.

**Common Misconception** If children do not find five different pairs of number partners for 10, **then** provide them with cubes to model a pattern of number partners for 10 one at a time, starting with 1 and 9, taking one cube from 9 and adding it to 1.
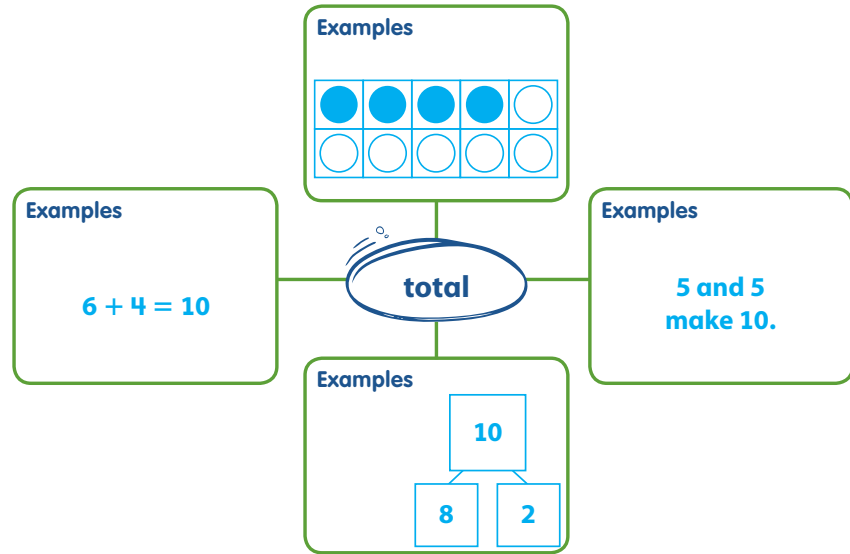
🌎 **Real-World Connection**
Encourage children to think about everyday places or situations where people might need to add to find a total of 10. Have volunteers share their ideas. Examples: items packaged in groups of 10, bowling, saving pennies.

## Solutions

### Support Vocabulary Development

**1** Develop understanding by accessing children's prior knowledge of the word *total*. Say: Total *means "altogether."* For example, there are six red notebooks on the table and four yellow notebooks on the floor. How many total notebooks are there? 6 and 4 make 10. The total is 10. Draw a picture of a number bond and a 10-frame to represent the word *total*.

Now that children have heard the description of the vocabulary, have them work in pairs and take turns describing *total* in their own words. After each partner has described the word, direct their attention to the graphic organizer and have them use words, numbers, or pictures to complete examples that show the meaning of *total* using at least two original ideas and another idea they heard from the teacher or a partner.

**2** Read the problem aloud as children whisper read along with you. Then organize the class in two groups. One group chorally reads the first sentence of the problem. Ask: *What is the total number of fish?* [10] Draw a large circle on the board to represent a fishbowl. Say: *I need a total of 10 fish in the fishbowl.* Have the other group of children chorally read the second sentence of the problem. Draw two yellow fish in the fishbowl. Chorally read the last sentence all together. Pair one child from each group together and have them use crayons or markers to create a drawing that illustrates the problem. Ask: *How can we find the answer? What should we draw?* Have partners discuss their strategy before they begin to draw. Have partners turn and talk about how knowing the total helped them solve the problem.

### Supplemental Math Vocabulary

• *number bond*

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Name: _____

## Prepare for Number Partners for 10

**1** Think about what you know about addition. Fill in each box. Use words, numbers, and pictures. Show as many ideas as you can.
**Possible answers:**

**Examples**

**Examples**
$6 + 4 = 10$

**total**

**Examples**
5 and 5 make 10.

**Examples**
10
8   2

**2** Jasmine has a total of 10 fish.
2 fish are yellow and the rest are red.
How many red fish does Jasmine have?
**Possible answer: 2 and 8 make 10. Jasmine has 8 red fish.**

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**3** Assign problem 3 to provide another look at exploring number partners for 10.

This problem is very similar to the problem about Mia's number cards. In both problems, children must make 5 different number pairs to show 10. The question asks for five different number pairs to make 10.

Children may want to use counters, pennies, paper clips, or cereal pieces.

Suggest that children read the problem three times, asking themselves one of the following questions each time:

• *What is this problem about?*
• *What is the question I am trying to answer?*
• *What information is important?*

**Solutions:**

All possible ways to make 10: 0 and 10; 1 and 9; 2 and 8; 3 and 7; 4 and 6; 5 and 5; 6 and 4; 7 and 3; 8 and 2; 9 and 1; 10 and 0. Children can choose any of these number pairs in any order.
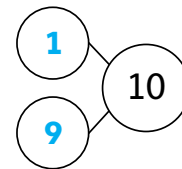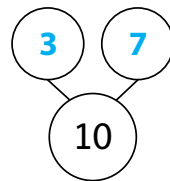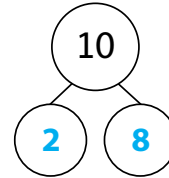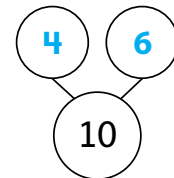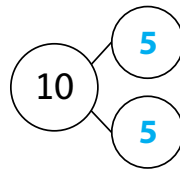
*Medium*

**3** Solve the problem.

**Anna wants to show five different pairs of numbers that make 10.**

**What are five ways she could show 10?**

Possible answers:

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**ELL** **English Language Learners: Differentiated Instruction**

**Prepare for Session 2** Use with *Model It*.

| Levels 1–3 | Levels 2–4 | Levels 3–5 |
|---|---|---|
| **Listening/Speaking** After reading the *Model It* problem aloud, write the numbers 1–9 on the board horizontally. Circle 1 and 9 and draw a line underneath to connect them. ①  2  3  4  5  6  7  8  ⑨ Say: *1 and 9 are number partners for 10.* Have children repeat. Ask pairs of children to come to the board and connect two more numbers that are number partners for ten. Have them use this sentence frame to name the number partners: _____ *and* _____ *are number partners for 10.* Extend the activity by asking children to point to the colored cube illustration from *Model It* that represents the number partners they named in their sentence. | **Listening/Speaking** Read the *Model It* problem aloud, then have children work in groups of three or four to examine the relationship between the colored cube illustration and the corresponding equations. Say: *In each row there are 10 cubes. In the first row, the blue cube represents the number 1. The red cubes represent the missing number. 1 and 9 are number partners for 10.* Write $1 + 9 = 10$. Say: *Because we can add in any order, I can make another equation using 1 and 9 in a different order.* Write $9 + 1 = 10$. Refer to the strategies anchor chart and point out adding in any order. Ask children to take turns explaining each row of the *Model It*. | **Speaking/Writing** Read the *Model It* problem aloud, then have partners examine the relationship between the colored cube illustration and the corresponding equations. Ask: *Do you see a pattern? What pattern do you see in the illustration?* (Pause and let partners discuss.) *What pattern do you see in the equations?* (Pause for partner discussion.) *How can using a pattern help you find the answers?* Write the last question on the board. Ask children to reflect on their learning by writing a response that incorporates vocabulary from the following word bank: *blue cubes, red cubes, pattern, number partners, total, strategy.* |

**Purpose** In this session children find ways to make 10 with the numbers 1 through 9. The purpose of this problem is for children to develop an understanding of the part-whole relationship between addends and the total 10.

## Start

### ✋ Connect to Prior Knowledge

*Materials* For each child: 10 counters

**Why** Model missing addend equations totaling 10 to prime children for applying strategies to solve problems involving partners for 10.

**How** Show the equations with missing addends. Children use counters to model equations and name the missing number partner to make 10.

Use counters to solve.

$1 + \underline{\phantom{x}} = 10$    $2 + \underline{\phantom{x}} = 10$

$3 + \underline{\phantom{x}} = 10$    $4 + \underline{\phantom{x}} = 10$

$5 + \underline{\phantom{x}} = 10$

**Solution** Children model each equation with counters and name the missing addends: 9, 8, 7, 6, 5.

### Develop Language

**Why** Clarify the meaning of the word *pair* as used to describe number partners.

**How** Write the words *pair* and *pear* on the board. Explain that these words are homophones—words that sound the same but have different meanings. Tell children that a pear is a type of fruit. Explain that *number pairs* refer to two addends that make up the total. Have children draw a picture of *number pairs*.

## Try It

### Make Sense of the Problem

Read the problem aloud. To support children in making sense of the problem, prompt them to relate the problem to the previous session.
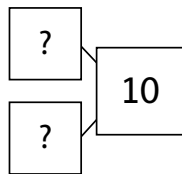
**Ask** *How is this problem like the one you did in the previous session? How is it different?*

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**Jen and Kay each have cards with numbers 1 to 9.**
**Two cards with a sum of 10 are chosen.**
**What are different ways to make 10?**



### Try It    Possible student work:

**Sample A**

○  ○○○○○○○○○
**1 and 9          9 and 1**

○○  ○○○○○○○○
**2 and 8          8 and 2**

○○○  ○○○○○○○
**3 and 7          7 and 3**

○○○○  ○○○○○○
**4 and 6          6 and 4**

○○○○○  ○○○○○
**5 and 5**

**Sample B**

$1 + 9$    $4 + 6$    $3 + 7$

$8 + 2$    $9 + 1$    $6 + 4$

$7 + 3$    $2 + 8$    $5 + 5$

**🧰 Math Toolkit**
- connecting cubes
- number bond
- number cards

**DISCUSS IT**
To make 10, I start with one number and then . . .

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## Discuss It

### Support Partner Discussion

Encourage children to share their strategies with a partner. Support as needed with questions such as:

- *Did you draw a picture or a model? Why or why not?*
- *How did you choose the strategy you used?*
- *Is there another way of looking at that?*

**Common Misconception** **If** children name only $5 + 5 = 10$ and have difficulty finding other number partners for 10, **then** provide practice opportunities modeling with connecting cubes. Have children begin with equal cube trains to show $5 + 5$ and then transfer connecting cubes one at a time from one cube train to the other to show increasing and decreasing addends while conserving the total.

## Select and Sequence Solutions

One possible order for whole class discussion:

- using objects or drawing a model to show two groups that total 10
- writing addition expressions that total 10; some may include expressions with the same addends in different order
- using a pattern to show a relationship between increasing and decreasing numbers that total 10

## Support Whole Class Discussion

**Compare and connect** children's representations and strategies. Have them identify how they are related.

**Ask** *What do all of the solutions have in common?*

**Listen for** They all have five different pairs of addends. Four of the pairs can be written in two different ways by switching the order. $5 + 5$ uses the same two addends, so switching the order doesn't make it look different.

## Model It

**If no child presented the model** shown on the Student Worktext page, connect the cube models and addition equations to the children's models by having children identify how they represent the problem.

**Ask** *What part of each equation do the blue cubes in the models show? How do you know?*

**Listen for** The blue cubes show the numbers that are in the book. I know because the number of blue cubes matches each number.

**Ask** *What part of each equation do the red cubes in the models show? How do you know?*

**Listen for** The red cubes show the numbers that are missing. I know this because every cube train has 10 cubes and the missing number makes 10.

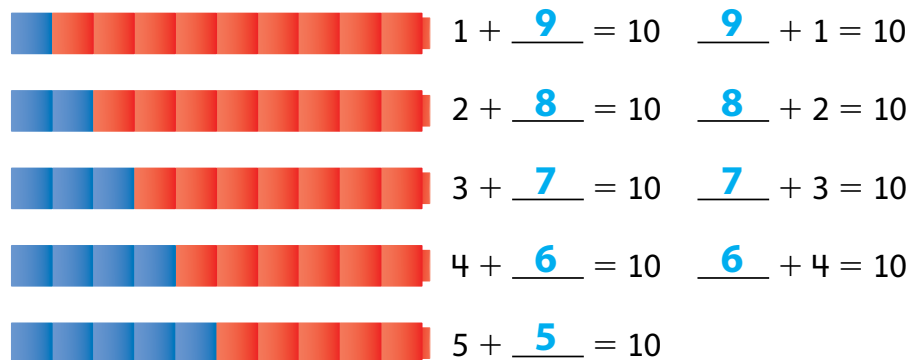**Ask** *Which number partners for 10 do you find easier to remember? Why do you think this is?*

**Listen for** Children may say 9 and 1 because they just count 1 more from 9, or 5 and 5 because it is a doubles fact and because they have five fingers on each hand. Sharing these ideas will help children think of ways to remember the partners.

**Jen and Kay each have cards with numbers 1 to 9.**
**Two cards with a sum of 10 are chosen.**
**What are different ways to make 10?**

?
?
10

2
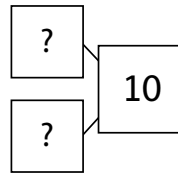
## Model It

Find different ways to make 10.

$1 + \underline{9} = 10$    $\underline{9} + 1 = 10$

$2 + \underline{8} = 10$    $\underline{8} + 2 = 10$

$3 + \underline{7} = 10$    $\underline{7} + 3 = 10$

$4 + \underline{6} = 10$    $\underline{6} + 4 = 10$

$5 + \underline{5} = 10$

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## Deepen Understanding

**Missing Addends**

**SMP 8** Use repeated reasoning.

When discussing the colored cube models and missing addend equations in *Model It*, prompt children to use a related subtraction equation.

✋ **Materials** Per child: 10 connecting cubes

**Ask** *How can you find the missing number in the addition equation $1 + \_\_ = 10$ without using addition? Use your cubes to show how to do this.*

**Listen for** I can start with 10 cubes and take one away to see how many more are needed. I can subtract $10 - 1$ to find the missing number, 9.

**Ask** *How do you know if this strategy would work with other equations?*

**Listen for** I can try another one, such as $3 + \_\_ = 10$. I start with a cube train of 10 and take 3 away and see that there are 7 left.

**Generalize** *Do think you can use this way to find missing numbers for the other addition equations? Why or why not?* Listen for children's early awareness of the relationship between addition and subtraction.

## Connect It

**Support Whole Class Discussion**

Ask children to look at what they drew or wrote to solve the problem and compare it to the colored cube model in *Model It*.

**1** Help children make sense of the colored cubes model by comparing it to their own.

**Ask** *How did you show the number partners 1 and 9? How does* Model It *show 1 and 9? How did you show the other number partners for 10? How does* Model It *show the other number partners?*

**Listen for** I used a pattern to add 1 + 9 and the other number partners for 10. *Model It* uses colored cubes to show the number partners.

**2** **Ask** *How can using cubes help?*

**Listen for** I can match the two colors of cubes to the parts of the equation. Every cube train is the same length, so I know they all make 10. When they are lined up in order it looks like stair steps.

## Apply It

Explain that the next problems are an opportunity for children to practice finding partners to make 10.

Make connecting cubes and number cards available.

**3** $10 = 5 + 5$

| | |
|---|---|
| $10 = 6 + 4$ | $10 = 4 + 6$ |
| $10 = 7 + 3$ | $10 = 3 + 7$ |
| $10 = 8 + 2$ | $10 = 2 + 8$ |
| $10 = 9 + 1$ | $10 = 1 + 9$ |

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## Connect It

**1** How is your way like **Model It**? How is it different?

**Children may say they found the same number partners for 10 as Model It, but they used two groups of counters while Model It uses trains of 10 connecting cubes.**

**2** How do cubes help you?

**Possible answer: I can match the two colors of cubes to the parts of the equation. Every cube train is the same length so I know they all equal 10.**

## Apply It

**3** Look at the models. Complete the equations.

$10 = 5 + \underline{5}$

$10 = 6 + \underline{4}$    $10 = \underline{4} + 6$

$10 = 7 + \underline{3}$    $10 = \underline{3} + 7$

$10 = 8 + \underline{2}$    $10 = \underline{2} + 8$

$10 = 9 + \underline{1}$    $10 = \underline{1} + 9$

**99**

### ✋ Hands-On Activity

**Connect finding missing numbers to modeling with connecting cubes to make 10.**

**If . . .** *children are unsure of how to use cube models to complete missing addend equations*

**Then . . .** *use the activity below to connect the visual models on the Student Worktext page to a concrete representation.*

**Materials** For each child: 20 connecting cubes (10 each of two colors)

• Write $10 = 5 + \underline{\phantom{0}}$ on the board.

• Have children make a single-color cube train of 5. Ask: *How many cubes do you need to make a number partner for 5 that makes a total of 10?* [5]

• Have children make a different color cube train of 5 and then connect the two cube trains to check that the total is 10.

• Repeat with equations that have 10 as the total and either 6, 7, 8, or 9 as the first addend. Watch for children to adjust the colors of the cubes to make trains of a single color to match each addend and connect them to make 10.

**4** $6 + 4 = 10$ $\qquad$ $4 + 6 = 10$

**5** First 2 cubes should be colored one color; remaining 8 cubes a different color.

$8 + 2 = 10$

**6** First 7 cubes should be colored one color; remaining 3 cubes a different color.

$3 + 7 = 10$

## Support Whole Class Discussion

When children have completed problems 4–6, discuss the answers as a class.

**Ask** *How do the cubes and colored squares help you write equations with totals of 10?*

**Listen for** I can color squares to show partners for 10. I can look at the colored cubes to write equations and then switch the order of the number partners to write a different equation.

## Close: Exit Ticket

***Materials*** For each child: whiteboard, markers (two different colors)

**Why** Check children's understanding of models and writing addition equations within 10.

**How** Given the equation $4 + 6 = 10$, children use individual whiteboards and two colors of markers to draw a model and write a related addition equation.

Draw a model for this equation.

$4 + 6 = 10$

Write another equation your model could show.

$\_\_ + \_\_ = 10$

**Possible Solutions**

Children may draw a train of 10 cubes, coloring the first 4 one color and the last 6 another color.

$6 + 4 = 10$

**Error Alert** **If** children incorrectly write related equations for the colored cube model, **then** have them use connecting cubes to model and record $4 + 6 = 10$ and then flip the connecting cubes and record $6 + 4 = 10$.

**4** Look at the model.

Complete the two equations.



$\underline{\quad 6 \quad} + \underline{\quad 4 \quad} = 10$ $\qquad$ $\underline{\quad 4 \quad} + \underline{\quad 6 \quad} = 10$

**5** Color to show $2 + 8 = 10$.

Then write another equation for your model.



$\underline{\quad 8 \quad} + \underline{\quad 2 \quad} = 10$

**6** Color to show $7 + 3 = 10$.

Then write another equation for your model.



$\underline{\quad 3 \quad} + \underline{\quad 7 \quad} = 10$

**100**

## Solutions

1. 
$10 = 1 + 9$     $10 = 9 + 1$

$10 = 2 + 8$     $10 = 8 + 2$

$10 = 3 + 7$     $10 = 7 + 3$

$10 = 4 + 6$     $10 = 6 + 4$

$10 = 5 + 5$

*Basic*

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Name: _____

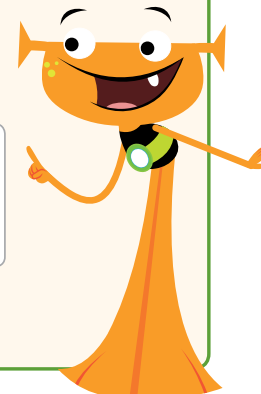## Practice Number Partners for 10

**Look at the Example. Then solve problems 1–4.**

### Example

Use the row of 10 cubes.
What are two ways to make 10?

1 blue cube and 9 green cubes

$10 = 1 + 9$       $10 = 9 + 1$

1. Use the cubes. Write ways to make 10.

$10 = \underline{1} + 9$    $10 = \underline{9} + 1$

$10 = \underline{2} + 8$    $10 = \underline{8} + 2$

$10 = \underline{3} + 7$    $10 = \underline{7} + 3$

$10 = \underline{4} + 6$    $10 = \underline{6} + 4$

$10 = \underline{5} + 5$

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## Fluency Practice

### Identify partners for 10.

*Materials* For each child: Activity Sheet *Partners for 10*

Have children complete Activity Sheet *Partners for 10* to practice identifying number partners that total 10 in a number bond.

**2** 10 = 3 + 7          10 = 7 + 3
*Medium*

**3** Children may color the first 5 or last 5 squares and leave the others blank. They may color the first 5 squares one color and the last 5 squares a different color.
*Medium*

**4** Possible answer:
Children complete the top three number bonds to show partners for 10 (writing 9, 2, 3).

For the bottom two number bonds, they identify and write the remaining number partners for 10 (5, 5 and 4, 6).
*Challenge*

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**2** Look at the model.
Complete the two equations.



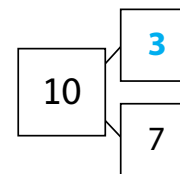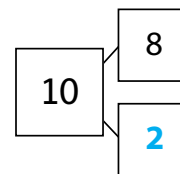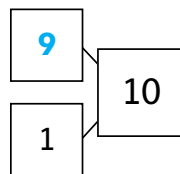$10 = \underline{3} + \underline{7}$          $10 = \underline{7} + \underline{3}$

**3** Color to show 5 + 5 = 10.     **Children may color the first 5 or the last 5 squares.**



**4** Find all the number partners for 10.
Complete the number bonds.   **Possible answer:**
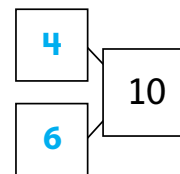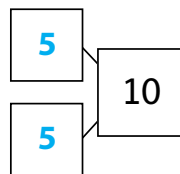
9 / 1 — 10
8 / 2 — 10
3 / 7 — 10

5 / 5 — 10
4 / 6 — 10

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**Prepare for Session 3**
Use with *Connect It*.

**Levels 1–3**

**Reading/Speaking** Use with *Connect It* problem 2. Have children interpret symbols in equations and practice reading them aloud. After completing the number bond together, have children read and circle Buzz's and Boom's equations that contain the numbers 10, 8, and 2. Draw a plus sign on the board. Say: *Plus*. Have children repeat. Point to Buzz's equations. Say: *8 + 2 = 10* and *2 + 8 = 10*. Have children repeat. Draw a minus sign on the board. Say: *Minus*. Have children repeat. Point to Boom's equations. Say: *10 − 2 = 8* and *10 − 8 = 2*. After children have practiced vocalizing each type of equation, have them get together with a partner and take turns reading each of the equations aloud.

**Levels 2–4**

**Speaking/Writing** Pair children up and have them read *Connect It* problem 2 together. Provide the following sentence frame for support as they respond to each question: *The number bond shows _____. _____ is right because _____. _____ is also right because _____.* After children have shared and discussed their answers with their partner, have them use the sentence frames to record their answers in their notebooks.

**Levels 3–5**

**Speaking/Writing** Have children work with a partner to discuss *Connect It* problem 2. After they have determined that both characters' equations are correct, ask them why both of Boom's subtraction equations start with 10. Ask: *What do you notice about Boom's equations? Could they start with a number other than 10 if they are subtraction equations? Could 8 − 6 = 2 go with this number bond? Why or why not?* Have children discuss their answers with their partner. Next, ask children to write a letter to either character explaining why their equations are correct and why they could have included the equations with the other operation.

## Purpose
In this session children solve a word problem where one part, 6, and the whole, 10, are given. The purpose of this problem is to strengthen children's understanding of composing and decomposing 10, which will serve as the basis for different computation strategies later.
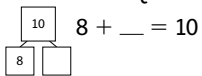
## Start

### ✋ Connect to Prior Knowledge

**Materials** For each child: 10 counters, Activity Sheet *Number Bond Mat*

**Why** Review using counters and a number bond to prime children for modeling partners for 10 to solve missing addend problems.

**How** Children fill in the missing number partner in the number bond and the equation. Then they use counters to check their solution.

| | **Solutions** |
|---|---|
| Use counters. Kim has 10 stickers. 8 are circles. The rest are squares. How many stickers are squares?<br><br>[10] [8] [ ]   $8 + \_\_ = 10$ | 2 in the number bond;<br>$8 + 2 = 10$<br>2 stickers are squares. |

## Develop Language

**Why** Help children verbalize thinking by providing sentence frames to answer the question: *How do you know?*

**How** After children have used manipulatives or drawings to solve the problem, have them work in pairs and take turns explaining their strategies to one another. Encourage children to choose one of the following sentence frames as they talk with their partner: *I used _____ . I drew _____ . I started with _____ .*
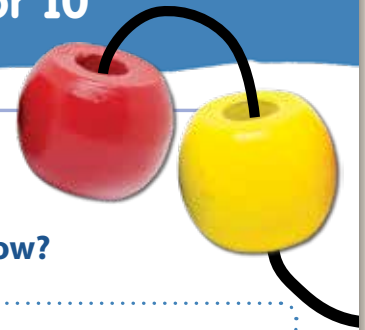
## Try It

### Make Sense of the Problem

Read the problem aloud. To support children in making sense of the problem, prompt them to recognize how the problem relates to number partners for 10.

**Ask** *What are you trying to find? What do you know?*

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Dalila has 10 beads.
6 are red. The rest are yellow.
How many are yellow? How do you know?

### Try It

**Math Toolkit**
• counters
• connecting cubes
• number bonds

**Possible student work:**

**Sample A**

● ● ● ● ● ● ○ ○ ○ ○

**6 + 4 = 10**

**4 beads are yellow.**

**Sample B**

⊗ ⊗ ⊗ ⊗ ⊗ ⊗ ○ ○ ○ ○

**10 − 6 = 4**

**4 beads are yellow.**

> **DISCUSS IT**
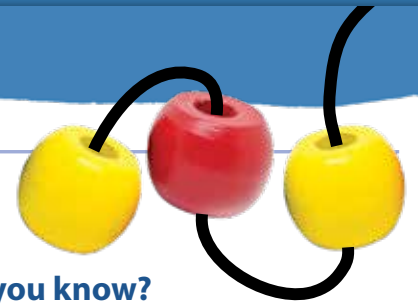> How can you think about the partners for 10?

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## Discuss It

### Support Partner Discussion

Encourage children to talk about what information they know about the beads and what they need to find out as they discuss their solutions.

Support as needed with questions such as:

• *Did you use a drawing or a model to help you solve the problem?*

• *Can you explain why you did it that way?*

• *What did you notice about your partner's strategy?*

**Common Misconception** If children have difficulty finding how many yellow beads there are because they are not pictured, **then** have children use counting on to begin with 6 and count on to 10 using other strategies and models they know (for example, fingers, bar models, number paths).

## Select and Sequence Solutions

One possible order for whole class discussion:

- showing 6 counters of one color and then 4 of another color
- drawing 10 beads and crossing out 6
- writing addition and subtraction equations

## Support Whole Class Discussion

**Compare and connect** different representations and have children describe how they are related.

**Ask** *What is the same about these models? What is different?*

**Listen for** Each one shows a total of 10 and parts of 6 and 4. They show them in different ways.

## Model It

**If no child presented the model** shown on the Student Worktext page, connect the 10-frame to the children's models by having children identify how to represent the problem.

**Ask** *Why are there 6 red counters in this 10-frame?*

**Listen for** They stand for the 6 red beads.

**Ask** *How does the 10-frame help you see how many yellow beads there are?*

**Listen for** It takes 4 yellows to fill all 10 squares of the 10-frame.

## Connect It

### Support Whole Class Discussion

Ask children to look at what they drew or wrote to solve the problem and compare it to the 10-frame, number bond, and addition equation in *Model It*.

**1** Help children make sense of the 10-frame model and number bond by comparing them to their own.

**Ask** *How did you show red and yellow beads that total 10? How does* Model It *show 6 and 4?*

**Listen for** *Model It* uses a 10-frame with red and yellow counters and a number bond with 10 total and 6 as one part. I used two colors to draw 6 and 4, and I added them to get 10.

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**Dalila has 10 beads.**

**6 are red. The rest are yellow.**
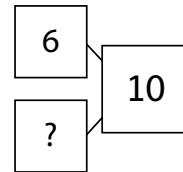
**How many are yellow? How do you know?**
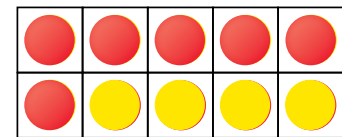
### Model It

$10 - 6 = ?$

$6 + ? = 10$

Use 10 counters. 6 are red. The rest are yellow.

$10 - 6 = \underline{4}$

$6 + \underline{4} = 10$

Dalila has $\underline{4}$ yellow beads.

### Connect It

**1** How is your way like **Model It**? How is it different?

Children may say they showed the number partners 6 and 4 like Model It, but Model It uses a 10-frame and number bond while they used a row of counters.

## Deepen Understanding
### Compare Strategies
**SMP 7** Use structure.

When discussing the 10-frame in *Model It*, prompt children to identify how it compares to models and strategies they used to find partners for 8 and 9.

**Ask** *How is using a 10-frame to find partners for 10 like finding partners for 8 and 9? How is it different?*

**Listen for** I can use a pattern of equations, drawings, number bonds, counters, or connecting cubes to find the partners for 8 and 9 to solve problems. I can use all of these to find number partners for 10 also. Using a 10-frame helps me find partners of 10 because it has exactly 10 spaces to fill.

**Generalize** *Can you use strategies and models for finding number partners for 8 and 9 to solve problems using number partners for 10?*

Listen for children's understanding that when modeling number partners, models and strategies that are useful for other numbers can also be used for making 10. The 10-frame is a model that is particularly useful for making 10.

**2** Prompt children to identify that the addition and subtraction equations use the same partners for 10.

**Ask** *What do you need to know about the number bond to figure out who is right?*

**Listen for** I need to know the number that the question mark stands for. The question mark stands for 2 because 2 is the number partner for 8 to make 10.

**Ask** *When you look at the equations Buzz wrote, what do you notice?*

**Listen for** Buzz wrote $8 + 2 = 10$ and $2 + 8 = 10$. Those are both addition equations using the parts to make the total 10.

**Ask** *When you look at the equations Boom wrote, what do you notice?*

**Listen for** Boom wrote $10 - 2 = 8$ and $10 - 8 = 2$. Those are both subtraction equations that break the total 10 into number partners.

**Ask** *Who is right? How do you know?*

**Listen for** Both Boom and Buzz are right. They both used 8 and 2 as partners for 10 in their equations.
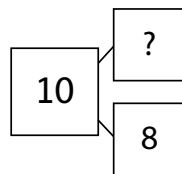
## Apply It

Explain that the next problems are an opportunity for children to practice solving problems by using 10-frames to find missing partners to make 10.

Make counters and 10-frames available.

**3** Drawings should show counters in the remaining 9 spaces of the 10-frame.

$9 + 1 = 10$

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**2** What does the number bond show?
Who is right? How do you know?

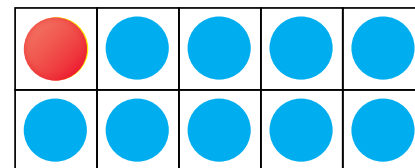| 10 | ? |
|----|---|
|    | 8 |

**Buzz**
$8 + 2 = 10$
$2 + 8 = 10$

**Boom**
$10 - 2 = 8$
$10 - 8 = 2$

**Possible answer: Buzz and Boom are both right. Buzz wrote 2 addition equations. Boom wrote 2 subtraction equations. They both used 8 and 2 as partners for 10 in their equations.**

## Apply It

**3** 10 stickers in an album. Some are big. 1 is small. How many are big?

Find $? + 1 = 10$.

Start with 1.

Draw counters to make 10.

$\underline{9} + 1 = 10$

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### ✋ Hands-On Activity

**Connect adding using a 10-frame to finding number partners for 10.**

**If . . .** *children are unsure about using a number bond to add or subtract,*

**Then . . .** *use the activity below to connect the model on the Student Worktext page to a concrete representation.*

***Materials*** For each child: 10 two-color counters, Activity Sheet *10-Frames*

• Have children place 7 red counters on the 10-frame. Write a number bond with 10 as the total and 7 as one part. Ask, *How many more counters do you need to fill the 10-frame?* [3] Have them fill the 10-frame with yellow counters and complete the number bond.

• Explain that the 3 yellow counters represent the missing number partner for 7.

• Clear the 10-frame, and then place 3 red counters in the first 3 spaces of the frame. Ask, *How many more counters do you need to fill the 10-frame?* [7]

• Listen for recognition that the answer is 7 because they just made 10 with 7 and 3. Watch for children who use the number bond as a reference.

• Repeat with other examples.

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④ Children draw counters in a 10-frame. (Top row: 5 counters of one color. Bottom row: 5 of another color.)
$5 + 5 = 10$; $10 - 5 = 5$

⑤ Children draw counters in a 10-frame. (Top row: 5 counters of one color. Bottom row: 2 counters in the same color and 3 of another color.)
$7 + 3 = 10$; $10 - 7 = 3$

⑥ Children draw counters in a 10-frame. (Top row: 5 counters of one color. Bottom row: 1 counter in the same color and 4 of another color.)
$6 + 4 = 10$; $10 - 6 = 4$

## Support Whole Class Discussion

When children have completed problems 3–6, discuss the answers as a class.

**Ask** *How can 10-frames help you find missing partners?*

**Listen for** I can draw counters for the partner I know using one color and then add enough counters to fill the 10-frame using a different color. The number of counters of each color are the number partners that make 10.

## Close: Exit Ticket

*Materials* For each child: 10 two-color counters, Activity Sheet *10-Frames*

Have children use a 10-frame and counters to solve each equation. Have them write each equation with the missing addend filled in.

Use counters and a 10-frame to solve.
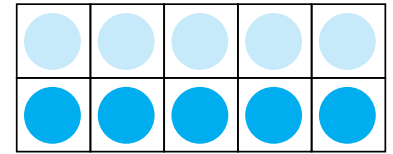$9 + \_\_ = 10$
$4 + \_\_ = 10$
$7 + \_\_ = 10$

**Solutions**
$9 + 1 = 10$; $4 + 6 = 10$
$7 + 3 = 10$
**Look for** 10-frames filled in correctly showing each addend all one color.
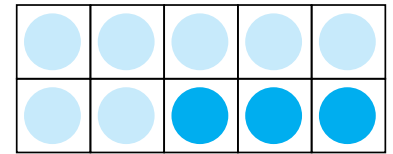
④ Find $5 + ? = 10$.

Draw counters. Use two colors.



$5 + \underline{\ 5\ } = 10$

$10 - 5 = \underline{\ 5\ }$

⑤ Find $7 + ? = 10$.
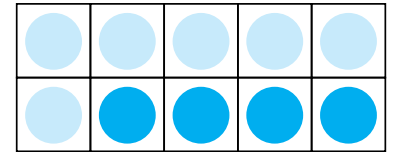
Draw counters. Use two colors.



$7 + \underline{\ 3\ } = 10$

$10 - 7 = \underline{\ 3\ }$

⑥ Find $6 + ? = 10$.

Draw counters. Use two colors.



$6 + \underline{\ 4\ } = 10$

$10 - 6 = \underline{\ 4\ }$

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**Error Alert** **If** children show the incorrect number of counters in the 10-frame, **then** reinforce how the counters represent the numbers in the equation. Model how to start at the top row and show (left to right) the number of counters to represent the first addend. Then switch to a different color and continue left to right, top row to bottom row, filling the 10-frame completely. Then look at each number in the equation and ask children where they see that in the 10-frame.

## Solutions

**1** Children draw 5 counters in the bottom row of the 10-frame.

$5 + 5 = 10$

*Basic*

**2** Children draw 9 counters in the remaining 9 spaces of the 10-frame.

$1 + 9 = 10$

*Medium*
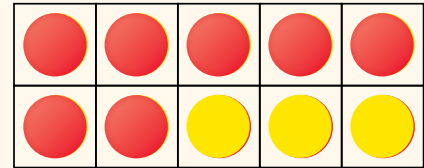
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Name: _____

## Practice Number Partners for 10

**Look at the Example. Then solve problems 1–5.**

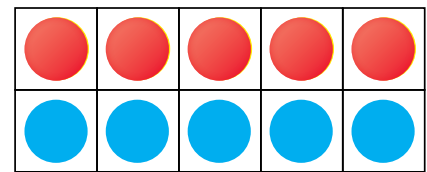**Example** Find $7 + ? = 10$.
Start with 7.
Add counters to make 10.

$7 + 3 = 10$

$10 - 7 = 3$

**1** Find $5 + ? = 10$.

Start with 5.
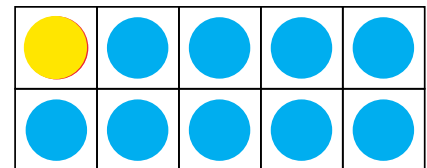
Draw counters to make 10.

$5 + \underline{5} = 10$

**2** Find $1 + ? = 10$.

Start with 1.

Draw counters to make 10.

$1 + \underline{9} = 10$

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## Fluency & Skills Practice   Teacher Toolbox

**Assign *Number Partners for 10***

In this activity children practice finding number partners for 10. There are many real-world applications for the number 10. For example, children should be able to recognize how many more pennies they need in order to exchange a group of pennies for a dime, or how many one-dollar bills they should get back when paying with a ten-dollar bill. Children should also recognize that their fingers and toes are number partners for 10.

**Fluency and Skills Practice**

Number Partners for 10          Name _____

**Draw counters to make 10. Then complete the equation.**

$10 = 9 + \underline{1}$

$10 = 1 + \underline{\phantom{0}}$

$10 = 8 + \underline{\phantom{0}}$

$10 = 2 + \underline{\phantom{0}}$

③ Children draw counters in a 10-frame. (Top row: 4 counters of one color, 1 counter of another color. Bottom row: 5 more of the second color.)

$4 + 6 = 10; 10 - 4 = 6$

*Medium*

④ Children draw counters in a 10-frame. (Top row: 3 counters of one color, 2 counters of another color. Bottom row: 5 more of the second color.)
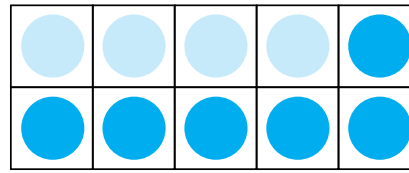
$3 + 7 = 10; 10 - 3 = 7$

*Medium*

⑤ Children draw 8 more counters, all the same color, to complete the 10-frame.
Children write 8 to complete the number bond.

$2 + 8 = 10$        $10 - 2 = 8$

*Challenge*
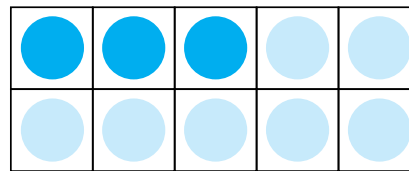
---

③ Find $4 + ? = 10$.

Draw counters. Use two colors.

$4 + \underline{6} = 10$

$10 - 4 = \underline{6}$
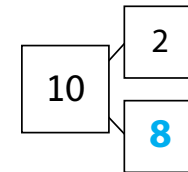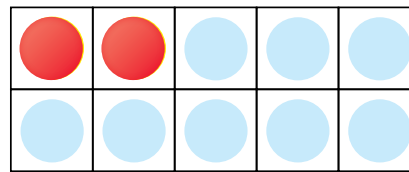
④ Find $3 + ? = 10$.

Draw counters. Use two colors.

$3 + \underline{7} = 10$

$10 - 3 = \underline{7}$

⑤ Draw counters to make 10.
Complete the number bond.
Then write two equations.   **Possible answer:**

$\underline{2} + \underline{8} = \underline{10}$        $\underline{10} - \underline{2} = \underline{8}$

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**ELL** **English Language Learners: Differentiated Instruction**

**Prepare for Session 4**
Use with *Apply It*.

| **Levels 1–3** | **Levels 2–4** | **Levels 3–5** |
|---|---|---|
| **Listening/Speaking** Use with *Apply It* problem 5. Have children practice matching spoken words to operations from pictures. In random order, call out an equation that is represented by each picture and have children repeat the equation and point to the correct picture. For example, say *4 + 6 = 10*. Children should point to the last pair of cards. Or say *10 − 7 = 3*. Children should point to the first pair of cards. Remember to use both addition and subtraction equations as examples. | **Reading/Speaking** Read *Apply It* problem 5 to children as they follow along with their fingers. Tell them there is an important word written in all capital letters. Have them raise their hand when they find the word. Ask: *Why is the word* NOT *important in this problem?* Have children work with a partner. Ask: *What total are you looking for?* [10] *What should you do if the total does* NOT *equal 10?* [Draw an X.] Ask children to work with a partner to solve the problem. | **Speaking** Ask children to work in pairs to solve *Apply It* problem 5. Direct children's attention to the strategies anchor chart. Ask partners to choose one of the strategies and explain how the strategy could be used to help them solve the problem. For example, counting on could be used to find the total of 7 and 3. Start at 7 and count on 8, 9, 10. Add in any order could help add the second pair of cards because some children might find adding 7 + 1 easier than adding 1 + 7. In the last picture children might draw 4 more dots to show the dots in a ten frame arrangement and then count all the dots. |

**Purpose** In this session children practice finding number partners for 10 as they complete number bonds, addition equations, and subtraction equations.

## Start

### Develop Fluency

**Why** Build fluency with addition facts using number partners for 10.

**How** Use strategies and numerical reasoning to find missing numbers for related equations with a total of 10. Have children complete the equations with missing addends.

| | Solutions |
|---|---|
| 10 = __ + 2 | 10 = 8 + 2 |
| 2 + __ = 10 | 2 + 8 = 10 |
| | |
| 7 + __ = 10 | 7 + 3 = 10 |
| 10 = __ + 7 | 10 = 3 + 7 |

## Example

Read the Example problem aloud. Have children describe how to use the number bond.

**Ask** *How could you use the number bond to write the addition and subtraction equations?*

**Listen for** I can start with the total 10. I can use the number partners 5 and 5 to write $10 = 5 + 5$ and $10 - 5 = 5$.

Discuss how the number bond represents both addition and subtraction with 5 as parts that make up 10 as the whole. Relate this to both equations.

## Apply It

**1** Possible approach: children write 1 in the number bond.

$10 = 9 + 1$

$1 + 9 = 10$

**DOK 2**

**2** Children write 1 in the number bond.

$10 - 9 = 1$

$10 - 1 = 9$

**DOK 2**

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**Complete the Example. Then solve problems 1–5.**

**Example** Write two equations.

10

5    5
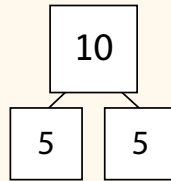
$10 = \underline{5} + \underline{5}$

$10 - \underline{5} = \underline{5}$

## Apply It

**1** Complete the number bond. Write two addition equations.

1    9

10

$10 = \underline{9} + \underline{1}$

$\underline{1} + \underline{9} = 10$

**2** Complete the number bond.
Write two subtraction equations.

1    9

10
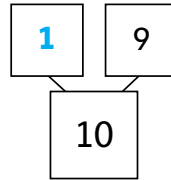
$10 - \underline{9} = \underline{1}$

$10 - \underline{1} = \underline{9}$

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**3** Children write 2 in the number bond.

Possible equations:

$10 = 8 + 2$

$10 - 2 = 8$

**DOK 2**

**4** Children write 7 in the number bond.

$10 - 3 = 7$    $10 - 7 = 3$

$7 + 3 = 10$    $3 + 7 = 10$

**DOK 2**

**5** Children draw an X on the pair of cards that shows 1 and 7.

**DOK 1**

## Close: Exit Ticket

### ✋ Check for Understanding

**Materials** For each child: 10 connecting cubes

Ask children to write 2 addition and 2 subtraction equations for the number bond showing 10, 3, and 7.

Use cubes.
Write 2 addition equations and 2 subtraction equations for this model.

| 10 | 7 |
|    | 3 |

**Possible Solutions**

$7 + 3 = 10$

$10 = 3 + 7$

$10 - 3 = 7$

$10 - 7 = 3$

**Error Alert** For children who are still struggling, use the table on the right to guide remediation.

After providing remediation, check children's understanding of the following problem: Write the four equations for the number bond including 10, 4, and 6. [$4 + 6 = 10$, $6 + 4 = 10$, $10 - 4 = 6$, and $10 - 6 = 4$]

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**3** Complete the number bond.

Write two equations. **Possible answers:**

$10 = \underline{\textbf{8}} + \underline{\textbf{2}}$

$10 - \underline{\textbf{2}} = \underline{\textbf{8}}$

**4** Complete the number bond.

Write four equations.

$10 - \underline{\textbf{3}} = \underline{\textbf{7}}$    $10 - \underline{\textbf{7}} = \underline{\textbf{3}}$

$\underline{\textbf{7}} + \underline{\textbf{3}} = 10$    $\underline{\textbf{3}} + \underline{\textbf{7}} = 10$

**5** Draw an X on the pair of cards that does NOT show a way to make 10.

## Error Alert

| If the error is . . . | Children may . . . | To support understanding . . . |
|---|---|---|
| $10 + 3 = 13$ or $7 - 3 = 4$ | be using numbers in the number bond with any operation to create equations. | Help children understand the relationship between the number bond squares. Draw three different number bonds with the following numbers in the total squares: 13, 10, and 7. Make one of the parts 3 in each number bond. Discuss why certain erroneous equations do not match the number bond on the slide. |
| $7 - 10 = 3$ | be applying the commutative property to subtraction. | Have children read the subtraction equation and attempt to model it with a picture. Invite them to draw 7 circles and attempt to cross out 10. Discuss where the total 10 goes in a subtraction equation. |

### Solutions

**1**  $10 = 6 + 4$
$10 = 4 + 6$
*Basic*

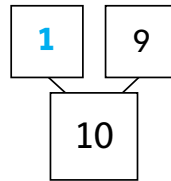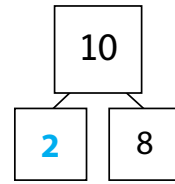**2**  Children write 4 to complete the number bond.
$10 - 4 = 6$
$10 - 6 = 4$
*Medium*

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## Practice Number Partners for 10

**Look at the Example. Then solve problems 1–5.**

**Example**  Write four equations.

10
7   3
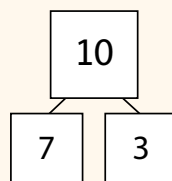
$7 + 3 = 10$         $3 + 7 = 10$

$10 - 7 = 3$         $10 - 3 = 7$
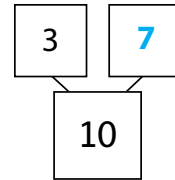
**1**  Write two addition equations.
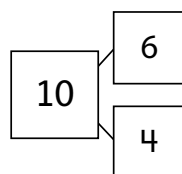
10   6   4

$10 = \underline{6} + \underline{4}$

$10 = \underline{4} + \underline{6}$

**2**  Complete the number bond.
Write two subtraction equations.

10   6   4

$10 - \underline{4} = 6$

$10 - 6 = \underline{4}$

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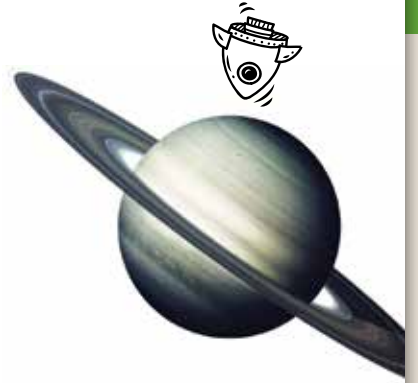
**3** Children write 5 to complete the number bond.

$5 + 5 = 10$

$10 - 5 = 5$

*Medium*

**4** Children write 2 to complete the number bond.

$10 = 2 + 8$    $10 - 2 = 8$

$8 + 2 = 10$    $10 - 8 = 2$

*Challenge*

**5** Children draw an X on the pair of cards that shows 6 and 3.

*Challenge*

**3** Complete the number bond.
Write two equations.

5   5

10
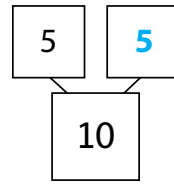
$\underline{5} + \underline{5} = 10$

$10 - \underline{5} = 5$

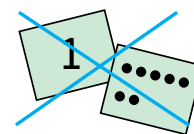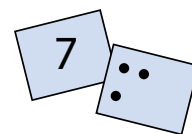**4** Complete the number bond.
Write four equations.

10

2   8
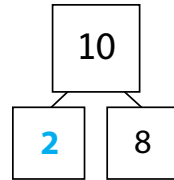
$10 = \underline{2} + \underline{8}$    $10 - \underline{2} = \underline{8}$

$\underline{8} + \underline{2} = 10$    $10 - \underline{8} = \underline{2}$

**5** Draw an X on the pair of cards that does NOT show a way to make 10.

9

6

5
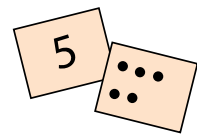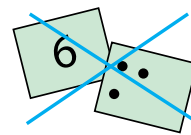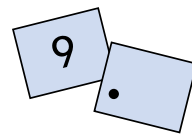
**Purpose** In this session children practice finding number partners for 10 using 10-frames, number bonds, and addition and subtraction equations.

## Start

### Develop Fluency

**Why** Develop fluency with problems involving number partners for 10.

**How** Use strategies and numerical reasoning to complete equations using number partners for 10.

__ + 9 = 10

10 = __ + 2

10 − __ = 6

10 = __ + 5

**Possible Solutions**

1 + 9 = 10

10 = 8 + 2

10 − 4 = 6

10 = 5 + 5

## Apply It

**1** Draw 7 counters. See Student Worktext for possible equations. Note that order of numbers may vary.
*DOK 2*

**2** Write 8 in the number bond. See Student Worktext for possible equations. Note that order of numbers may vary.
*DOK 2*

**3** Write 6 in the number bond. See Student Worktext for possible equations. Note that order of numbers may vary.
*DOK 2*

**4** Write 2 in the number bond. See Student Worktext for possible equations. Note that order of numbers may vary.
*DOK 2*

**5** Write 1 in the number bond. See Student Worktext for possible equations. Note that order of numbers may vary.
*DOK 2*

**6** Write 4 in the number bond. See Student Worktext for possible equations. Note that order of numbers may vary.
*DOK 2*

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### Apply It

**Solve problems 1–6.**

**1** Draw counters to show 10. Write two equations.
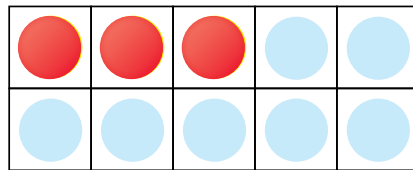
$10 - \underline{3} = \underline{7}$

$10 - \underline{7} = \underline{3}$

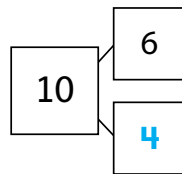**2** Complete the number bond. Write two equations.

2

8

10
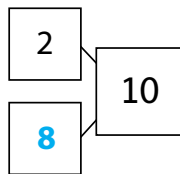
$10 = \underline{2} + \underline{8}$

$10 = \underline{8} + \underline{2}$

**3** Complete the number bond. Write four equations.

4

6

10
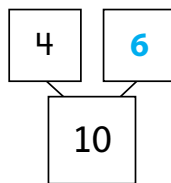
$\underline{4} + \underline{6} = 10$   $10 - \underline{4} = \underline{6}$

$10 = \underline{6} + \underline{4}$   $10 - \underline{6} = \underline{4}$

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## Differentiated Instruction

### RETEACH

### ✋ Hands-On Activity
**Play Sums of Ten game.**

**Children** struggling with the concept of composing partners for 10

**Will benefit from** additional work with concrete representations of making ten.

*Materials* For each pair: Activity Sheet *Number Cards 0 to 11*, Activity Sheet *Dot Cards*, 2 different colors of paper

- Print number cards 1–9 on colored paper and dot cards 1–9 on different color paper and provide a set of both cards for each pair.

- Mix up the cards and place them facedown in rows. Children take turns turning over two cards, one of each color. If the sum of the two cards is 10, the child keeps the cards. If not, the cards are returned to their position facedown again. Play continues until all combinations of number partners for 10 have been found.

- Optional: add cards with 10 and 0 and cards containing 10 and 0 dots.

## Close: Exit Ticket

### Math Journal

**Materials** For each child: Activity Sheet *Number Bond Mat*

Have children complete a number bond with 8, 2, and 10 and write two addition and two subtraction equations for it.

- Fill in a number bond with the numbers 10, 8, and 2.
- Use your number bond to write four equations.

__ + __ = __    __ + __ = __
__ − __ = __    __ − __ = __

**Possible Solutions**

Number bond: 10 with partners 8 and 2.

$8 + 2 = 10$
$2 + 8 = 10$
$10 - 8 = 2$
$10 - 2 = 8$

**Error Alert** **If** children correctly complete the addition equations but incorrectly complete the subtraction equations, **then** have them use a 10-frame and counters to model $8 + 2 = 10$. Have them take away 8 counters to model $10 - 8 = 2$. Ensure that they understand that the total of 10 counters begins the subtraction equation by connecting it to the full 10-frame. Repeat with other number partners.

**4** Complete the number bond.
Write two equations.

**Possible answer:**

[number bond: 2 and 8 → 10]
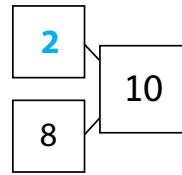
$8 + \underline{2} = 10$

$10 - \underline{8} = \underline{2}$
or      $\underline{2}$      $\underline{8}$

**5** Complete the number bond.
Write four equations.

[number bond: 9 and 1 → 10]
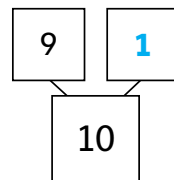
$10 - \underline{1} = \underline{9}$     $10 - \underline{9} = \underline{1}$

$\underline{1} + \underline{9} = 10$     $\underline{9} + \underline{1} = 10$

**6** Complete the number bond.
Write four equations.

[number bond: 10 → 6 and 4]
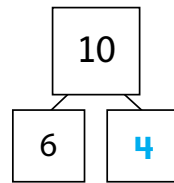
$\underline{6} + \underline{4} = 10$     $\underline{4} + \underline{6} = 10$

$10 - \underline{6} = \underline{4}$     $10 - \underline{4} = \underline{6}$

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## EXTEND

### ⭐ Challenge Activity
**Make a book.**

**Children** who have achieved proficiency with finding number partners for 10

**Will benefit from** deepening their understanding of combinations for ten.

**Materials** For each pair: 10 two-color counters

- Have children work in pairs to create a book. Each page should include a different combination of two colors of dots that make 10.

- Challenge pairs to model combinations of dots totaling 10 and to put them into contexts so that the pages of their book tell a story.

- Circulate and offer support and feedback. When the pages are complete, have children write a title, design a cover, and make a book for their classmates to read.

## PERSONALIZE

### 🟩 i-Ready®

Provide children with opportunities to work on their personalized instruction path with *i-Ready* Online Instruction to:

- fill prerequisite gaps
- build up grade-level skills

# Use Strategies for Addition and Subtraction Facts

## Lesson Objectives

### Content Objectives

- Fluently add and subtract within 10.
- Use strategies such as counting on, using the relationship between addition and subtraction, and using a known sum or difference to find an unknown sum or difference to add and subtract.

### Language Objectives

- Identify and use more than one strategy to complete addition or subtraction equations in which the unknown is located in all positions.
- Record addition facts to 10 in an addition table.
- Compare two approaches to addition or subtraction and describe how they are the same or different.

## Prerequisite Skills

- Add and subtract within 10.
- Understand the relationship between addition and subtraction.

## Standards for Mathematical Practice (SMP)

SMPs 1, 2, 3, 4, 5, and 6 are integrated in every lesson through the *Try-Discuss-Connect* routine.*

In addition, this lesson particularly emphasizes the following SMPs:

**4** Model with mathematics.

**5** Use appropriate tools strategically.

**7** Look for and make use of structure.

**8** Look for and express regularity in repeated reasoning.

*See page 1m to see how every lesson includes these SMPs.

## Lesson Vocabulary

- **column** a group of objects or numbers that go from top to bottom.
- **row** a group of objects or numbers that go from left to right.

Review the following key term.

- **addend** a number being added.

## Learning Progression

**In Kindergarten** children fluently add and subtract within 5 and record number partners within 10 using a drawing or equation.

**In Grade 1** children develop fluency in addition and subtraction within 10 through the use of models and strategies.

**In this lesson** children complete and analyze addition tables, using strategies they have developed to find sums and differences. They demonstrate fluency by completing addition and subtraction equations in which the unknown is located in all positions. Children continue to develop their understanding of the relationship between addition and subtraction as they work with related equations.

**In Grade 2** children become fluent in addition and subtraction within 20, applying strategies developed for addition and subtraction within 10.

# Lesson Pacing Guide

## Whole Class Instruction

| | | |
|---|---|---|
| **SESSION 1**<br>**Explore**<br>*45–60 min* | **Using Strategies for Addition and Subtraction Facts**<br>• Start  *5 min*<br>• Try It  *20 min*<br>• Connect It  *15 min*<br>• Close: Exit Ticket  *5 min* | **Additional Practice**<br>Lesson pages 207–208 |
| **SESSION 2**<br>**Develop**<br>*45–60 min* | **Using Strategies for Addition and Subtraction Facts**<br>• Start  *5 min*<br>• Try It  *15 min*<br>• Discuss It  *10 min*<br>• Model It  *5 min*<br>• Connect It  *10 min*<br>• Apply It  *5 min*<br>• Close: Exit Ticket  *5 min* | **Additional Practice**<br>Lesson pages 213–214<br><br>**Fluency Practice**<br>Practice Facts with the Addition Table |
| **SESSION 3**<br>**Develop**<br>*45–60 min* | **Using Strategies for Addition and Subtraction Facts**<br>• Start  *5 min*<br>• Try It  *15 min*<br>• Discuss It  *10 min*<br>• Model It  *5 min*<br>• Connect It  *10 min*<br>• Apply It  *5 min*<br>• Close: Exit Ticket  *5 min* | **Additional Practice**<br>Lesson pages 219–220<br><br>**Fluency** 🔘<br>Using Strategies for Addition and Subtraction Facts |
| **SESSION 4**<br>**Refine**<br>*45–60 min* | **Using Strategies for Addition and Subtraction Facts**<br>• Start  *5 min*<br>• Apply It  *35 min*<br>• Close: Exit Ticket  *5 min* | **Additional Practice**<br>Lesson pages 223–224 |
| **SESSION 5**<br>**Refine**<br>*45–60 min* | **Using Strategies for Addition and Subtraction Facts**<br>• Start  *5 min*<br>• Apply It  *15 min*<br>• Small Group Differentiation  *20 min*<br>• Close: Exit Ticket  *5 min* | **Lesson Quiz** 🔘<br>or **Digital Comprehension Check** |

## Lesson Materials

| | |
|---|---|
| **Lesson**<br>*(Required)* | *Per child:*  10 two-color counters, 10 connecting cubes<br>*Per pair:*  20 two-color counters |
| **Activities** | *Per child:*  10 two-color counters, counters, index cards, crayons<br>*Per pair:*  12 counters<br>*Activity Sheets:* 🔘  Number Paths, Number Cards 0 to 11, Addition Table 2, Addition Table 3 |
| **Math Toolkit** | counters, crayons |
| **Digital Math Tool** 🔘 | Counters and Connecting Cubes |

## Small Group Differentiation

### PREPARE

**Ready Prerequisite Lessons**

**Grade K**
• Lesson 21  Add Within 10
• Lesson 23  Subtract Within 10

### RETEACH

**Tools for Instruction**

**Grade K**
• Lesson 21  Add Within 10
• Lesson 23  Subtract Within 10

**Grade 1**
• Lesson 10  Addition and Subtraction Facts

### REINFORCE

**Math Center Activity**

**Grade 1**
• Lesson 10  Number Bond Facts

### EXTEND

**Enrichment Activity**

**Grade 1**
• Lesson 10  10 Square

*i-Ready*

## Independent Learning

### PERSONALIZE

**i-Ready Lessons***

**Grade 1**
• Fluently Add and Subtract Within 10
• Count On to Add
• Practice: Count On to Add
• Add in Any Order
• Doubles
• Add Doubles Plus 1
• Count On to Subtract

**Learning Games**
• *Hungry Guppy*
• *Hungry Fish*
• *Match*

*We continually update the Interactive Tutorials. Check the Teacher Toolbox for the most up-to-date offerings for this lesson.

# Connect to Family, Community, and Language Development

The following activities and instructional supports provide opportunities to foster school, family, and community involvement and partnerships.

## Connect to Family

Use the **Family Letter**—which provides background information, math vocabulary, and an activity—to keep families apprised of what their child is learning and to encourage family involvement.

Available in Spanish
Teacher Toolbox

### Use Strategies for Addition and Subtraction Facts

LESSON 10

**Dear Family,**

This week your child is learning strategies for quickly recalling addition and subtraction facts.

Your child will use addition tables to add numbers with totals up to 10. This will help your child think about patterns and strategies for finding an unknown addend or a total.

Below is part of an addition table.

| 4 + 1 5 | 4 + 2 6 | 4 + 3 7 | 4 + 4 8 |
|---|---|---|---|
| 5 + 1 6 | 5 + 2 ___ | ___ + 3 8 | 5 + ___ 9 |

The second addend increases by one, so the total increases by one.

Knowing $5 + 4 = 9$ means you can solve $9 - ___ = 5$

Below is part of a table showing number partners.

| Partners for 7 | Partners for 8 |
|---|---|
| 0 + 7 = 7 | 0 + 8 = 8 |
| 1 + 6 = 7 | ___ + 7 = 8 |
| 2 + 5 = 7 | 2 + ___ = 8 |

Solving ___ + 7 = 8 can help you solve $8 - 7 = ___$.

Invite your child to share what he or she knows about addition and subtraction facts by doing the following activity together.

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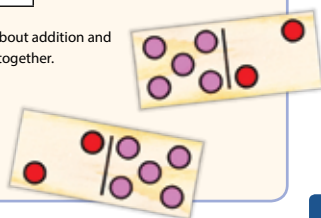
**Activity** Addition and Subtraction Facts

**Do this activity with your child to explore using strategies for addition and subtraction facts.**

*Materials* toy blocks, paper clips, or paper and pencil

Help your child see how practicing addition and subtraction facts can help him or her solve addition and subtraction problems quickly.

• Ask your child to solve addition problems that have totals up to 10. For example, you might ask your child to find $5 + 4, 2 + 7,$ or $9 + 1$.

• Each time your child solves a problem correctly, he or she places a block to build a tower. Encourage your child to see how tall the tower can get!

• Then start to build a new tower, this time asking your child to solve subtraction problems in which the first number is no greater than 10. For example, you might ask your child to find $8 - 4, 10 - 2,$ or $6 - 5$.

• Again, each time your child answers correctly, he or she adds a block to the tower.
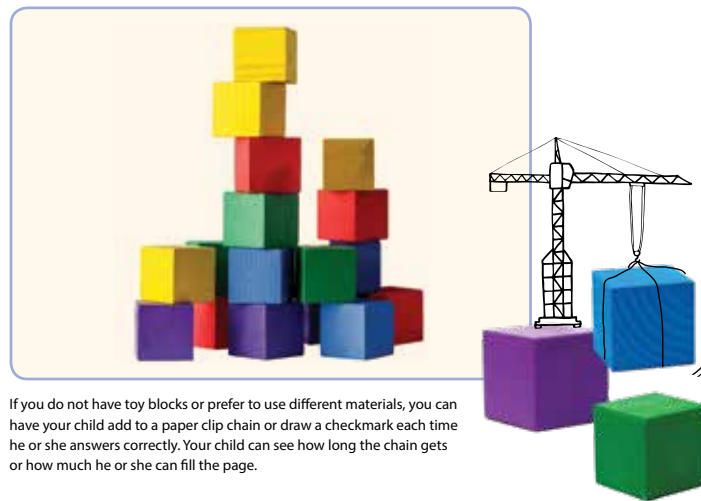
If you do not have toy blocks or prefer to use different materials, you can have your child add to a paper clip chain or draw a checkmark each time he or she answers correctly. Your child can see how long the chain gets or how much he or she can fill the page.

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## Goal

The goal of the Family Letter is to help children explore strategies for solving addition and subtraction facts with an unknown number in various locations.

## Activity

Thinking about patterns and strategies for finding an unknown addend or total helps children develop automaticity with addition and subtraction facts. Look at the *Addition and Subtraction Facts* activity and adjust if necessary to connect with children.

## Math Talk at Home

Encourage children to explore strategies for solving simple addition and subtraction facts with their family members using common household objects, such as blocks, paper clips, or pencil and paper.

**Conversation Starters**  Below are additional conversation starters children can write in their Family Letter or math journal, with your guidance, to engage family members:

• *What is the total?*

• *How did you solve the equation?*

• *Is there a strategy that makes solving the problem easier?*

## Connect to Community and Cultural Responsiveness

Use these activities to connect with and leverage the diverse backgrounds and experiences of all children.

**Session 1**  Use with *Connect It*.

- Marbles are usually made from glass, clay, plastic, or stone and are used in games played around the world. Native American, African, European, and Australian cultures use marbles in a variety of games where players compete to knock or bump one another's marbles out of a line or circle. Ask: *Do you play with marbles? Do you know a game that uses marbles? What are the rules of that game?*

**Session 2**  Use with *Try It*.

- Develop the concept of one more and one less by modeling a movement and asking children to do one more or one less repetition of it. For example, do four jumping jacks. Ask children to do the same number of jumping jacks, plus one more. Ask: *How many total jumping jacks did you do?* [5] Next, touch your toes six times. Say: *Copy the exercise but do one fewer repetitions than me.* Ask: *How many times did you touch your toes?* [5] Other possible movements include hopping on one leg, jumping up and down, and knee lifts.

**Session 3**  Use with *Model It*.

- Continue to deepen children's understanding of patterns as a repeated design through examination of patterns such as polka dots, stripes, checks, and plaids found in clothing. Encourage children to look for patterns at home, at school, and in their communities and to share them throughout the lesson.

**Session 4**  Use throughout the session.

- Say: *Tools are used by professionals in many careers.* Discuss the different tools used by builders, doctors, teachers, and scientists. Ask: *How do these tools help them do their jobs? What math tools do children use in class to help them solve problems?* Develop understanding that the addition table, counters, connecting cubes, and number bond mats are tools that they use to solve problems.

**Session 5**  Use at the end of Session 5.

- Create a word bank with math terms that the children have been learning throughout Unit 1, such as *doubles, total, addend, subtraction, equation, pattern,* and *false*. Choose a word and provide 4–5 clues. Have children guess the word with a partner. For example, if the mystery word is *total*, use the following clues: 1) This word means *whole*. 2) A phrase used in math problems to describe this word is *in all*. 3) In the equation $2 + 1 = 3$, 3 is an example of the word. 4) The word can be used to complete this sentence frame: *When an addend increases by one, the _____ also increases by one.*

## Connect to Language Development

For ELLs, use the Differentiated Instruction chart to plan and prepare for specific activities in every session.

**ELL** English Language Learners: Differentiated Instruction

**Prepare for Session 1** Use with *Connect It*.

| Levels 1–3 | Levels 2–4 | Levels 3–5 |
|---|---|---|
| **Listening/Speaking**  Read the *Connect It* problem aloud. Think aloud as you illustrate the problem. Say: *I have 8 marbles.* Draw 8 circles. *5 marbles are red.* Color 5 of the circles red. *The rest are yellow.* Point to the remaining circles. Ask: *How many are yellow?* Allow time for children to respond. Refer to the strategies anchor chart. Say: *Point to and name the strategy you used to solve the problem.* If children point to "counting on," model the strategy by pointing to the remaining circles and counting on [6, 7, 8]. Ask: *How many more did you count?* If children point to "number partners," draw a number bond showing 8 as the whole and 5 as one of the parts. Ask: *What's missing?* [3] | **Reading/Speaking**  Have children work in pairs to Read the *Connect It* problem. Then have them create an illustration or model using two-color counters. Ask partners to take turns covering the problem with a sticky note and retelling the problem in their own words using the drawing or model as a guide. Refer to the strategies anchor chart and ask children to explain which strategy they used to solve the problem using the words *first, next,* and *then.* If children need additional support, provide the following word bank: *total, count on, number partners, whole, part, strategy, addition, subtraction, equation.* | **Speaking/Writing**  Have children read and work on the *Connect It* problem. After they complete the *Connect It* problem, ask: *Which strategy did you use to solve the problem?* Then, ask children to work in pairs to create a new problem using the same total [8], but different addends, or number partners. Instruct them to use the *Connect It* problem as a guide as they write the new problem in their math notebooks. Say: *Think about which strategy might be used to help solve the new problem.* Provide a list of strategies such as doubles, doubles plus 1, number partners, counting on, and adding in any order. |

**Purpose** In this session children apply familiar strategies for addition and subtraction to find a missing number from a set of clues provided by the teacher.

## Start

### Develop Fluency

**Why** Review doubles facts to prime children for using known strategies and known facts to relate to other addition facts.

**How** Find the sums of doubles facts to 10.

| | | **Solutions** |
|---|---|---|
| 1 + 1 = __ | 4 + 4 = __ | 1 + 1 = 2 |
| 2 + 2 = __ | 5 + 5 = __ | 2 + 2 = 4 |
| 3 + 3 = __ | | 3 + 3 = 6 |
| | | 4 + 4 = 8 |
| | | 5 + 5 = 10 |

## Try It

✋ *Materials* For each pair: 20 two-color counters

### Use Clues to Find Mystery Numbers

Tell children that today they will work with a partner and be detectives. Explain that you will give them clues that they will use to find missing numbers, just like a detective uses clues to solve a mystery.

Read the following clue: *I have 6 marbles. Some are red and some are yellow. There is the same number of red marbles as yellow marbles. How many are red and how many are yellow?* [3 are red and 3 are yellow] Observe as pairs work together toward a solution.

**Ask** *How did you solve the mystery? Did you use facts you already knew?*

**Listen for** I knew that the two numbers being added have to be the same because the clue said the same number of reds and yellows. It is a doubles fact. 3 + 3 = 6.

**Common Misconception** **If** children do not recognize that the first clue is a doubles fact, **then** ask them to list all of the ways that you can make 6 with two-color counters and identify which way matches the clue.

Read the next clue: *I have 7 marbles. Some are red and some are yellow. I have 2 yellow marbles. How*

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**Listen to the clues.**
**Use counters to find missing numbers.**

### Learning Target
- Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making ten; decomposing a number leading to a ten; using the relationship between addition and subtraction; and creating equivalent but easier or known sums.
**SMP** 1, 2, 3, 4, 5, 6, 7, 8

### Try It

Check children's work.

🧰 Math Toolkit
• counters ⟳

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many are red? [5] Observe whether pairs use an addition or subtraction strategy as they interpret this problem.

**Ask** *How did you solve the mystery? Did you use facts you already knew?*

**Listen for** I started with 2 counters and counted on 5 until I got to 7. I started with 7 counters and subtracted the 2 yellows. 7 − 2 = 5. I knew that 2 + 5 = 7.

### Support Whole Class Discussion

**Ask** *How can you use the clues to find the mystery numbers?*

**Listen for** I think about which number is the total and which number is the part I know in the problem. I use counters to make a model and then I can use addition or subtraction to find the missing part.

Continue the mystery number game by giving children additional clues like:

- *I have 9 marbles. There are more red marbles than yellow marbles. How many red marbles and how many yellow marbles could I have?* [Any combination where the total equals 9 and the greater of the two addends represents the red marbles.]

- *I have the same number of red marbles as yellow marbles. If I take a yellow marble away, I will have 7 marbles. How many red and how many yellow marbles will I have?* [3 yellow and 4 red]

## Connect It

🖐️ **Materials** For each child: 8 two-color counters

### Pose a Different Problem

Read the clues from the Student Worktext page aloud. Have children draw a picture to model the problem. Then have children write an equation for their solution and strategy.

### Support Whole Class Discussion

**Ask** *What strategy did you use to find the number of yellow marbles?*

**Listen for** I started with 8 counters and made 5 red. Then I made the rest yellow and counted 3 yellows. I started with 5 counters and then counted on until I had 8.

**Ask** *Can this problem be represented as an addition equation? How?*

**Listen for** I know that 8 is the total and 5 is the red part so I can find the addend that goes with 5 to make 8. $5 + 3 = 8$, so I know there must be 3 yellow marbles.

**Ask** *Can this problem be represented as a subtraction equation? How?*

**Listen for** 8 can be broken up into 5 red and the rest yellow. When I take 5 away from 8, there are 3 left so there are 3 yellow.

**Ask** *What do you notice about the subtraction equation and the addition equation?*

**Listen for** The same numbers (8, 5, and 3) are in both equations. There is a plus sign and a minus sign. The numbers are in a different order.

## Connect It

**I have 8 marbles.**
**5 marbles are red, the rest are yellow.**
**How many are yellow?**

> Children should show five red counters and three yellow counters.

**Possible answer:**     $8 \ominus 5 = 3$

**3** marbles are yellow.

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## Close: Exit Ticket

Read the problem aloud and have children complete the equation.

I have 10 marbles.
I have the same number of yellow marbles as red marbles.
How many of each do I have?
___ ◯ ___ = ___

**Solution**
5 red and 5 yellow
$5 + 5 = 10$
**Listen for** I know 10 is a doubles total for $5 + 5$. 5 red marbles is the same number as 5 yellow marbles, so it matches the clues.

**Common Misconception** **If** children struggle with interpreting the clues, **then** have them start with what they know. [10 marbles] Then ask them to use counters to show the same number of red and yellow.

🌎 **Real-World Connection**
Encourage children to think about everyday places or situations where people might need to use clues to solve a quantities problem. Have volunteers share their ideas. Examples: children going to a party, animals at the zoo, food items.

## Solutions

### Support Vocabulary Development

**1** Read the directions aloud as children whisper read along with you. Facilitate a discussion about the strategies covered in past lessons, such as counting on, double, doubles plus one, number partners, adding in any order, drawing pictures, constructing models and using patterns.

Create models of each strategy and display them around the room. Have groups of three or four children rotate to each model and name the strategy. After groups have explored the strategy examples, have them return to their desks or tables to complete the graphic organizer.

**2** Read the problem aloud for children. Allow time for them to think about their strategy for solving the problem. Then have children form two concentric circles facing one another—an inside circle and an outside circle. Have the children in the inside circle explain their strategy to the child standing opposite them in the outside circle. Then give the child in the outside circle an opportunity to explain their strategy. Have children in the outside circle rotate one person to the right while the inside circle remains still. Children will now have a new partner, and the activity can be repeated.

### Supplemental Math Vocabulary

• *pattern*

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Name: _____

## Prepare for Using Strategies to Add and Subtract

**1** Think about what you know about strategies that help you solve addition and subtraction problems. Fill in each box. Use words, numbers, and pictures. Show as many ideas as you can.
**Possible answers:**

**strategy**

**Examples**

Ways to make 9:

$0 + 9 = 9$

____1____ $+ 8 = 9$

$2 +$ ____7____ $= 9$

**Examples**

$9 - 5 =$ ____?____

I know $4 + 5 = 9$.
So, $9 - 5 = 4$.

**Examples**

| $3 + ①$ | $3 + ②$ | $3 + ③$ |
|---|---|---|
| ④ | ⑤ | ⑥ |

**one-more-than pattern**
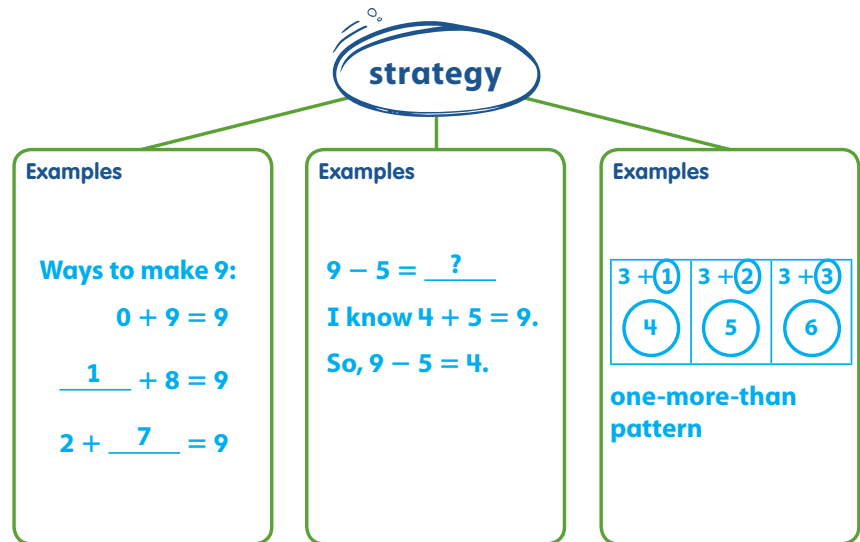
**2** Explain your strategy for solving
$6 - 2 =$ _____.
**Possible answer: I think $2 + ? = 6$. I know $2 + 4 = 6$. So, $6 - 2 = 4$.**

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**3** Assign problem 3 to provide another look at solving a subtraction word problem.

This problem is very similar to the problem about finding the number of yellow marbles. In both problems, children use a strategy to solve a word problem. The question asks for the number of green buttons.

Children may want to use buttons, counters, pennies, or pasta shapes.

Suggest that children read the problem three times, asking themselves one of the following questions each time:

• *What is this problem about?*

• *What is the question I am trying to answer?*

• *What information is important?*

### Solution

$7 - 3 = 4$; 4 buttons are green.
*Medium*

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**3** Solve the problem. Show your work.

**I have 7 buttons.**
**3 buttons are yellow, the rest are green.**
**How many are green?**

> **Children should show 3 yellow counters and 4 green counters.**

**Possible answer:**   $\underline{\quad 7 \quad} \bigominus \underline{\quad 3 \quad} = \underline{\quad 4 \quad}$

$\underline{\quad 4 \quad}$ buttons are green.

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**Prepare for Session 2**
Use with *Try It*.

| Levels 1–3 | Levels 2–4 | Levels 3–5 |
|---|---|---|
| **Listening/Speaking** Read the *Try It* problem aloud. Break down each sentence in the problem to make it accessible for children. Ask questions to clarify. Allow children time to respond. Read the first sentence and then ask: *What is Hugo trying to figure out?* [4 + 5] Read the next sentence and ask: *What does he know?* [Other facts that can help him find the total of 4 + 5] Read: *What facts could help him?* Encourage children to share expressions that could help Hugo find the total. If children need additional support, create notecards with the following expressions: *3 + 3, 4 + 4, 5 + 5*. Have children choose which facts could help Hugo solve the problem. | **Speaking/Reading** Unpack the *Try It* problem with children by analyzing each sentence together and highlighting important information. Have children work in small groups to generate facts that could help solve the problem. If children need additional support, guide them to make a connection between the addends in the expression 4 + 5 and addends in other facts that might help them solve the problem. Provide notecards with the phrases *one more* and *one less* for each group. Have children take turns using the phrases to explain how one of the facts can help Hugo solve the problem. | **Reading/Speaking** Have children read and solve the *Try It* problem individually. Then, have them discuss their answers with a partner using the following word bank to guide their discussions: *doubles, doubles plus 1, solve, strategy, fact, more, less, total.* |

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**Purpose** In this session children think about how they can use facts they know to solve 4 + 5. The purpose of this problem is for children to see how they can connect facts they know to other closely related facts.

## Start

### Develop Fluency

**Why** Build fluency with doubles and doubles plus 1 facts in order to relate them to each other and to other facts on the addition fact table.

**How** Complete the number bonds. Ask children what patterns they notice.

Complete the number bonds.

| | | |
|---|---|---|
| 9 | 8 | 7 |
| 4 | 4 | 4 |

| | | |
|---|---|---|
| 6 | 5 | 4 |
| 3 | 3 | 3 |

**Solutions**
5; 4; 3; 3; 2; 1

*Listen for* Children may notice patterns in the numbers that remain constant and the numbers that decrease by 1.

### Develop Language

**Why** Review the directional words *across*, *down*, and *diagonal*.

**How** Before working with addition tables, you may want to reinforce directional words using Total Physical Response. Have children use their arms to demonstrate *across* (extending both arms out to the side), *down* (thrusting both arms toward the ground parallel with the body) and *diagonal* (extending the right arm up toward the top right corner of the room and the left arm down toward the bottom left corner of the room).

## Try It

### Make Sense of the Problem

Read the problem aloud. To support children in making sense of the problem, prompt them to relate the problem to the previous session.

**Ask** *How is this problem like the ones you did in the previous session? How is it different?*

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## Develop Using Strategies for Addition and Subtraction Facts

Hugo tries to figure out the total 4 + 5.

He knows some other facts that can help him.

What facts could help him?

What is the total?

### Try It

🧰 Math Toolkit
• counters
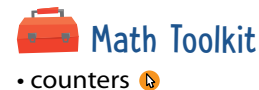
**Possible student work:**

**Sample A**

4 + ⑤

4 + 1

4 + 4 = 8

One more is 9.

**Sample B**

I know 5 + 5 = 10.

4 is 1 less than 5.

1 less than 10 is 9.

💬 **DISCUSS IT**
How can knowing another addition fact help you solve this problem?

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## Discuss It

### Support Partner Discussion

Encourage children to share their solutions and the number facts that helped them find the total.

Support as needed with questions such as:

- *What did you notice about your partner's approach?*
- *Did your partner find the same total as you did?*
- *How were you sure your answer was right?*

**Common Misconception** **If** children aren't connecting facts they know that they can use to help with this problem, **then** ask them to model this problem using a number bond or counters.

## Select and Sequence Solutions

One possible order for whole class discussion:

- children combine a group of 4 counters and a group of 5 counters
- children add by counting on from either 4 or 5
- children notice that $4 + 5$ is the same as $4 + 4 + 1$
- children recognize that $5 + 4$ is one less than $5 + 5 = 10$

## Support Whole Class Discussion

**Compare and connect** the different ways that children found the total.

**Ask** *What addition facts can be used to help you find 4 +5?*

**Listen for** Children may comment on how using the doubles facts $4 + 4 = 8$ and/or $5 + 5 = 10$ helped them solve $4 + 5$.

### Model It

**If no child presented the model** shown on the Student Worktext page (each of $4 + 4$, $4 + 6$, $5 + 4$, and $5 + 5$), connect the addition facts table to the children's models by having children anchor their thinking around various facts related to $4 + 5$.

Allow children time to complete the totals for all squares on the table and then discuss observations.

**Ask** *What do you notice about 4 + 6? How can it help with 4 + 5?*

**Listen for** I know 4 and 6 are number partners for 10. 5 is 1 less than 6, so $4 + 5$ is one less than 10. The totals across the row show a pattern of counting up by ones. $4 + 6$ is in the square right after $4 + 5$.

**Ask** *What do you notice about 5 + 4? How can it help with 4 + 5?*

**Listen for** $5 + 4 = 9$, and the same addends in a different order make the same total, so $4 + 5$ is 9.

**Ask** *What do you notice about 4 + 4?*

**Listen for** I know $4 + 4 = 8$ because it is a doubles fact. It comes right before $4 + 5$ in the row, so $4 + 5 = 9$ is 1 more than this doubles fact.

**Ask** *What do you notice about 5 + 5?*

**Listen for** $5 + 5$ is under $4 + 5$. I see a pattern of totals looking down the column. Each total is one more than the one above it, so $4 + 5 = 9$ would be above $5 + 5 = 10$.

> **Hugo tries to figure out the total $4 + 5$.**
> **He knows some other facts that can help him.**
> **What facts could help him?**
> **What is the total?**

### Model It

Use facts you know. Write the totals.

| $1 + 1$ | $1 + 2$ | $1 + 3$ | $1 + 4$ | $1 + 5$ | $1 + 6$ | $1 + 7$ | $1 + 8$ | $1 + 9$ |
|---|---|---|---|---|---|---|---|---|
| **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
| $2 + 1$ | $2 + 2$ | $2 + 3$ | $2 + 4$ | $2 + 5$ | $2 + 6$ | $2 + 7$ | $2 + 8$ | |
| **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | |
| $3 + 1$ | $3 + 2$ | $3 + 3$ | $3 + 4$ | $3 + 5$ | $3 + 6$ | $3 + 7$ | | |
| **4** | **5** | **6** | **7** | **8** | **9** | **10** | | |
| $4 + 1$ | $4 + 2$ | $4 + 3$ | $4 + 4$ | $4 + 5$ | $4 + 6$ | | | |
| **5** | **6** | **7** | 8 | **9** | 10 | | | |
| $5 + 1$ | $5 + 2$ | $5 + 3$ | $5 + 4$ | $5 + 5$ | | | | |
| **6** | **7** | **8** | 9 | 10 | | | | |

- $4 + 6$ and $5 + 5$ can help because they have addends that are close to $4 + 5$.
- $5 + 4$ can help because it has the same addends as $4 + 5$.
- $4 + 4$ can help because it is a doubles fact and one addend is 1 less than 5.

$4 + 5 = \underline{\textbf{9}}$

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## Deepen Understanding
**Addition Fact Table**
**SMP 5** Use tools.

Have children identify how the addition fact table can help them.

**Ask** *What are some addition facts listed on this table that you already know? Where are they on the table?*

**Listen for** Children may point out doubles facts (on a diagonal), plus 1 facts (first row and first column), doubles plus 1 facts (diagonals adjacent to the doubles facts), or number partners for 10 (diagonal in opposite direction).

**Ask** *What patterns do you notice on the table?*

**Listen for** Totals go in counting order going across the rows. Each row starts with a number that is one more than the row above it. Totals go in counting order looking down the columns. Diagonals going from top right to bottom left have the same totals.

**Generalize** *How can the addition fact table help you?* Listen for understanding that recognizing patterns helps to anchor each fact to related facts around it.

## Connect It

**Support Whole Class Discussion**

Ask children to look at what they drew or wrote to solve the problem and compare it to the addition fact table in *Model It*.

**1** Help children make sense of the addition fact table by comparing the model to their own solution.

> **Ask** *Which facts did you know that helped you find 4 + 5? Was it one of the facts used in* Model It?
>
> **Listen for** Children's answers will vary depending on the strategy they chose to use. Encourage them to describe why they chose a certain strategy.

**2** **Ask** *Which other fact in* Model It *do you think is the most helpful when solving 4 + 5? Why?*

> **Listen for** Children's answers will depend on how comfortable they are with facts like doubles, doubles plus 1, or partners for 10. Listen for children's ability to articulate why they find certain facts helpful.

## Apply It

Explain that the next problems are an opportunity for children to explore the addition fact table.

**3** 4; 5

Row A: 7, 8, 9;

Row B: 6, 9, 10

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## Connect It

**1** How is your way like **Model It**? How is your way different?

Children may comment that like Model It, they recognized 4 + 5 as a near doubles fact for 4 + 4 + 1, while Model It also uses 5 + 5 − 1.

**2** Which other fact do you think is the most helpful to use when solving 4 + 5?

Possible answer: 5 + 5 because they are number partners for 10 and it is a doubles fact.

## Apply It

**3** Look at the facts in **row** A.

What addend is in each fact? __**4**__

Look at the facts in row B.

What addend is in each fact? __**5**__

Write all the missing totals in the table.

| | 4 + 1 | 4 + 2 | 4 + 3 | 4 + 4 | 4 + 5 | 4 + 6 | | | |
|---|---|---|---|---|---|---|---|---|---|
| A | 5 | 6 | **7** | **8** | **9** | 10 | | | |
| | 5 + 1 | 5 + 2 | 5 + 3 | 5 + 4 | 5 + 5 | | | | |
| B | **6** | 7 | 8 | **9** | **10** | | | | |
| | 6 + 1 | 6 + 2 | 6 + 3 | 6 + 4 | | | | | |
| C | 7 | 8 | 9 | 10 | | | | | |

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### ✋ Hands-On Activity
**Solving more number mysteries.**

**If . . .** *children struggle with relating facts to other known facts,*

**Then . . .** *use the addition facts table while finding mystery numbers.*

*Materials* For each child: 10 two-color counters, crayons, Activity Sheet *Addition Table 2*

- Tell children this clue: *There are 7 counters in all and 1 is yellow. The rest are red. How many red counters are there?* [6] Ask children to find all the facts that could represent this situation. If children only identify 6 + 1 in the first column, ask whether the same addend pair is anywhere else on the table. Listen for recognition that the first row contains 1 + 6. Have children write the total and shade these two squares on the table.

- Repeat with other clues such as: *There are 5 red counters and the same number of yellow counters. How many in all?* [10] Have children write the total and shade the square showing 5 + 5 = 10.

- Prompt children to make observations about why most facts appear twice on the table but doubles facts only appear once.

Lesson 10 Use Strategies for Addition and Subtraction Facts

**4** 6; 2

　　Row C: 8, 10;

　　Row D: 8, 9;

　　Row E: 9, 10;

　　Row F: 10

**5** 8 − 2 = 6; 9 − 2 = 7; 10 − 2 = 8

　　Children should see the connection between the addition equations and the related subtraction equations.

## Support Whole Class Discussion

When children have completed problems 3–5, discuss the answers as a class.

**Ask** *How can the addition fact table be a helpful tool when trying to solve a subtraction equation?*

**Listen for** The first number in a subtraction equation matches a total on the addition fact table. The number being subtracted matches one of the addends. The other addend is the difference in the subtraction equation.

## Close: Exit Ticket

Children complete the subtraction equations that correspond to each addition fact shown.

Complete the subtraction equations.

| 5 + 3 | | 5 + 4 |
| 8 | | 9 |

8 − 5 = ___　　9 − ___ = 4

| 5 + 5 |
| 10 |

10 − ___ = ___

**Solutions**

8 − 5 = 3;

9 − 5 = 4;

10 − 5 = 5

**Error Alert** **If** children do not complete the equations correctly, **then** have them use counters to model the addition fact shown and guide them to relate it to the corresponding subtraction equation by showing taking away or taking apart using the counters.

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**4** Look at the facts in row C.

What addend is in each fact? __**6**__

Look at the facts in **column** H.

What addend is in each fact? __**2**__

Write all the missing totals in the table.

　　　　G　　　H

|   | G | H |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
| **A** | 4 + 1<br>5 | 4 + 2<br>6 | 4 + 3<br>7 | 4 + 4<br>8 | 4 + 5<br>9 | 4 + 6<br>10 |   |   |
| **B** | 5 + 1<br>6 | 5 + 2<br>7 | 5 + 3<br>8 | 5 + 4<br>9 | 5 + 5<br>10 |   |   |   |
| **C** | 6 + 1<br>7 | 6 + 2<br>**8** | 6 + 3<br>9 | 6 + 4<br>**10** |   |   |   |   |
| **D** | 7 + 1<br>**8** | 7 + 2<br>**9** | 7 + 3<br>10 |   |   |   |   |   |
| **E** | 8 + 1<br>**9** | 8 + 2<br>**10** |   |   |   |   |   |   |
| **F** | 9 + 1<br>**10** |   |   |   |   |   |   |   |

**5** Complete the subtraction equations.

| 6 + 2 |
| 8 |

| 7 + 2 |
| 9 |

| 8 + 2 |
| 10 |

**Possible answers:**

8 − 2 = __**6**__ 　 __**9**__ − __**2**__ = __**7**__ 　 __**10**__ − __**2**__ = __**8**__

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## Solutions

**1** The addend 2 is in each fact;

5, 6, 7

*Basic*

**2** The addend 3 is in each fact;
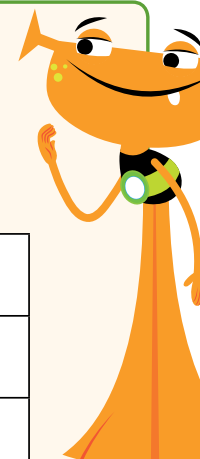
5, 6, 7, 8

*Basic*

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Name: _____

### Practice Using Strategies to Add and Subtract

**Look at the Example. Then solve problems 1–5.**

#### Example

An addition table can help you learn facts.

It can also help you see patterns.

Below is part of an addition table.

|   | 1 + 1 2 | 1 + 2 3 | 1 + 3 4 | 1 + 4 5 | 1 + 5 6 |
|---|---|---|---|---|---|
| A | 2 + 1 3 | 2 + 2 4 | 2 + 3 5 | 2 + 4 6 | 2 + 5 7 |
| B | 3 + 1 4 | 3 + 2 5 | 3 + 3 6 | 3 + 4 7 | 3 + 5 8 |

**1** Look at the facts in row A.

What addend is in each fact? ___2___

Write the missing totals in row A in the table.

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**2** Look at the facts in row B.

What addend is in each fact? ___3___

Write the missing totals in row B in the table.

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## Fluency Practice

**Practice facts with the Addition Table.**

*Materials*  For each pair: Activity Sheet *Addition Table 3*

• Distribute Activity Sheet *Addition Table 3*. Have partners take turns covering an addend or sum in the table while their partner's eyes are closed. The partner must determine the missing addend or sum and tell or write an addition and/or subtraction equation using the three numbers in the fact square.

• Once successful, children cross out the fact. Continue as time permits.

**3** 8, 9, 10;
  8, 9, 10;
  9, 10
  *Medium*

**4** Possible answers:
  $8 - 4 = 4; 9 - 4 = 5; 10 - 4 = 6$
  *Medium*

**5** 3, 4, 5;
  $8 - 5 = 3; 9 - 5 = 4; 10 - 5 = 5$
  *Challenge*

**3** Write the totals in the table.

| 1 + 6 | 1 + 7 | 1 + 8 | 1 + 9 |
|---|---|---|---|
| 7 | **8** | **9** | **10** |
| 2 + 6 | 2 + 7 | 2 + 8 | |
| **8** | **9** | **10** | |
| 3 + 6 | 3 + 7 | | |
| **9** | **10** | | |

**4** Complete the subtraction equations. **Possible answers:**

| 4 + 4 | 4 + 5 | 4 + 6 |
|---|---|---|
| 8 | 9 | 10 |

$8 - 4 = \underline{4}$  |  $9 - \underline{4} = \underline{5}$  |  $10 - \underline{4} = \underline{6}$

**5** Fill in the blanks.
Then complete the subtraction equations.

| 5 + **3** | 5 + **4** | **5** + 5 |
|---|---|---|
| 8 | 9 | 10 |

$8 - \underline{5} = 3$  |  $\underline{9} - \underline{5} = 4$  |  $\underline{10} - \underline{5} = 5$

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**ELL** **English Language Learners:** **Differentiated Instruction**

**Prepare for Session 3** Use with *Connect It*.

### Levels 1–3

**Listening/Reading** Read *Connect It* problem 2 aloud as children follow along with their fingers. Have children use the addition table from *Model It* to support their comprehension of the problem. Reread the problem, pausing between sentences to allow time for children to point to important information from each sentence on the addition table. Emphasize the phrases *across the table, pattern in the addends,* and *pattern in the totals.* Say: *Use your finger to point across the row. Point to the pattern in the addends. Point to the pattern in the totals.* If children need additional support, model the activity and then repeat as children mimic your motions.

### Levels 2–4

**Speaking/Writing** Read *Connect It* problem 2 aloud as children whisper read along with you. Have children act out the problem in pairs, with one partner playing the role of Boom and the other partner playing the role of Buzz. Ask: *What is important about the pattern that Boom saw? What is important about the pattern that Buzz saw?* Encourage children to use words from the problem in their answers. Ask: *Who is right? How do you know?* Work with children to co-write sentence starters that help them express their ideas in complete sentences.

### Levels 3–5

**Reading/Speaking** Have children read *Connect It* problem 2 and ask them to circle the two words in each sentence that they believe are most important. Pair them up to compare their answers with a partner. If children selected different words, have them ask their partner: *Why do you think this is important?* Encourage them to justify their choices in complete sentences. After children discuss their selections, instruct them to answer the questions *Who is right? How do you know?* Encourage them to use any applicable words that they circled to explain their answer.

**Purpose** In this session children recognize and describe patterns in the addition table. The purpose is to build children's number sense with the connection between addends and a total.

## Start

### ✋ Connect to Prior Knowledge

*Materials* For each child: 10 two-color counters

**Why** Connect addition facts to related subtraction facts to promote fluency in both operations and to understand the relationship between addition and subtraction.

**How** Children use pieces of the addition table or counters to write related subtraction facts.

Complete the subtraction equations.

| 4 + 2 | 3 + 6 |
|-------|-------|
| 6     | 9     |

6 − __ = 4      9 − 3 = __

| 5 + 5 |
|-------|
| 10    |

__ − 5 = 5

**Solutions**
6 − 2 = 4;
9 − 3 = 6;
10 − 5 = 5

### Develop Language

**Why** Clarify the definition of the multiple-meaning word *table* as used in the terms *fact table* and *addition table*.

**How** Say: *The term* table *is used to describe furniture that has four legs and a top, such as a dining table or coffee table. It can also mean a chart or diagram of numbers or figures which usually has rows and columns.*

## Try It

### Make Sense of the Problem

Read the problem aloud. To support children in making sense of the problem, prompt them to color patterns as they find them. Children can use different colored crayons for each pattern they find.

**Ask** *What is a pattern? What are you being asked to do?*

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## Develop Using Strategies for Addition and Subtraction Facts

Lila notices patterns on the fact table.

What could be some patterns she notices?

Color to show patterns.

**Try It**                                   🧰 Math Toolkit
                                             • crayons

**Possible student work:**

| 1 + 1 | 1 + 2 | 1 + 3 | 1 + 4 | 1 + 5 | 1 + 6 | 1 + 7 | 1 + 8 | 1 + 9 |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

| 2 + 1 | 2 + 2 | 2 + 3 | 2 + 4 | 2 + 5 | 2 + 6 | 2 + 7 | 2 + 8 |
|-------|-------|-------|-------|-------|-------|-------|-------|
| 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

| 3 + 1 | 3 + 2 | 3 + 3 | 3 + 4 | 3 + 5 | 3 + 6 | 3 + 7 |
|-------|-------|-------|-------|-------|-------|-------|
| 4 | 5 | 6 | 7 | 8 | 9 | 10 |

| 4 + 1 | 4 + 2 | 4 + 3 | 4 + 4 | 4 + 5 | 4 + 6 |
|-------|-------|-------|-------|-------|-------|
| 5 | 6 | 7 | 8 | 9 | 10 |

| 5 + 1 | 5 + 2 | 5 + 3 | 5 + 4 | 5 + 5 |
|-------|-------|-------|-------|-------|
| 6 | 7 | 8 | 9 | 10 |

| 6 + 1 | 6 + 2 | 6 + 3 | 6 + 4 |
|-------|-------|-------|-------|
| 7 | 8 | 9 | 10 |

| 7 + 1 | 7 + 2 | 7 + 3 |
|-------|-------|-------|
| 8 | 9 | 10 |

| 8 + 1 | 8 + 2 |
|-------|-------|
| 9 | 10 |

| 9 + 1 |
|-------|
| 10 |

**Sample A**

All of the top row and first column facts have 1 as an addend.

**Sample B**

The colored diagonal squares all have 10 for a total.

**DISCUSS IT**
A pattern I noticed on the table was . . .

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## Discuss It

### Support Partner Discussion

Encourage children to describe each pattern they color. Ask them to tell what they first noticed about the pattern and the steps they took to determine it was a pattern.

Support as needed with questions such as:

• *Did you and your partner find any of the same patterns?*

• *Can you describe the pattern(s) that you colored?*

• *Do you agree with the pattern your partner found?*

**Common Misconception** If children are struggling with finding patterns, **then** have them cover up rows or columns of the addition table, leaving only one row or column visible at a time.

## Select and Sequence Solutions

One possible order for whole class discussion:

- rows and columns with totals in counting sequence
- addends increasing by 1 going across or down
- diagonals that have the same total
- diagonal that shows doubles

## Support Whole Class Discussion

**Compare and connect** different patterns and discuss how they are related.

**Ask** *Where are the patterns that show different number partners for one number? Where are the patterns that show totals increasing by 1?*

**Listen for** Children should describe the columns or diagonals where they found different patterns. Children may use phrases such as *they go up by 1* or *all the numbers are the same*. Encourage them to be as descriptive as possible.

## Model It

**If no child found the patterns** shown on the Student Worktext page, connect these patterns to the patterns children found by having children describe each pattern.

**Ask** *How could you describe the pattern colored yellow?* [all of the facts have 1 as an addend] *Are there other patterns that are similar to this?*

**Listen for** Children should point out other examples in the chart where the same addend appears in every fact in a given row or column.

**Ask** *How could you describe the pattern colored purple?* [all the facts that have 10 as a total] *Are there other patterns that are similar to this?*

**Listen for** Children should point out other diagonals in the chart: number partners for 9, number partners for 8, etc.

**Ask** *How are the facts in all of the orange squares alike? Could any of the orange squares be a different color? Why do you think that?*

**Listen for** Children should observe that the orange squares are doubles facts and may recognize that 1 + 1 could also be yellow since one addend is 1. 2 + 2 could also be green since one addend is 2. The fact 5 + 5 can be purple since it has a total of 10.

**Lila notices patterns on the fact table.**

**What could be some patterns she notices?**

**Color to show patterns.**

## Model It

Look at the facts in the colored boxes.

| 1 + 1 2 | 1 + 2 3 | 1 + 3 4 | 1 + 4 5 | 1 + 5 6 | 1 + 6 7 | 1 + 7 8 | 1 + 8 9 | 1 + 9 10 |
|---|---|---|---|---|---|---|---|---|
| 2 + 1 3 | 2 + 2 4 | 2 + 3 5 | 2 + 4 6 | 2 + 5 7 | 2 + 6 8 | 2 + 7 9 | 2 + 8 10 | |
| 3 + 1 4 | 3 + 2 5 | 3 + 3 6 | 3 + 4 7 | 3 + 5 8 | 3 + 6 9 | 3 + 7 10 | | |
| 4 + 1 5 | 4 + 2 6 | 4 + 3 7 | 4 + 4 8 | 4 + 5 9 | 4 + 6 10 | | | |
| 5 + 1 6 | 5 + 2 7 | 5 + 3 8 | 5 + 4 9 | 5 + 5 10 | | | | |
| 6 + 1 7 | 6 + 2 8 | 6 + 3 9 | 6 + 4 10 | | | | | |
| 7 + 1 8 | 7 + 2 9 | 7 + 3 10 | | | | | | |
| 8 + 1 9 | 8 + 2 10 | | | | | | | |
| 9 + 1 10 | | | | | | | | |

☐ facts with 1
☐ facts with 2
☐ doubles facts
☐ partners for 10

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## Deepen Understanding

### Addition Table

**SMP 7** Look for structure.

Ask these questions when discussing the patterns inherent in the structure of the addition facts table.

**Ask** *What do you notice about the totals when one addend stays the same and the other addend increases by one? Where do you see this on the addition table?*

**Listen for** Children should recognize that when one addend remains the same and the other addend increases by one, the total increases by one.

Challenge children to explain what they notice by covering up all parts of the table except one row, column, or diagonal and asking them to describe a pattern they see. Some patterns you might choose to look at are doubles plus one, doubles minus one, or number partners for a given number.

**Generalize** *How can thinking about these patterns help with solving problems?* Listen for children's awareness that the structure in our number system can show the connection between related addition facts.

## Connect It

**Support Whole Class Discussion**

Ask children to look at the patterns they found in the addition table and compare them to the patterns shown in *Model It*.

**1** Help children make sense of the *Model It* patterns by comparing them to their own.

**Ask** *How did you describe that pattern?*

**Listen for** Children should be as precise as possible when describing and explaining the patterns they colored.

**2** **Ask** *Why does Boom think he is correct? Why does Buzz think he is correct?*

**Listen for** Children should notice that the addends across a row have two features: one addend is always the same while the other addend increases by 1. They should also notice that the totals across a row increase by 1. Encourage children to articulate how these observations are related and why both Boom and Buzz are correct.

## Apply It

Explain that the next problems are an opportunity for children to practice using the addition table to complete addition and subtraction equations.

**3** Missing totals: 6, 7, 8, 9, 10

$6 - 5 = 1$; $7 - 5 = 2$; $8 - 5 = 3$; $9 - 5 = 4$; $10 - 5 = 5$

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## Connect It

**1** How are your patterns like **Model It**?

How are they different?

*Children may say that they found one diagonal pattern for doubles facts like Model It, while Model It also shows another diagonal pattern with number partners for 10.*

**2** Boom and Buzz look across a row.

Boom says there is a pattern in the addends.

Buzz says there is a pattern in the totals.

Who is right? How do you know?

*Possible answer: Boom and Buzz are both right. The addends and totals both increase by one as you look across a row.*

## Apply It

**3** Fill in the missing totals in this table.

Complete the subtraction equations.

$6 - 5 =$ **1**

$7 - 5 =$ **2**

$8 - 5 =$ **3**

$9 - 5 =$ **4**

$10 - 5 =$ **5**

| $4 + 1$ 5 | $4 + 2$ 6 | $4 + 3$ 7 | $4 + 4$ 8 | $4 + 5$ 9 | $4 + 6$ 10 |
|---|---|---|---|---|---|
| $5 + 1$ **6** | $5 + 2$ **7** | $5 + 3$ **8** | $5 + 4$ **9** | $5 + 5$ **10** | |

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📖 **Visual Model**

**Relate subtraction to addition.**

**If . . .** *children struggle with completing subtraction equations by looking at the related addition equations,*

**Then . . .** *use a number bond to show the relationship between the three numbers in each box on the fact table.*

- Copy this fact table square on the board: $3 + 4$ with 7 below it.

- Relate subtraction to addition by erasing the plus sign and drawing lines from the 7 to the 4 and 3, as in a number bond with the total on the bottom. It may also be helpful to draw the number bond with the total on the top.

| 3 | 4 |
|---|---|
| | 7 |

| | 7 | |
|---|---|---|
| 3 | | 4 |
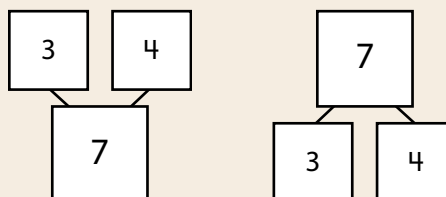
- Ask how a number bond can help to show the total and the parts. Ask children to write 2 subtraction equations using 7, 3, and 4.

**4** Circled on the table: 1 + 3, 2 + 2, 3 + 1;

1 + 3 = 4; 2 + 2 = 4; 3 + 1 = 4

**5** Circled on the table: 1 + 6, 2 + 5, 3 + 4, 4 + 3,
5 + 2, 6 + 1;

7 = 1 + 6; 7 = 2 + 5; 7 = 3 + 4; 7 = 4 + 3;
7 = 5 + 2; 7 = 6 + 1

## Support Whole Class Discussion

When children have completed problems 3–5, discuss the answers as a class.

**Ask** *How can knowing an addition fact help you complete a subtraction equation?*

**Listen for** Think of the first number in the subtraction equation as the total in an addition fact. The addends are the number being subtracted and the number that is left (or the difference). The two parts and the whole are the same.

## Close: Exit Ticket

Children complete the subtraction equations for 4 addition facts in one section of the addition fact table.

Complete the equations.

| 3 + 3 | 3 + 4 |
|-------|-------|
| 6     | 7     |
| 4 + 3 | 4 + 4 |
| 7     | 8     |

6 − __ = 3          7 − __ = 4

7 − 3 = __          8 − 4 = __

**Solutions**
6 − 3 = 3;
7 − 3 = 4;
7 − 3 = 4;
8 − 4 = 4

**Error Alert** **If** children always choose the left or the right addend to fill in the equation, **then** isolate each addition fact square and have children use counters or a number bond to solve each equation, noticing that the addend combination (rather than the addend order) is what determines the answer.

---

**4** Look at the table. Circle the ways to make 4.

Complete the addition equations. **Possible answer: Addends may be written in any order.**

| 1 + 1 | 1 + 2 | (1 + 3) | 1 + 4 |
|-------|-------|---------|-------|
| 2     | 3     | 4       | 5     |
| 2 + 1 | (2 + 2) | 2 + 3 | 2 + 4 |
| 3     | 4     | 5       | 6     |
| (3 + 1) | 3 + 2 | 3 + 3 | 3 + 4 |
| 4     | 5     | 6       | 7     |
| 4 + 1 | 4 + 2 | 4 + 3   | 4 + 4 |
| 5     | 6     | 7       | 8     |

**1** + **3** = 4

**2** + **2** = 4

**3** + **1** = 4

---

**5** Look at the table. Circle the ways to make 7.

Complete the addition equations. **Possible answers: Addends may be written in any order.**

| 1 + 1 | 1 + 2 | 1 + 3 | 1 + 4 | 1 + 5 | (1 + 6) |
|-------|-------|-------|-------|-------|---------|
| 2     | 3     | 4     | 5     | 6     | 7       |
| 2 + 1 | 2 + 2 | 2 + 3 | 2 + 4 | (2 + 5) | 2 + 6 |
| 3     | 4     | 5     | 6     | 7     | 8       |
| 3 + 1 | 3 + 2 | 3 + 3 | (3 + 4) | 3 + 5 | 3 + 6 |
| 4     | 5     | 6     | 7     | 8     | 9       |
| 4 + 1 | 4 + 2 | (4 + 3) | 4 + 4 | 4 + 5 | 4 + 6 |
| 5     | 6     | 7     | 8     | 9     | 10      |
| 5 + 1 | (5 + 2) | 5 + 3 | 5 + 4 | 5 + 5 | |
| 6     | 7     | 8     | 9     | 10    | |
| (6 + 1) | 6 + 2 | 6 + 3 | 6 + 4 | | |
| 7     | 8     | 9     | 10    | | |

7 = **1** + **6**

7 = **2** + **5**

7 = **3** + **4**

7 = **4** + **3**

7 = **5** + **2**

7 = **6** + **1**

### Solutions

**1** 5; 5; 5
*Basic*

**2** Circled expressions: 4 + 1; 3 + 2; 2 + 3; 1 + 4

Possible equations: 1 + 4 = 5; 5 = 3 + 2; 2 + 3 = 5; 5 = 4 + 1
*Basic*

---

## Practice Using Strategies to Add and Subtract

**Look at the Example. Then solve problems 1–5.**

**Example**  The shaded boxes show ways to make 4.

| 1 + 1 2 | 1 + 2 3 | 1 + 3 4 | 1 + 4 5 |
|---|---|---|---|
| 2 + 1 3 | 2 + 2 4 | 2 + 3 5 | 2 + 4 6 |
| 3 + 1 4 | 3 + 2 5 | 3 + 3 6 | 3 + 4 7 |
| 4 + 1 5 | 4 + 2 6 | 4 + 3 7 | 4 + 4 8 |

**1** Write the missing totals in the table.

---

**2** Look at the table. Circle the ways to make 5. Complete the addition equations.

**Possible answer: Addends may be written in any order.**

$$\underline{1} + \underline{4} = 5 \qquad 5 = \underline{3} + \underline{2}$$

$$\underline{2} + \underline{3} = 5 \qquad 5 = \underline{4} + \underline{1}$$

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## Fluency & Skills Practice   Teacher Toolbox

**Assign *Using Strategies for Addition and Subtraction Facts***

In this activity children practice adding within 10 in an addition table and identify addition facts with a given addend or sum. As part of the activity, children connect addends to a total. This skill is useful in real-world situations in which the total and one addend are known but the other addend is unknown.

Fluency and Skills Practice

Using Strategies for Addition and Subtraction Facts          Name _____

1 Write the missing totals in the table.
2 Color all the boxes with an addend of 1 red.
3 Color all the boxes with an addend of 2 blue.
4 Color all the boxes with a sum of 10 green.

| 1 + 1 2 | 1 + 2 3 | 1 + 3 4 | 1 + 4 | 1 + 5 6 | 1 + 6 7 | 1 + 7 8 | 1 + 8 9 | 1 + 9 10 |
|---|---|---|---|---|---|---|---|---|
| 2 + 1 3 | 2 + 2 4 | 2 + 3 | 2 + 4 6 | 2 + 5 7 | 2 + 6 8 | 2 + 7 9 | 2 + 8 10 | |
| 3 + 1 4 | 3 + 2 | 3 + 3 6 | 3 + 4 | 3 + 5 8 | 3 + 6 9 | 3 + 7 10 | | |
| 4 + 1 | 4 + 2 6 | 4 + 3 7 | 4 + 4 8 | 4 + 5 | 4 + 6 10 | | | |
| 5 + 1 6 | 5 + 2 7 | 5 + 3 8 | 5 + 4 | 5 + 5 10 | | | | |
| 6 + 1 7 | 6 + 2 | 6 + 3 9 | 6 + 4 10 | | | | | |
| 7 + 1 8 | 7 + 2 | 7 + 3 10 | | | | | | |
| 8 + 1 9 | 8 + 2 | | | | | | | |
| 9 + 1 10 | | | | | | | | |

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**3** 2; 4; 6
*Basic*

**4** The doubles facts totals 2, 4, and 6 should be circled.

$4 + 4 = 8; 5 + 5 = 10$
*Medium*

**5** $2 + 2; 4 - 2 = 2;$
$3 + 3; 6 - 3 = 3;$
$4 + 4; 8 - 4 = 4$
*Challenge*

---

**3** Write the missing totals for the doubles facts in the table.

| $1 + 1$ | $1 + 2$ | $1 + 3$ |
|---|---|---|
| ②  | 3 | 4 |
| $2 + 1$ | $2 + 2$ | $2 + 3$ |
| 3 | ④ | 5 |
| $3 + 1$ | $3 + 2$ | $3 + 3$ |
| 4 | 5 | ⑥ |

**4** Circle the totals for the doubles facts. Use the pattern to complete these addition equations.

$4 + 4 = \underline{\textbf{8}}$          $5 + 5 = \underline{\textbf{10}}$

**5** Fill in the blanks.
Then complete the subtraction equations.

$2 + \underline{\textbf{2}}$ / $4$          $3 + \underline{\textbf{3}}$ / $6$          $\underline{\textbf{4}} + 4$ / $8$

$4 - \underline{\textbf{2}} = 2$          $\underline{\textbf{6}} - \underline{\textbf{3}} = 3$          $\underline{\textbf{8}} - \underline{\textbf{4}} = 4$

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**ELL** English Language Learners: Differentiated Instruction

**Prepare for Session 4**
Use with *Apply It*.

### Levels 1–3

**Listening/Writing** Read *Apply It* problem 3 aloud. Have children work in pairs to create number bonds that represent each equation. Say: *Point to the whole. The whole is the total.* Have children repeat the sentence as they point. Say: *Point to the parts. The parts are the addends.* Have them repeat the sentence as they point. Write the words *total* and *addend* and have children label each box of the number bond with the correct term. Say: *Think of the first number in a subtraction equation as the total. One of the addends will be the number you are subtracting and the other addend will be the difference.* If children need additional support, repeat the explanation.

### Levels 2–4

**Listening/Speaking** Read *Apply It* problem 3 aloud. Have children work with a partner to create a number bond to represent each cell of the addition table on a piece of scratch paper. Tell them to cut out each section of the number bond and arrange the pieces to form subtraction equations. Provide sticky notes with the symbols − and = for children to use to construct the equations. Have children summarize their ideas with their partner. If children need support, ask: *What did you notice about the equations? Where did you put the total? Where did you put the addends?*

### Levels 3–5

**Writing** Have children complete *Apply It* problem 3. Then have them analyze the following sentences, which use informal vocabulary, and replace the bolded words or phrases with discipline-specific vocabulary: *Think of the first number as the **whole**. The **parts** will be the number I am subtracting and the number that is **left**.* If children need additional support, provide the following word bank: *the difference, addends, total.*

## Purpose
In this session children practice finding sums and differences, continuing to use the addition table as a tool.

## Start

### Connect to Prior Knowledge

**Why** Practice addition facts and examine the structure and vertical patterns in an addition table.

**How** Complete the row of the addition table shown, providing either the missing addend or the total. Have children read the completed list of totals in the row to verify the pattern in the answers.

Complete this row in the addition table.

| 3 + __ | __ + 2 | 3 + 3 | 3 + __ | __ + __ | 3 + 6 |
|--------|--------|-------|--------|---------|-------|
| 4      | 5      | __    | 7      | 8       | __    |

**Solutions**
$3 + 1 = 4; 3 + 2 = 5;$
$3 + 3 = 6; 3 + 4 = 7;$
$3 + 5 = 8; 3 + 6 = 9$

**Listen for** 4, 5, 6, 7, 8, 9.

## Example
Read the Example problem aloud and have children complete the table.

**Ask** How did you find the missing numbers in the table?

**Listen for** Children should explain patterns that they see or addition facts that they know.

## Apply It

**1** First row: $7 + 1 = 8; 7 + 2 = 9; 7 + 3 = 10$

Second row: $8 + 1 = 9; 8 + 2 = 10$
*DOK 2*

**2** First row: $2 + 4 = 6; 2 + 5 = 7; 2 + 6 = 8;$
$2 + 7 = 9; 2 + 8 = 10$

Second row: $3 + 4 = 7; 3 + 5 = 8; 3 + 6 = 9;$
$3 + 7 = 10$
*DOK 2*

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# Refine Using Strategies for Addition and Subtraction Facts

**Complete the Example. Then solve problems 1–4.**

### Example    Fill in the blanks.

| 4 + **3** | **4** + 4 | 4 + 5 | **4** + **6** |
|-----------|-----------|-------|---------------|
| 7         | 8         | **9** | 10            |
| **5** + 3 | 5 + **4** | **5** + **5** | |
| 8         | 9         | 10    | |

## Apply It

Fill in the blanks.

**1**

| **7** + 1 | 7 + **2** | **7** + **3** |
|-----------|-----------|---------------|
| 8         | 9         | 10            |
| 8 + **1** | **8** + 2 | |
| 9         | 10        | |

**2**

| 2 + **4** | **2** + 5 | 2 + 6 | **2** + 7 | 2 + **8** |
|-----------|-----------|-------|-----------|-----------|
| 6         | 7         | **8** | **9**     | 10        |
| **3** + 4 | 3 + **5** | **3** + **6** | 3 + **7** | |
| 7         | 8         | 9     | **10**    | |

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**3** 4 + 5 = 9; 9 − 5 = 4; 9 − 4 = 5;

4 + 6 = 10; 10 − 6 = 4; 10 − 4 = 6

*DOK 2*

**4** First row: 6 + 2 = 8; 6 + 4 = 10

Second row: 7 + 1 = 8; 7 + 3 = 10

Third row: 8 + 2 = 10

Fourth row: 9 + 1 = 10

*DOK 1*

---

## Close: Exit Ticket

### ✋ Check for Understanding

**Materials** For each child: 10 connecting cubes

Have children complete the equations.

| | |
|---|---|
| 5 + __ = 6 | __ − 3 = 4 |
| __ = 3 + 4 | 10 − 4 = __ |
| __ = 5 + 3 | 10 − 3 = __ |
| 9 − __ = 5 | 4 + __ = 10 |

**Solution**

5 + 1 = 6; 7 − 3 = 4;
7 = 3 + 4; 10 − 4 = 6;
8 = 5 + 3; 10 − 3 = 7;
9 − 4 = 5; 4 + 6 = 10

**Error Alert** For children who are still struggling, use the table on the right to guide remediation.

After providing remediation, check children's understanding using the following equations:

7 + __ = 9        ___ − 4 = 2

___ = 5 + 4      10 − 8 = ___

___ = 3 + 2      9 − 6 = ____

10 − 4 = ___     4 + ___ = 7

---

**3** Fill in the blanks.

Then complete the subtraction equations.

| 4 + __5__ |
|---|
| 9 |

$9 - \underline{5} = 4$

$9 - 4 = \underline{5}$

| 4 + 6 |
|---|
| __10__ |

$\underline{10} - 6 = 4$

$\underline{10} - 4 = 6$

---

**4** Fill in the blanks.

| 6 + 1 | 6 + 2 | 6 + 3 | 6 + 4 |
|---|---|---|---|
| 7 | **8** | 9 | **10** |

| 7 + 1 | 7 + 2 | 7 + 3 | |
|---|---|---|---|
| **8** | 9 | **10** | |

| 8 + 1 | 8 + 2 | | |
|---|---|---|---|
| 9 | **10** | | |

| 9 + 1 | | | |
|---|---|---|---|
| **10** | | | |

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## Error Alert

| If the error is . . . | Children may . . . | To support understanding . . . |
|---|---|---|
| incorrect responses primarily among subtraction facts | not be relating subtraction to addition. | Model an addition fact with cubes, fingers, and number bonds. Write a related subtraction fact. Model and discuss how knowing an addition fact can help find a difference. |
| incorrect responses primarily among missing addends | not recognize the application of number partner pairs. | Provide children with additional opportunities to play partner games where the sum is known and one addend must be found. |
| incorrect responses among a specific fact family | not have developed strategies for that fact family. | Review possible strategies allowing children time to develop and practice strategies that enable them to work with the challenging facts. |

## Solutions

**1** First Row: $5 + 1 = 6$; $5 + 2 = 7$; $5 + 3 = 8$; $5 + 4 = 9$

Second Row: $6 + 1 = 7$; $6 + 2 = 8$; $6 + 3 = 9$; $6 + 4 = 10$

*Basic*

**2** First Row: $3 + 3 = 6$; $3 + 4 = 7$; $3 + 5 = 8$; $3 + 6 = 9$

Second Row: $4 + 3 = 7$; $4 + 4 = 8$; $4 + 5 = 9$; $4 + 6 = 10$

*Basic*

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Name: _____

## Practice Using Strategies to Add and Subtract

**Look at the Example. Then solve problems 1–5.**

### Example

| $1 + 6$ | $1 + 7$ | $1 + 8$ | $1 + 9$ |
|---|---|---|---|
| 7 | 8 | 9 | 10 |

**1** Fill in the blanks.

| $5 + \underline{1}$ | $\underline{5} + \underline{2}$ | $\underline{5} + 3$ | $5 + \underline{4}$ |
|---|---|---|---|
| 6 | 7 | 8 | 9 |
| $\underline{6} + 1$ | $6 + \underline{2}$ | $\underline{6} + \underline{3}$ | $\underline{6} + 4$ |
| 7 | 8 | 9 | 10 |

**2** Fill in the blanks.

| $\underline{3} + 3$ | $3 + \underline{4}$ | $3 + \underline{5}$ | $\underline{3} + 6$ |
|---|---|---|---|
| 6 | 7 | 8 | 9 |
| $4 + \underline{3}$ | $\underline{4} + 4$ | $\underline{4} + 5$ | $4 + 6$ |
| 7 | $\underline{8}$ | 9 | $\underline{10}$ |

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**3**  7 + 2 = 9; 9 − 2 = 7; 9 − 7 = 2;
8 + 2 = 10; 10 − 2 = 8; 10 − 8 = 2
*Medium*

**4**  First Row: 4 + 2 = 6; 4 + 3 = 7; 4 + 4 = 8;
4 + 5 = 9
Second Row: 5 + 2 = 7; 5 + 3 = 8; 5 + 4 = 9;
5 + 5 = 10
*Basic*

**5**  Possible approach:
7 − 4 = 3; 9 − 5 = 4; 10 − 5 = 5; 8 − 5 = 3
*Challenge*

**3** Fill in the blanks.
Then complete the subtraction equations.

7 + **2**
9

9 − **2** = 7

9 − 7 = **2**

8 + 2
**10**

**10** − 2 = 8

**10** − 8 = 2

**4** Fill in the blanks.

| 4 + **2** | 4 + **3** | **4** + 4 | **4** + 5 |
|---|---|---|---|
| 6 | **7** | 8 | **9** |
| **5** + 2 | 5 + **3** | 5 + **4** | **5** + 5 |
| **7** | 8 | **9** | 10 |

**5** Use the facts in problem 4. Complete the subtraction facts.  **Possible answers:**

7 − **4** = **3**

10 − **5** = **5**

9 − **5** = **4**

8 − **5** = **3**

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**Purpose** In this session children practice finding and using patterns in addition and subtraction facts.

## Start

### Connect to Prior Knowledge

**Why** Reinforce types of facts by having children construct various equations that meet the criteria of the clues.

**How** Use the clues to write possible addition equations. Tell how you decided where to put the clue number in the equation.

This doubles fact has a 5.
__ + __ = __
This doubles +1 fact has a 4.
__ + __ = __
This doubles +1 fact has a 3.
__ + __ = __

**Possible Solutions**
$5 + 5 = 10$; $3 + 4 = 7$ or $4 + 5 = 9$; $1 + 2 = 3$ or $2 + 3 = 5$ or $3 + 4 = 7$

*Listen for* Children tell how they decided which addends could make the kind of fact described.

## Apply It

**1** Children should fill in all number facts for the sums 7, 8, 9, and 10.
*DOK 2*

**2** Children should identify the pattern and see that listing this way accounts for all fact pairs.
*DOK 2*

**3** Children should fill in the solutions to all subtraction facts with 7, 8, 9, and 10. Children may describe patterns they see as:
- the differences are numbers in counting order starting at 0, then starting at 1, 2, and 3. This happens both in the rows and the columns.
- as you look down the column, the number being subtracted is 1 less (7, 6, 5, 4, 3, 2, 1).
- the first number in every subtraction equation in a column is the same.
*DOK 1*

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## Refine Using Strategies for Addition and Subtraction Facts

### Apply It

**Solve problems 1–4.**

**1** Fill in the table.

| Partners for 7 | Partners for 8 | Partners for 9 | Partners for 10 |
|---|---|---|---|
| $0 + \underline{7} = 7$ | $0 + 8 = \underline{8}$ | $0 + 9 = 9$ | $0 + 10 = 10$ |
| $1 + \underline{6} = 7$ | $1 + 7 = 8$ | $1 + 8 = 9$ | $1 + 9 = 10$ |
| $2 + \underline{5} = 7$ | $2 + 6 = 8$ | $2 + 7 = 9$ | $2 + 8 = 10$ |
| $3 + \underline{4} = 7$ | $3 + 5 = 8$ | $3 + 6 = 9$ | $3 + 7 = 10$ |
| $4 + \underline{3} = 7$ | $4 + 4 = 8$ | $4 + 5 = 9$ | $4 + 6 = 10$ |
| $5 + \underline{2} = 7$ | $5 + 3 = 8$ | $5 + 4 = 9$ | $5 + 5 = 10$ |
| $6 + \underline{1} = 7$ | $6 + 2 = 8$ | $6 + 3 = 9$ | $6 + 4 = 10$ |
| $7 + \underline{0} = 7$ | $7 + 1 = 8$ | $7 + 2 = 9$ | $7 + 3 = 10$ |
|  | $8 + 0 = 8$ | $8 + 1 = 9$ | $8 + 2 = 10$ |
|  |  | $9 + 0 = 9$ | $9 + 1 = 10$ |
|  |  |  | $10 + 0 = 10$ |

**2** The number partners for 7 are listed in order to show a pattern. Why is this helpful?
**Possible answer: so you can tell you have them all**

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## Differentiated Instruction

### RETEACH

### ✋ Hands-On Activity
**Play an addition/subtraction game.**

**Children** struggling with addition and subtraction facts

**Will benefit from** practice using strategies for addition and subtraction facts.

*Materials* For each pair: 12 counters, Activity Sheet *Number Paths*, Activity Sheet *Number Cards 0 to 11*

- Print number cards 1–9 on colored paper and number cards 0–5 on a different color paper. Shuffle each set and place piles facedown.
- One partner turns over a card from each pile, makes an addition or a subtraction equation, and places a counter on the sum or difference found on the number path. Used cards are returned to the bottom of each pile.
- The other partner draws the next two cards and repeats the activity. If both the sum and difference are already covered, play goes to the other partner.
- Play continues until all the numbers on the number path are filled.

**4** No should be circled; Buzz incorrectly wrote
2 + 3 = 6 instead of 2 + 4 = 6.
*DOK 3*

## Close: Exit Ticket

**Math Journal**

Children list all of the ways to make 8.

List all of the ways to make 8.
How can you list them so you are sure you haven't missed any?

**Possible Solutions**
0 + 8; 1 + 7; 2 + 6;
3 + 5; 4 + 4; 5 + 3;
6 + 2; 7 + 1; 8 + 0

*Listen for* I can think of how the facts are organized on the table and write them in order.

**Error Alert** **If** children miss any of the number facts for 8, **then** have them use an addition fact table to color the facts they did write and identify which facts they omitted. Prompt them to describe a pattern they see in order to make the list complete.

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**3** Fill in the blanks.

| Facts with 7 | Facts with 8 | Facts with 9 | Facts with 10 |
|---|---|---|---|
| 7 − 7 = **0** | 8 − 7 = **1** | 9 − 7 = **2** | 10 − 7 = **3** |
| 7 − 6 = **1** | 8 − 6 = **2** | 9 − 6 = **3** | 10 − 6 = **4** |
| 7 − 5 = **2** | 8 − 5 = **3** | 9 − 5 = **4** | 10 − 5 = **5** |
| 7 − 4 = **3** | 8 − 4 = **4** | 9 − 4 = **5** | 10 − 4 = **6** |
| 7 − 3 = **4** | 8 − 3 = **5** | 9 − 3 = **6** | 10 − 3 = **7** |
| 7 − 2 = **5** | 8 − 2 = **6** | 9 − 2 = **7** | 10 − 2 = **8** |
| 7 − 1 = **6** | 8 − 1 = **7** | 9 − 1 = **8** | 10 − 1 = **9** |

What patterns do you notice? **Possible answer: As you look down each column, the difference increases by 1.**

**4** Buzz says he has found all of the ways to make 6.

| 0 + 6 = 6 | 1 + 5 = 6 | 2 + 3 = 6 | 3 + 3 = 6 |

| 4 + 2 = 6 | 5 + 1 = 6 | 6 + 0 = 6 |

Do you agree? Circle:    Yes    (No)
Tell why.
**2 + 3 does not equal 6. It should be 2 + 4 = 6.**

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## EXTEND

### ⭐ Challenge Activity
**Write clues for number partners.**

**Children** who have achieved proficiency

**Will benefit from** deepening understanding of addition and subtraction facts.

***Materials*** For each child: counters and index cards

- Remind children of the "Number Detectives" game from the activity in Explore.
- Challenge them to write their own "clues" for number partners. Tell them they may work in pairs to make up clues that are different from the ones in Explore.

- Encourage them to try "2 more or 2 less" clues. They should write each clue on a card and then read it to their partner, who works it out with counters to make sure it is clear and has a solution.
- These clues can be used for other children to try to solve.

## PERSONALIZE

**i-Ready®**

Provide children with opportunities to work on their personalized instruction path with *i-Ready* Online Instruction to:

- fill prerequisite gaps
- build up grade-level skills

# Find the Unknown Number

## Lesson Objectives

### Content Objectives

- Find the missing number in an addition or subtraction equation (missing number in all positions).
- Use familiar number facts and strategies to help find a missing number in an addition or subtraction equation.
- Use related addition and subtraction facts to solve for an unknown number in an equation.

### Language Objectives

- Explain how to use a number path and 10-frames to add two whole numbers with a sum up to 20.
- Write numbers in a number bond to show a sum.
- Read an equation with the equal sign in any position.

## Prerequisite Skills

- Know addition and subtraction facts to 20.
- Know doubles and doubles plus 1 facts.
- Know how to count on to add and subtract.
- Make a ten to add and subtract with teen numbers.
- Understand missing addends.
- Understand the meaning of the equal sign.

## Standards for Mathematical Practice (SMP)

SMPs 1, 2, 3, 4, 5, and 6 are integrated in every lesson through the *Try-Discuss-Connect* routine.*

In addition, this lesson particularly emphasizes the following SMPs:

**2** Reason abstractly and quantitatively.

**5** Use appropriate tools strategically.

**7** Look for and make use of structure.

*See page 1m to see how every lesson includes these SMPs.

## Lesson Vocabulary

There is no new vocabulary. Review the following key terms.

- **equal sign (=)** a symbol that means *is the same as*.
- **equation** a mathematical sentence that uses an equal sign (=) to show that two things are equal.

## Learning Progression

**In Kindergarten** children add and subtract within 10 and solve word problems involving joining situations with totals as the unknowns. Children write and solve equations that lead to the understanding of the meaning of "equal."

**In Grade 1** children use equations to represent a wider variety of word problem situations where the unknown is in different positions. They also deepen their understanding of the meaning of the equal sign by analyzing true and false equations.

**In this lesson** children find the unknown in equations relating three whole numbers involving sums up to 20. Word problems represent all situation types and the unknown is found in different positions.

**In Grade 2** children fluently add and subtract within 20 using mental strategies. They also use addition and subtraction within 100 to solve one- and two-step word problems of all situation types with unknowns in all positions.

# Lesson Pacing Guide

## Whole Class Instruction

| SESSION 1<br>**Explore**<br>*45–60 min* | **Interactive Tutorial*** *(Optional)* ▸<br>*Prerequisite Review:* Think Addition to Subtract<br>.................................................................<br>**Finding the Unknown Number**<br>• Start  *5 min*<br>• Try It  *20 min*<br>• Connect It  *15 min*<br>• Close: Exit Ticket  *5 min* | **Additional Practice**<br>Lesson pages 355–356 |
|---|---|---|
| SESSION 2<br>**Develop**<br>*45–60 min* | **Finding the Unknown Number**<br>• Start  *5 min*<br>• Try It  *15 min*<br>• Discuss It  *10 min*<br>• Model It  *5 min*<br>• Connect It  *10 min*<br>• Apply It  *5 min*<br>• Close: Exit Ticket  *5 min* | **Additional Practice**<br>Lesson pages 361–362<br><br>**Fluency Practice**<br>Find the Missing Number |
| SESSION 3<br>**Develop**<br>*45–60 min* | **Finding the Unknown Number**<br>• Start  *5 min*<br>• Try It  *15 min*<br>• Discuss It  *10 min*<br>• Model It  *5 min*<br>• Connect It  *10 min*<br>• Apply It  *5 min*<br>• Close: Exit Ticket  *5 min* | **Additional Practice**<br>Lesson pages 367–368<br><br>**Fluency** ▸<br>Finding the Unknown Number |
| SESSION 4<br>**Refine**<br>*45–60 min* | **Finding the Unknown Number**<br>• Start  *5 min*<br>• Apply It  *35 min*<br>• Close: Exit Ticket  *5 min* | **Additional Practice**<br>Lesson pages 371–372 |
| SESSION 5<br>**Refine**<br>*45–60 min* | **Finding the Unknown Number**<br>• Start  *5 min*<br>• Apply It  *15 min*<br>• Small Group Differentiation  *20 min*<br>• Close: Exit Ticket  *5 min* | **Lesson Quiz** ▸<br>or **Digital Comprehension Check** |

### Lesson Materials

| **Lesson**<br>*(Required)* | *Per child:*  20 two-color counters, 20 connecting cubes (10 of one color, 10 of another color), copy of Start slide (Session 3), copy of Close slide (Sessions 2, 3)<br>*Per pair:*  9 two-color counters<br>*For display:*  9 pencils<br>*Activity Sheets:* ▸  Teen Number Paths**, 10-Frames**, Number Bond Recording Sheet |
|---|---|
| **Activities** | *Per child:*  10-frames, number paths, counters, connecting cubes (all optional)<br>*Per pair:*  30 counters, 2 number cubes, 15 connecting cubes<br>*Activity Sheets:* ▸  10-Frames**, Facts Practice 1, Teen Number Paths** |
| **Math Toolkit** | counters, 10-frames, connecting cubes, number paths |
| **Digital Math Tool** ▸ | Counters and Connecting Cubes |

**Used for more than one activity.

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## Small Group Differentiation

### PREPARE

**Ready Prerequisite Lesson**

**Grade K**
• Lesson 22  Find the Missing Part of 10

### RETEACH

**Tools for Instruction**

**Grade K**
• Lesson 22  Find Missing Addends
          for Sums to 10

**Grade 1**
• Lesson 16  Find the Unknown Number

### REINFORCE

**Math Center Activity**

**Grade 1**
• Lesson 16  Find the Missing Number

### EXTEND

**Enrichment Activity**

**Grade 1**
• Lesson 16  Using What You Know to
          Solve Other Problems

**i-Ready**

## Independent Learning

**Learning Games**
• *Hungry Guppy*
• *Hungry Fish*

*We continually update the Interactive Tutorials. Check the Teacher Toolbox for the most up-to-date offerings for this lesson.

# Connect to Family, Community, and Language Development

The following activities and instructional supports provide opportunities to foster school, family, and community involvement and partnerships.

## Connect to Family

Use the **Family Letter**—which provides background information, math vocabulary, and an activity—to keep families apprised of what their child is learning and to encourage family involvement.

**Available in Spanish**
**Teacher Toolbox**

### Find the Unknown Number

**LESSON 16**

#### Dear Family,

This week your child is learning to use addition and subtraction strategies to find the missing number in an equation.

In class, your child will be solving mathematics mysteries.

Your child will be seeing addition and subtraction equations where one of the numbers is missing. Your child will need to figure out the unknown number using different addition and subtraction strategies that he or she has learned.

Below are examples of the types of problems your child will be solving.

$4 + \_\_\_\_ = 11$

$15 - 7 = \_\_\_\_$

$\_\_\_\_ + 3 = 12$

$12 = ? + 8$

$9 - ? = 2$

Invite your child to share what he or she knows about finding the missing number in an equation by doing the following activity together.

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### Activity  Find the Unknown Number

**Do this activity with your child to explore finding unknown numbers.**

*Materials* 20 counters (beans, coins, or other small objects), paper and pencil

• Have your child count out 14 counters.

• Tell your child to close his or her eyes while you take away some counters.

• Remove 5 counters and hide them from sight.

• Count the remaining counters with your child and say: *Now there are 9 counters. How many counters did I take away?*

• Write the equation $14 - \_\_\_\_ = 9$ and have your child use any strategy to figure out the number of counters you removed.

• Have your child write the missing number in the blank of the equation and then read the entire equation.
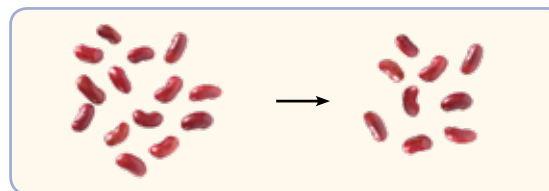


Repeat this activity, sometimes taking counters away from the starting group and sometimes adding counters to the starting group. Help your child write an addition or a subtraction equation to match each situation.

• Use these examples or make up your own:

1. Start with 6 counters and add some to make a total of 14.

2. Start with 9 counters and add some to make a total of 16.

3. Start with 18 counters and take away some to make a total of 10.

*Answers:* **1.** $6 + 8 = 14$; **2.** $9 + 7 = 16$; **3.** $18 - 8 = 10$

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## Goal

The goal of the Family Letter is to show how addition and subtraction strategies can be used to find the missing number in an equation.

## Activity

Look at the *Find the Unknown Number* activity and adjust it if needed to connect with children.

## Math Talk at Home

Encourage children and their family members to discuss situations in which they might need to find the missing number, and to solve missing number equations using small items found in their household such as beans or pasta.

**Conversation Starters**  Below are additional conversation starters children can write in their Family Letter or math journal, with your guidance, to engage family members:

• *How many are there?*

• *How many did you take away?*

• *How can we find the missing number?*

## Connect to Community and Cultural Responsiveness

Use these activities to connect with and leverage the diverse backgrounds and experiences of all children.

**Session 1** Use with *Try It*.

- Explain that a mystery is something that is not known. Tell children that during this lesson they will be acting as detectives to solve the mysteries about unknown numbers. Like detectives, children will need to use clues to find the answers.

**Session 2** Use anytime during the session.

- Explain to children that people in a variety of occupations use unknown numbers in different ways. For example, doctors use unknown numbers to determine correct dosages of medicines. Scientists use unknown numbers in experiments. Farmers use unknown numbers to grow crops. Bakers use unknown numbers to make large amounts of baked goods.

**Sessions 4 and 5** Use anytime during these sessions.

- Support the use of domain-specific vocabulary in math discourse with a brainstorming activity to generate words related to solving equations. Write each letter of the alphabet vertically on the board or a piece of poster paper. Ask children to think of words related to equations that start with the different letters of the alphabet. For example, *a* for add, *c* for count, *e* for equal. Set a timer for 2 minutes. Encourage children to dictate as many words as possible in any order as you record them next to each letter of the alphabet. Because the goal is to stimulate thinking about vocabulary related to the topic, it is not necessary to match a word to every letter. Post this list in the classroom and add more words in the future as they occur to children.

## Connect to Language Development

For ELLs, use the Differentiated Instruction chart to plan and prepare for specific activities in every session.

**ELL** English Language Learners: Differentiated Instruction

**Prepare for Session 1** Use with *Try It*.

| Levels 1–3 | Levels 2–4 | Levels 3–5 |
|---|---|---|
| **Reading/Speaking** Read the *Try It* problem aloud as children follow along with their fingers. Reread the problem again as children echo read. Choral read the problem a third time, this time pausing after each sentence to unpack the meaning. After the first sentence ask: *Who is the sentence about?* [Talia] *What does she bring to school?* [9 pencils] Read the second sentence and ask: *How many pencils does she give to her friends?* [some] Read the third sentence and ask: *How many pencils are left?* [3] Read the question and ask: *What are we trying to find?* [the number of pencils she gave away] Have children read the problem again and underline important clues. | **Reading/Writing** Echo read the *Try It* problem with children. Give each child an empty 3-frame comic strip and a sticky note with a question mark on it. Have them place the sticky note in the middle frame of the comic strip. Ask them to write the first sentence in the first frame of the comic strip and the third sentence in the third frame of the comic strip. Allow time for them to illustrate these frames. After they use counters to solve the problem, have them return to the comic strip and draw a picture in the middle frame that reflects the missing number. [6] | **Reading/Speaking** Choral read the *Try It* problem with children. Ask them to be detectives and search the problem to find three things: a number that represents the total [9], a number that represents the part [3], and the clue that helps them know there is an unknown number [*some*]. Write the terms *total, part,* and *unknown number* on the board. Encourage children to compare the clues they found with a partner using the terms on the board in their discussions. |

**Purpose** In this session, children act out a subtraction problem where the change is unknown. They model the problem with counters or pictures, relate it to an equation with a missing number, and then solve another problem.

## Start

### Develop Fluency

**Why** Practice finding missing addends for sums up to 10 to prepare for working with equations with unknowns in all positions.

**How** Complete the equation by finding the missing addend.

Find the missing addend.

$5 + \underline{\phantom{x}} = 8$  |  $2 + \underline{\phantom{x}} = 7$

$4 + \underline{\phantom{x}} = 10$  |  $6 + \underline{\phantom{x}} = 9$

**Solutions**
$5 + 3 = 8; 2 + 5 = 7$
$4 + 6 = 10; 6 + 3 = 9$

**Listen for** Children may interpret the equation in words by saying "5 plus some number equals 8."

## Try It

**Materials** For each pair: 9 two-color counters; For display: 9 pencils

### Act Out the Problem

Read the problem out loud together. Tell children that the problem they will be solving has a missing number and they will discover what it is.
Have one volunteer come to the front of the room and hold 9 pencils. Tell her to give away pencils one at a time until there are 3 pencils left in her hand.

**Ask** *How can we find out how many pencils were given away?*

**Listen for** Count the number of children who are holding the pencils she gave out.

Have the volunteer sit down and have pairs model the problem that you acted out using counters or drawings and then record the missing number in the equation.

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**Learning Target**
• Determine the unknown whole number in an addition or subtraction equation relating three whole numbers.
**SMP** 1, 2, 3, 4, 5, 6, 7

Talia brings 9 pencils to school.
She gives some to her friends.
She has 3 left.
How many pencils does Talia give away?

### Try It

🧰 Math Toolkit
• counters

**Possible answer: Children draw 9 pencils and put a circle around 3 of them. They write the numbers 1–6 on the other pencils.**

$9 - \underline{\textbf{6}} = 3$

Talia gives away __**6**__ pencils.
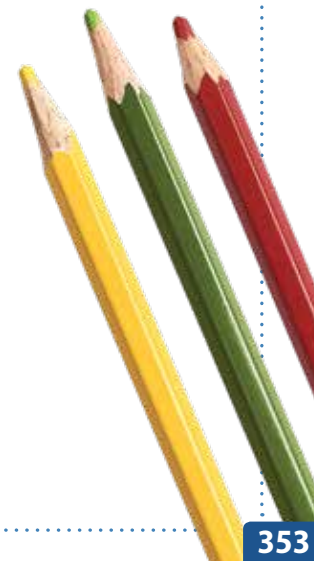
**Common Misconception** **If** children are unsure about how to model this problem on their paper, **then** have them use 9 two-color counters and focus on the 3 pencils that are left by changing them to the opposite color and moving them away from the group to determine how many others were given away.

### Support Whole Class Discussion

Have pairs describe how they modeled the problem to show that there were 9 pencils and 6 pencils were given away.

**Ask** *What did you do with your counters to show the number of pencils that were given away? How did you draw this on your paper?*

**Listen for** We put 9 counters on the page and moved away some counters until there were only 3 left. Then we counted how many we moved away. We drew 9 lines for the 9 pencils and then we crossed out pencils until there were only 3 left. We crossed out 6 pencils.

## Connect It

**✋ Materials** For each child: 8 two-color counters

### Pose a Different Problem

Read the problem out loud together.

**Ask** *How is this problem like the* Try It *problem? How is it different?*

**Listen for** This problem tells how many at the beginning and how many at the end, like the pencil problem. We have to find the missing number to find out how it changed. This is about birds instead of pencils. This time we are adding more birds to the group instead of giving away pencils. This is an addition problem.

### Model the Problem with Counters or Drawings

Have children model the problem with counters or a drawing to find out how many more birds joined the group.

After children have completed the task, ask them to compare answers with a partner and describe their strategies.

**Listen for** 3 birds are there first. I added counters to the group until there were 8 counters. I drew 3 circles for the first 3 birds and I kept drawing circles until there were 8. I counted how many I added.

### Support Whole Class Discussion

**Ask** *What did you know about the unknown number before you solved the problem?*

**Listen for** When you add it to 3, you get a total of 8. The unknown number must be less than 8. The missing number is more than 3 because 3 doubled is only 6.

**Ask** *What number can you write to make this equation true?* [5] *How do you know?*

**Listen for** I had to add 5 more counters to the group of 3 counters to make the 8 birds. I kept track of the counters I added to the group to make 8 birds. 3 and 5 are number partners for 8.

Have children complete the equation and record the answer at the bottom of the Student Worktext page.

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## Connect It

**3 birds are eating.**
**More birds join them.**
**Now there are 8 birds.**
**How many birds joined?**
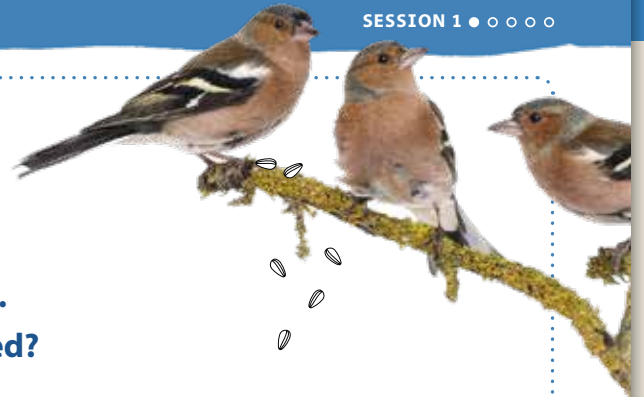
> Possible answer: Children draw 3 birds and another group of 5 birds.

$3 + \underline{\textbf{5}} = 8$

$\underline{\textbf{5}}$ birds joined.

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## Close: Exit Ticket

**✋ Materials** For each child: 8 two-color counters

Find the missing number.

$8 - \underline{\phantom{x}} = 2$

**Solution**
$8 - 6 = 2$

**Common Misconception** If children have a difficult time figuring out how many to take away from 8, **then** guide them to interpret the equation with words such as: *8 minus a number equals 2. If I start with 8 and take some away, there are 2 left*.
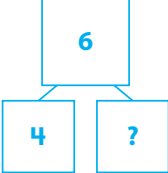
### 🌎 Real-World Connection

Encourage children to think about everyday places or situations where people might need to find an unknown number. Have volunteers share their ideas. Examples: desks in the classroom; fruit sold at a fruit stand; difference between ages.

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## Solutions

### Support Vocabulary Development

**1** Read the problem aloud to children. Ask them to point to the word *unknown* in the graphic organizer. Have children underline the prefix *un-*. Explain that *un-* means "not," so an unknown number is one that is not known. Replicate the Frayer Model on the board. Think aloud as you guide children through each box of the graphic organizer. Say: *An unknown number is a number in an equation that is not known.* Pause to allow time for children to write a definition in their own words. Point to the box labeled My Pictures and draw a picture, such as a number bond with one of the number partners missing. Say: *I will put a question mark in this box to represent the unknown number.* Give time for children to draw a picture. Point to the boxes for Examples and Non-Examples. Say: *I will write equations in these boxes. In the Examples box I will write equations that contain question marks to represent the unknown numbers. In the Non-Examples box I will write equations that show all the numbers.* Pause and allow children time to fill in the boxes.

**2** Have children work with a partner to write an equation to represent the problem. For additional support, distribute 5 sticky notes to each pair. Ask them to draw a plus sign, equal sign, and question mark on three of the sticky notes. Have them write the known numbers on the other two sticky notes and arrange the notes into an equation that represents the problem.

### Supplemental Math Vocabulary

- *equal sign*

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## Prepare for Finding the Unknown Number

**1** Think about what you know about figuring out unknown numbers in equations. Fill in each box. Use words, numbers, and pictures. Show as many ideas as you can.  **Possible answers:**

| In My Own Words | My Pictures |
|---|---|
| a number in an equation that is not known | $6$ <br> $4$ ? |

unknown numbers

| Examples | Non-Examples |
|---|---|
| $5 + ? = 8$ <br> $? - 9 = 4$ <br> $8 - 4 = $ _____ | $6 + 7 = 13$ <br> $9 - 8 = 1$ |

**2** Jared has 13 pens. He gives some to his mother. Jared has 6 pens left. Write an equation for the problem. Leave a blank for the unknown number.
**Possible answer: $13 - $ _____ $= 6$ or $6 + $ _____ $= 13$**

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**3** Assign problem 3 to provide another look at finding an unknown number.

This problem is very similar to the problem about how many birds joined the group of birds that are eating. In both problems, children are given an addition word problem with the change unknown and they must fill in the blanks to complete an equation and a solution sentence for the problem. The question asks how many lions joined the group of lions that are drinking.

Children may want to use counters, connecting cubes, paper clips, or cereal pieces.

Suggest that children read the problem three times, asking themselves one of the following questions each time:

- *What is this problem about?*
- *What is the question I am trying to answer?*
- *What information is important?*

**Solution:**
$5 + 4 = 9$
4 lions joined.
***Medium***

**3**  Solve the problem. Draw to show your work.

**5 lions are drinking. More lions join them.**
**Now there are 9 lions.**
**How many lions joined?**

**Possible answer: Children draw 5 circles on the left, a plus sign, and 4 circles on the right.**

$5 + \underline{\textbf{4}} = 9$

$\underline{\textbf{4}}$ lions joined.

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**ELL** **English Language Learners: Differentiated Instruction**

**Prepare for Session 2**
Use with *Connect It*.

| Levels 1–3 | Levels 2–4 | Levels 3–5 |
|---|---|---|
| **Speaking/Writing**  Pair children up to solve *Connect It* problem 2 using counters. Write the following terms on the board: *doubles plus 1, add in any order,* and *number partners*. Ask each group to choose one term in the equations and explain why they chose it. Reread the problem aloud, pausing after the first question. Have children say *He is right* or *He is not right* to indicate if Buzz is right or not. Encourage children to work with their partner to finish the sentence starter by using the term they chose from the board: *Yes, he is right because _____.* | **Writing/Speaking**  Organize children in groups of three or four. Ask them to read and solve *Connect It* problem 2. Display the following chart on the board: | **Speaking**  Have children read and solve *Connect It* problem 2. Then have them work with a partner to analyze possible strategies Buzz could have used to solve the problem. Write the following terms on notecards and mix them up: *doubles plus 1, add in any order, number partners,* and *make a ten*. Have partners take turns drawing a notecard from the pile and discussing how the term relates to the equations. |

Chart for Levels 2–4:

| Column 1 | Column 2 |
|---|---|
| doubles plus 1 | addend |
| add in any order | total |
| number partners | true equation |

Ask the groups to read the terms and choose at least one from each column that applies to the *Connect It* problem. After they have discussed how the terms relate to the problem, ask children to use the words as they cowrite a sentence that answers the question *How do you know?*

**Purpose** In this session, children solve a problem that has an unknown number at the start. The purpose of this problem is for children to connect this situation to an equation that can be used to solve the problem.

## Start

### ✋ Connect to Prior Knowledge

**Materials** For each child: 20 connecting cubes (10 of one color, 10 of another color)

**Why** Review doubles and doubles plus 1 facts with totals in the 11–20 range using equations with unknowns and the equal sign in different positions.

**How** Children complete the equations and then use connecting cubes to check their work.

Use connecting cubes to solve.

$8 + 8 =$ ___    $8 + 9 =$ ___

$14 = 7 +$ ___    $15 = 7 +$ ___

$12 =$ ___ $+ 6$    $13 =$ ___ $+ 6$

**Solutions**
$8 + 8 = 16; 8 + 9 = 17$
$14 = 7 + 7; 15 = 7 + 8$
$12 = 6 + 6; 13 = 7 + 6$

### Develop Language

**Why** Define the word *some* and examine how it is used in word problems with unknown numbers.

**How** Ask children to circle the word *some*. Read the first sentence of the *Try It* problem and then ask: *How many pies are on the table?* [some] Explain that *some* means an unknown number or amount. Point to groups of objects around the room and use the modifier *some*. Examples: *Here are some books. There are some pencils in the cup. Some children are wearing sneakers.*

## Try It

### Make Sense of the Problem

Read the problem aloud. To support children in making sense of the problem, prompt them to relate the problem to the previous session.

**Ask** *How is this problem like the ones you solved in the previous session? How is it different?*

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Some pies are on the table.

Ms. Karly brings 7 more pies.

Now there are 15 pies.

How many pies were on the table to start?

### Try It

**Math Toolkit**
- counters
- 10-frames
- connecting cubes
- number paths

**Possible student work:**
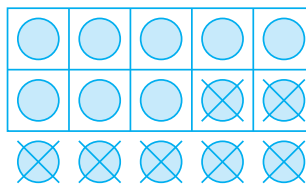
**Sample A**

$15 - 7 = 8$

**8 pies were on the table to start.**

**Sample B**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |

$7 + 8 = 15$

**8 pies were on the table to start.**

**DISCUSS IT**
I used the strategy . . .

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## Discuss It

### Support Partner Discussion

Encourage children to discuss how their models show how many pies were on the table to start.

Support as needed with questions such as:

- *How did you get started?*
- *Can you explain your model to your partner?*
- *Did you solve this in a different way than your partner solved it?*

**Common Misconception** **If** children struggle with modeling this problem because the start number is not given, **then** guide them to use two-color counters to work backwards and show all 15 pies first. Then turn some counters over to show how many pies Ms. Karly brought.

---

## Select and Sequence Solutions

One possible order for whole class discussion:

- 15 counters: 7 of one color and 8 of another color
- 15 pies drawn and 7 crossed out
- subtraction equation showing $15 - 7 = 8$

## Support Whole Class Discussion

**Compare and connect** the different representations and have children identify how they are related.

**Ask** *What does the 7 represent in the equation? What does the 15 represent? What does the blank represent?*

**Listen for** The 7 is the number of pies Ms. Karly brings. 15 is the total number of pies. The blank is the number of pies at the start that I need to find.

**Ask** *How does your model show $8 + 7 = 15$?*

**Listen for** Children should explain how they showed the total of 15 pies and how they represented the two groups of pies as the two parts that make the whole.

## Model It

**If no child presented the model** shown on the Student Worktext page, connect the 10-frame to the children's models by having children connect the model to the problem.

**Ask** *What part of the problem do the red counters represent?*

**Listen for** The 7 pies that Ms. Karly brings.

**Ask** *Why are the 7 red counters in the 10-frame first when 7 is not the starting number of pies?*

**Listen for** 7 is the number I know. I have to find out the number that goes with it to make 15.

**Ask** *What do the 8 yellow counters represent?*

**Listen for** I need a number to add to 7 to make 15. $7 + 3$ makes 10, and then 5 more makes 15. I added 8 yellow counters so that must be the number of pies that were on the table at the start.

Some pies are on the table.
Ms. Karly brings 7 more pies.
Now there are 15 pies.
How many pies were on the table to start?

## Model It

Find the missing number in the equation $? + 7 = 15$.

| Start with the number you know. |

| Add more until you get to the total. |
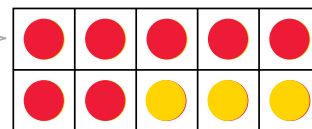
How many counters did you add?

**8** $+ 7 = 15$

**8** pies were on the table to start.

## Deepen Understanding
**Finding Unknown Numbers**
**SMP 7** Look for structure.

When discussing *Model It*, prompt children to recognize that different facts lend themselves to different strategies.

**Ask** *Why is making a ten using a 10-frame a strategy that helps solve this problem?*

**Listen for** I started with 7 and knew that I could use number partners for 10 to fill a 10-frame and then add 5 more to make the total 15.

**Ask** *What are some other strategies you could use?*

**Listen for** I know that $7 + 7 = 14$ so $7 + 8 = 15$. Doubles and doubles plus 1 facts are other strategies I could use.

**Generalize** *Why do you think it is important to know facts like number partners for 10 and doubles facts when solving an equation with an unknown number?* Listen for children to explain that if you recognize the total and one of the parts of a known number fact you can use that fact to find the other number.

## Connect It

### Support Whole Class Discussion

Ask children to look at what they drew or wrote to solve the problem and compare it to the 10-frame model in *Model It*.

**1** Help children make sense of the connecting cube model by comparing it to their own.

**Ask** *How is your way like* Model It*? How is it different?*

**Listen for** Children should explain their own methods, which may have been different than *Model It*.

**2** **Ask** *What is different about these two equations? Do the equations show the same addition problem?*

**Listen for** The equal sign is in a different place; the addition problem is the same in both. The total is the same for both equations and the addend is 7 in both, so the ? must stand for the same addend in both. The ? stands for 6 in both equations.

## Apply It

Explain that the next problems are an opportunity for children to practice finding the unknown number in equations.

Make counters, 10-frames, and number paths available.

**3** $8 + 6 = 14$

---

## Connect It

**1** How is your way like **Model It**?

How is it different?

*Children may say that they counted on from 7 to 15 using a number path while Model It counted on using a 10-frame.*

**2** Buzz says that the missing number in both of these equations is 6.

Is he right? How do you know?

$? + 7 = 13$   *Possible answer: Yes, Buzz is right because $6 + 7 = 13$ and $13 = 6 + 7$ are both true equations.*

$13 = ? + 7$

## Apply It

**3** Find the missing number.

How many more to make 14?

$8 + \underline{\textbf{6}} = 14$

| ⑧ | 9 | 10 | 11 | 12 | 13 | 14 | |
|---|---|----|----|----|----|----|---|

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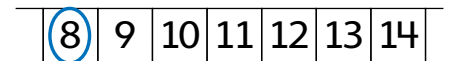
### ✋ Hands-On Activity
**Find the missing number.**

**If . . .** *children need more practice solving equations with unknown numbers,*

**Then . . .** *have them play this counter game.*

*Materials* For each pair: 30 counters, Activity Sheet *10-Frames*, Activity Sheet *Teen Number Paths*

- Pairs decide on a number of counters (between 11 and 20) to use for each turn. Model once using 14 counters.
- Place 14 counters on the table and have Player 1 close her eyes. Player 2 takes away some of the counters and hides them and then counts how many are left. Player 2 writes $14 - \underline{\quad} = 5$ to indicate that in this case, 5 counters remain.
- Player 1 uses a strategy and any tools such as 10-frames or number paths to figure out how many counters were taken away and then completes the equation.
- Player 2 checks the solution by showing how many counters were taken away.
- Pairs switch roles and repeat this with other totals up to 20.

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**4** $11 = 3 + 8$

**5** Possible approach: Start at 3 and add 7 to make 10. Add 2 more to get to 12. Adding 7 and 2 means that 9 were added, so $9 + 3 = 12$.

**6** Possible approach: Put 9 in the top 10-frame. Add 1 more to make 10 and then add 6 more in the bottom 10-frame. 10 and 6 more is 16, so $9 + 7 = 16$.

## Support Whole Class Discussion

When children have completed problems 3–6, discuss the answers as a class.

**Ask**  *Which strategy do you like to use for finding the missing number in an equation?*

**Listen for**  Children may express a preference for the number path, number bond, or 10-frame strategy shown in these problems. Their preferences may vary based on where the missing number is in an equation.

## Close: Exit Ticket

**Materials**  For each child: copy of printed slide

Have children solve the problem and complete the equation.

Find the missing number.

$8 + ? = 14$

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |

**Solution**

$8 + 6 = 14$

**Look for**  Children recognize that they can begin at 8 and count up to 14, keeping track of the number of jumps it takes to reach 14. Some children may make a jump from 8 to 10 and then from 10 to 14.

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**4** Find the missing number.

$11 = ? + 8$

$11 = \underline{\ 3\ } + 8$



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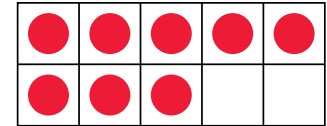
**5** Find the missing number.

$? + 3 = 12$

$\underline{\ 9\ } + 3 = 12$

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |

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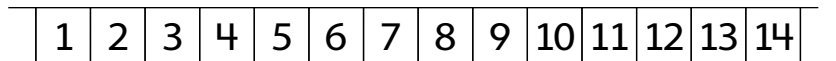
**6** Find the missing number.

$9 + 7 = \underline{\ 16\ }$
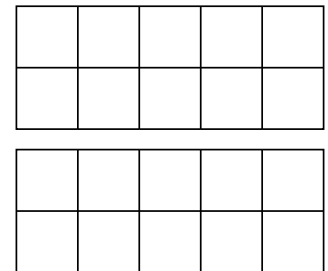
**Error Alert**  **If** children are not keeping track of their jumps on the number path accurately, **then** remind them to use one arrow to point at each number and carefully count the number of jumps once they have reached 14. Or, have them make two jumps: one jump from 8 to 10 and another jump from 10 to 14. The combined values of these jumps (2 and 4) represent the total distance from 8 to 14.

## Solutions

**1** Possible approach: Add 3 to make 10 and then 2 more.

$7 + 5 = 12$

*Basic*

**2** Possible approach: Jump of 1 from 9 to 10 and another jump of 6 from 10 to 16.

$9 + 7 = 16$

*Basic*

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Name: _____

## Practice Finding the Unknown Number

**Look at the Example. Then solve problems 1–5.**

### Example

Dawn sees 6 bunnies. More bunnies come.
Now there are 13 bunnies.
How many bunnies come?

$6 + 7 = 13$

7 bunnies come.

| 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
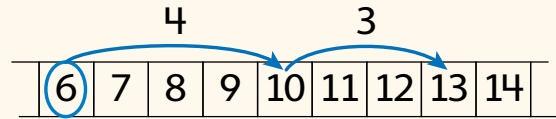
**1** Find the missing number.

$7 + ? = 12$

$7 + \underline{\ \ 5\ \ } = 12$

**2** Find the missing number.

$9 + 7 = \underline{\ \ 16\ \ }$

| 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |

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## Fluency Practice

### Find the missing number.

*Materials* For each child: Activity Sheet *Facts Practice 1*

- Have children fill in the blanks in the equations on Activity Sheet *Facts Practice 1*.
- Have pairs work together to find the missing number in each equation.
- Partners take turns explaining a strategy for finding the unknown number in all the equations in a given row.

**3** Possible approach: Add 1 more to make 10 and then 7 more to make 17. 1 and 7 makes 8 that were added, so $17 = 9 + 8$.
*Medium*

**4** Possible approach: Begin with 6 counters in the 10-frame. Add 4 more to make 10. Then add 5 more to get to 15 in all. 9 counters were added, so $9 + 6 = 15$.
*Basic*

**5** Possible approach: Draw 8 in the top 10-frame. Add 2 to make 10. Then add 3 more in the bottom 10-frame to make 13. 2 and 3 makes 5 added in all, so $13 = 8 + 5$.
*Challenge*

**3** Find the missing number.

$$17 = 9 + ?$$

$$17 = 9 + \underline{8}$$
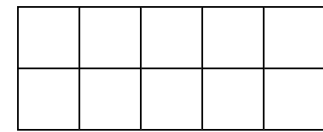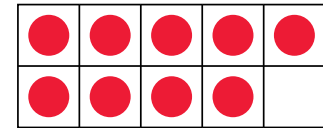
**4** Find the missing number.

$$? + 6 = 15$$

$$\underline{9} + 6 = 15$$
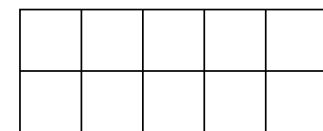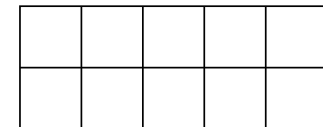
**5** Find the missing number.

$$13 = 8 + \underline{5}$$
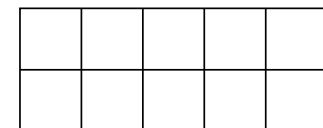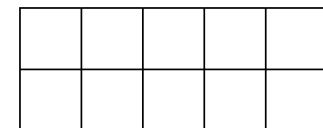
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**ELL English Language Learners: Differentiated Instruction**

**Prepare for Session 3** Use with *Model It*.

| Levels 1–3 | Levels 2–4 | Levels 3–5 |
|---|---|---|
| **Speaking/Listening** Pair children up to discuss the *Model It* problem. Draw or tape a number path to the ground and have them use their bodies to act out the solution. Ask: *Where do you start?* [14] *Why do you start on that number?* [It is the number of cherries Maddie started with.] *What number will you jump to?* [9] *Why will you stop at 9?* [That is the number of cherries Maddie had left after she ate some.] Allow children to jump from 14 to 9 and then ask: *How many jumps did you make altogether?* [5] | **Speaking/Writing** Pair children up to discuss the *Model It* problem. Draw or tape a number path to the ground and have children use their bodies to act out the solution. Have them act the problem out again, this time pausing between each step to write a sentence that relates to the context of the problem and corresponds to each step. Encourage them to use the sequencing words *first, next,* and *then* in their writing. | **Writing/Listening** Have children solve for the unknown numbers in the *Model It*. Then have children work with a partner to write the steps used to solve the problem. Encourage children to use the sequencing words *first, next,* and *then* in their writing. Have two sets of partners join and take turns reading their writing aloud to one another. Encourage children to revise their writing as needed after listening to the other partners' steps. |

**Purpose** In this session, children explore how to solve a subtraction problem with the change unknown. The purpose of this problem is for children to interpret another type of word problem and explore how to solve it using equations with missing numbers.

## Start

### Connect to Prior Knowledge

*Materials* For each child: copy of printed slide

**Why** Review adding and subtracting with number paths to enable children to use this tool to find missing numbers in equations.

**How** Children use a number path to solve an addition and a subtraction equation by modeling single jumps or jumps representing several numbers when making a ten to add or subtract.

Use a number path to solve.

$6 + 7 =$ _____

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |

$13 - 7 =$ _____

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |

**Solutions**

$6 + 7 = 13$

$13 - 7 = 6$

### Develop Language

**Why** Provide a sentence starter that children can use to verbalize their thinking to answer the *Discuss It* question.

**How** Write the following sentence starter on the board: *I can use addition to find the missing number by* _____ . If children need additional assistance, ask them to find the total in the problem. [14] Then ask what the other known number is. [9] Cowrite an addition equation with children. [9 + _____ = 14]

## Try It

### Make Sense of the Problem

Read the problem aloud. To support children in making sense of the problem, have them identify what information is important.

**Ask** *How many cherries does Maddie start with? What happens to the number of cherries when she starts eating them?*

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**14 cherries in a snack bag. Maddie eats some. Now there are 9 cherries. How many does Maddie eat?**

### Try It
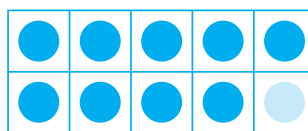
🧰 **Math Toolkit**
- counters
- connecting cubes
- 10-frames
- number paths

**Possible student work:**

**Sample A**

$9 + 5 = 14$

**Sample B**

| 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |

$14 - 5 = 9$

**DISCUSS IT**

How can you use addition to find the missing number in this problem?

Maddie eats __5__ cherries.

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## Discuss It

### Support Partner Discussion

Encourage children to use the term *unknown* as they discuss their solutions.

Support as needed with questions such as:

- *What tools did you use to help you model this problem?*
- *Can you explain your solution to your partner?*
- *Can you explain it a different way?*

**Common Misconception** **If** children struggle with representing their work with an equation, **then** ask them to explain their reasoning verbally to help them connect to the symbolic representation.

## Select and Sequence Solutions

One possible order for whole class discussion:

- count on 5 from 9 to 14 using counters
- draw 14 and cross out 9
- start at 14 on a number path and count back to 9
- write and solve the equation $14 - ? = 9$

## Support Whole Class Discussion

**Compare and connect** different representations and have children identify how they are related.

**Ask** *How did the models show that Maddie ate some of the cherries?*

**Listen for** Children should describe how different models show the difference representing the cherries that were eaten.

### Model It

**If no child presented the model** shown on the Student Worktext page, connect the number path to the children's models by having children identify how to represent the problem.

**Ask** *The arrow begins at 14 and jumps back to 10. Why does* Model It *show this jump of 4 in the first equation?*

**Listen for** Counting back from 14 to 10 is easy because it is a teen number. The difference is 4. 9 is the number to get to because that is how many cherries Maddie has now, so another jump from 10 to 9 is also easy. The difference is 1.

**Ask** *How did you find 5 as the solution?*

**Listen for** A jump of 4 plus a jump of 1 can be thought of as a jump of 5. Maddie must have eaten 5 cherries because she now has 9.

**14 cherries in a snack bag. Maddie eats some. Now there are 9 cherries. How many does Maddie eat?**

### Model It

Find the missing number in the equation.

$14 - ? = 9$

Use a number path.
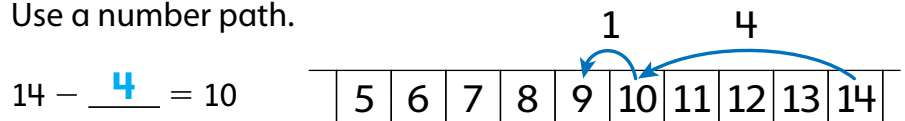
$14 - \underline{\textbf{4}} = 10$

$10 - \underline{\textbf{1}} = 9$

$14 - \underline{\textbf{5}} = 9$

Maddie eats $\underline{\textbf{5}}$ cherries.

| 1 | 4 |
| | |

| 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|----|----|----|----|----|

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## Deepen Understanding

### Model Word Problems by Representing Situations Symbolically

**SMP 2** Reason abstractly and quantitatively.
**SMP 7** Use structure.

Writing an equation with numerals and symbols for the unknown number requires children to think abstractly about the situation.

**Ask** *In the equation $14 - ? = 9$ what does the 14 represent? What does the 9 represent? What does the question mark represent?*

**Listen for** 14 is the total number of cherries in the bag at the beginning; 9 is the number of cherries left after some were eaten; the question mark shows the unknown number of cherries that were eaten.

**Generalize** *Do the numbers and symbols in this equation $9 + ? = 14$ represent the same things as they do in this equation $14 - ? = 9$?* Listen for children's awareness that the numbers do still represent the same things in both equations. The operation symbols represent opposite actions, so children may think of these as reversing the action of the story problem. If Maddie starts with the 9 cherries left in the bag and puts the 5 "eaten" cherries back in, then she would have the 14 that she started with.

## Connect It

### Support Whole Class Discussion

Ask children to look at what they drew or wrote to solve the problem and compare it to the number path model.

**1** Help children make sense of the number path model by comparing it to their own.

> **Ask** *How did you show 14 cherries? How did* Model It *show that the total is 14?*

> **Ask** *How did you show Maddie ate some cherries? How does* Model It *show that she ate some cherries?*

> **Listen for** Children should connect their representation of 14 as the whole and 9 as one of the parts with the number path's representation of these quantities. They may comment on how the 5 cherries she ate can be seen as 4 and 1 or as a group of 5.

**2** **Ask** *Is there a way to model this problem with an addition equation?*

> **Listen for** Encourage children who used addition to solve the problem to explain their thinking.

## Apply It

Explain that the next problems are an opportunity for children to practice finding unknown numbers in an equation.

Make counters, 10-frames, and number paths available.

**3** Possible approach: Jump back 3 to make 10, then jump back 3 more to reach 7. Add the jumps $(3 + 3)$, so $13 - 6 = 7$.

**4** Possible approach: Begin at 6 and count up 5 to reverse the action of the equation. Stop at 11, so $11 - 5 = 6$.

---

## Connect It

**1** How is your way like **Model It**?

How is it different?

**Children may say that they used a number path like Model It. They may have counted back by ones while Model It made a ten to subtract.**

**2** What is another strategy you could use to find the missing number?

**Possible answer: Another strategy is to count on from 9 to 14 to find the missing number.**

### Apply It

**3** Find the missing number.

$$13 - \underline{\mathbf{6}} = 7$$

| 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|----|----|----|----|----|
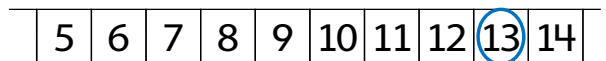
**4** Find the missing number.

$$\underline{\mathbf{11}} - 5 = 6$$

| 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |  |
|---|---|---|---|---|----|----|----|--|

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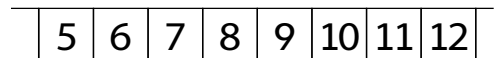
### ✋ Hands-On Activity
**Use a number path as a model.**

**If . . .** *children are unsure about using a number path to find missing numbers*

**Then . . .** *use this activity for practice finding the missing number in a subtraction problem.*

**Materials** For each pair: 2 number cubes, Activity Sheet *Teen Number Paths*

- Write the equation _____ − ? = _____ on the board and have pairs write it on a white board or paper.

- One child rolls the number cubes out of sight of his partner, finds the total, and writes the total in the first blank. Then he chooses one number cube and writes that number on the last blank. For example:

  Roll a 6 and a 5. Write $11 - ? = 6$.

- The other partner uses the number path to show how to find the missing number. Then the first child reveals the other number cube that was not written in the equation to check the solution.

- Children switch roles and repeat the activity.

**⑤** $17 - 8 = 9$

**⑥** $9 = 15 - 6$

**⑦** Possible approach: Begin with 9 counters and add 7 more to reverse the action of the equation. $16 - 7 = 9$

## Support Whole Class Discussion

When children have completed problems 3–7, discuss the answers as a class.

**Ask** *How can number paths and 10-frames help you find the unknown number in an equation?*

**Listen for** Children should describe how both models are useful for keeping track of differences by anchoring around the number 10.

## Close: Exit Ticket

**Materials** For each child: copy of printed slide

Have children find the unknown number using a number path.

Find the missing number.

$13 - ? = 9$

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |

**Solution**

$13 - 4 = 9$

**Look for** Children may jump back 3 from 13 to 10 and then 1 more to 9.

**Error Alert** **If** children do not find the correct solution, **then** provide counters and a 10-frame and have them solve the related addition equation $9 + ? = 13$ to find the answer. Then have them connect that back to the number path model to show $13 - 4 = 9$.

**⑤** Find the missing number.

$17 - 8 = ?$

$17 - 8 = \underline{\ 9\ }$
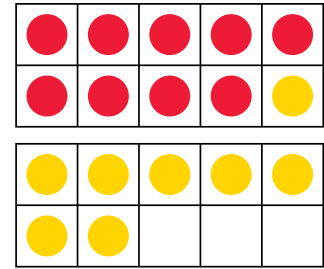
**⑥** Find the missing number.

$9 = 15 - ?$

$9 = 15 - \underline{\ 6\ }$
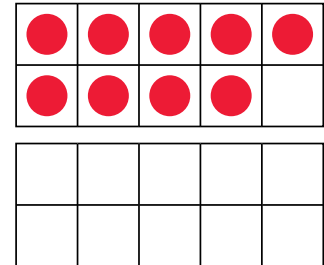
**⑦** Find the missing number.

$? - 7 = 9$

$\underline{\ 16\ } - 7 = 9$

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## Solutions

**1** Possible approach: Add 4 to make 10 and then add 2 to make 12. Adding 4 and 2 makes 6, so $12 - 6 = 6$.
*Basic*

**2** Possible approach: Begin at 6 on the number path and add 8 to reverse the action of the equation. Jump up 4 to make 10 and then jump 4 more to end at 14.

$14 - 8 = 6$
*Basic*

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Name: _____
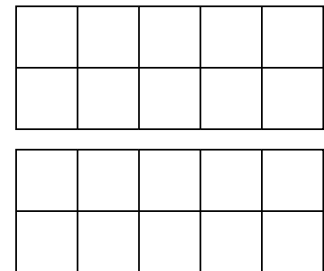
## Practice Finding the Unknown Number

**Look at the Example. Then solve problems 1–5.**
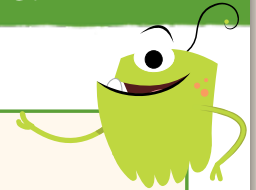
### Example

15 basketballs. Some roll away.
Now there are 8.
How many roll away?

$15 - ? = 8$

$8 + 7 = 15$

7 basketballs roll away.
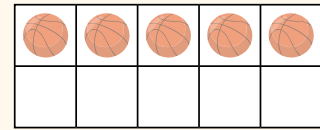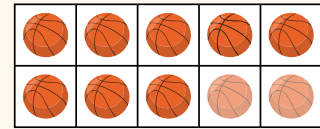
**1** Find the missing number.

$12 - ? = 6$

$12 - \underline{\textbf{6}} = 6$

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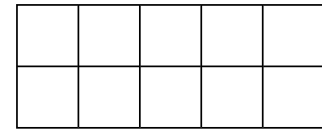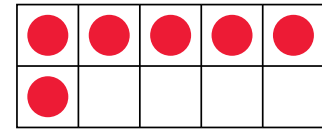
**2** Find the missing number.

$\underline{\textbf{14}} - 8 = 6$

| 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |

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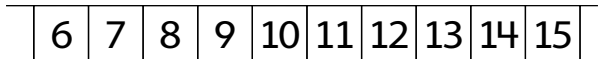
## Fluency & Skills Practice  [Teacher Toolbox]

### Assign *Finding the Unknown Number*

In this activity, children practice finding an unknown number in a subtraction equation. Children may need to solve real-world subtraction problems where the starting number, the number taken away, or the number remaining is unknown. For example, if a child knows how many markers he gave to friends in class and how many he has left, he can write a subtraction equation with the starting number unknown to find how many markers he had at the beginning of class.

**Fluency and Skills Practice**

Finding the Unknown Number   Name _____

**1** Find the missing number.
$17 - \underline{\quad} = 9$

**2** Find the missing number.
$\underline{\quad} - 8 = 5$

**3** Find the missing number.
$15 - \underline{\quad} = 6$

**3** Possible approach: Begin at 5 and jump up 7 to reverse the action of the equation. Add 5 to make 10 and then add 2 more to end at 12.
$5 = 12 - 7$
*Challenge*

**4** Possible approach: Put 9 counters in the top 10-frame. Add 1 to make 10 and then add 3 more to make 13 counters in all.
$9 = 13 - 4$
*Challenge*

**5** Possible approach: Begin at 11 on a number path, jump back 1 to 10, and then jump back 7 more to 3. Jumps of 1 and 7 make 8, so
$11 - 8 = 3$.
*Medium*

**3** Find the missing number.

$$5 = \underline{\textbf{12}} - 7$$

| 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|----|----|----|----|----|
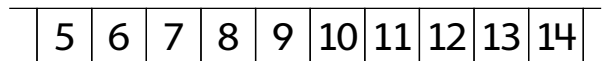
**4** Find the missing number.

$$9 = ? - 4$$

$$9 = \underline{\textbf{13}} - 4$$
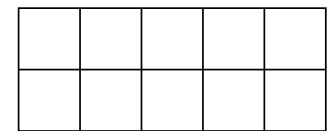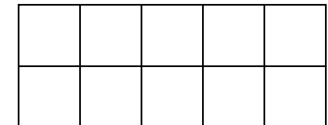
**5** Find the missing number.

$$11 - \underline{\textbf{8}} = 3$$
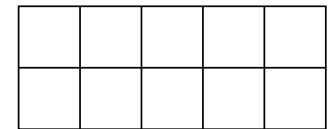
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**Prepare for Session 4**
Use with *Apply It*.

### Levels 1–3

**Listening/Writing** Read aloud *Apply It* problem 1. Distribute two color counters and a 10-frame to each child. Tell them to listen and follow directions to solve the problem. Read the following aloud, pausing between each sentence to allow children time to complete the task: *Place 8 red counters on the 10-frame. Look at the problem. Circle the number that shows the total. Place yellow counters on the 10-frame to make a 10. Decide how many more yellow counters you need to get to the total and place them next to the 10-frame. Count your yellow counters. Write that number in the blank.*

### Levels 2–4

**Speaking/Listening** Read aloud *Apply It* problem 1. Pair children to discuss and solve the problem. Distribute two-color counters and a 10-frame to each pair. Provide the following word bank: *counters, 10-frame, make a 10, total,* and *unknown number.* Have them use each term in a sentence as they build a model to solve the problem.

### Levels 3–5

**Speaking/Writing** Pair children to read, discuss, and solve *Apply It* problem 1. Ask them to use the equation to write a story problem that contains an unknown number. Remind children that the word *some* can be used to indicate an unknown number. If children need additional support, have them refer to the *Try It* problem from Session 1 to use as a context when writing their story problem.

**Purpose** In this session, children practice finding the missing numbers in addition and subtraction equations using 10-frames and number bonds.

## Start

### Connect to Prior Knowledge

**Why** Build on an understanding of the relationship between a subtraction equation and a related addition equation.

**How** Find the missing numbers in the equation pair.

Find the missing numbers.

| | |
|---|---|
| 11 − __ = 3 | 3 + __ = 11 |
| 15 − __ = 10 | 10 + __ = 15 |
| 10 − __ = 6 | 6 + __ = 10 |

### Solutions

11 − 8 = 3; 3 + 8 = 11
15 − 5 = 10; 10 + 5 = 15
10 − 4 = 6; 6 + 4 = 10

*Listen for* Children should recognize that the equation pairs are related.

### Example

Read the Example problem aloud and have children describe the connecting cube model.

**Ask** *Why is the first row of cubes in the Example doubled?*

**Listen for** Double 6 is 12, and that is close to 13.

## Apply It

**1** Possible approach:

Add 2 to make 10 and then add 2 more to make 12. 4 counters were added, so 4 + 8 = 12.

4 in the blank square of the number bond.
*DOK 2*

---

**Complete the Example. Then solve problems 1–4.**

**Example** Find the missing number in ? + 6 = 13.

Start with 6 cubes.

Double this to get 12 cubes.

Add 1 more to make 13.
How many cubes did you add?

**7** + 6 = 13

13 → 7, 6
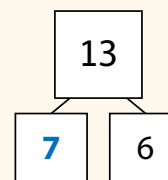
## Apply It

**1** Find the missing number.
Complete the number bond.

**4** + 8 = 12

12 → 4, 8

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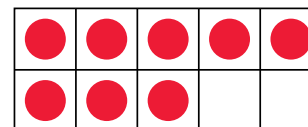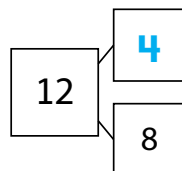
**2** Possible approach: Add 2 to make 10 and then add 7 more to represent the 9. $17 - 9 = 8$.

17 in the blank square on the number bond.
*DOK 2*

**3** Possible approach: 7 doubled is 14, so $14 = 7 + 7$.

7 in the blank square on the number bond.
*DOK 2*

**4** Possible approach: Subtract 6 to make 10 and then 3 more to end at 7. $7 = 16 - 9$.

7 in the blank square on the number bond.
*DOK 2*

## Close: Exit Ticket

### ✋ Check for Understanding

*Materials* For each child: 20 counters, Activity Sheet *Teen Number Paths*, Activity Sheet *10-Frames*

Use any strategy to find the missing number.
Show your work.

$17 - ? = 9$

**Possible Solution**
$17 - 7 = 10$;
$10 - 1 = 9$;
$17 - 8 = 9$

**Error Alert** For children who are still struggling, use the table on the right to guide remediation.

After providing remediation, check children's understanding of the following problem: Find the missing number. $15 - \_\_\_\_ = 6$

**2** Find the missing number.
Complete the number bond.

$? - 9 = 8$
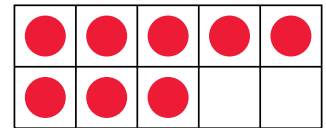
$\underline{\mathbf{17}} - 9 = 8$

17

9 | 8
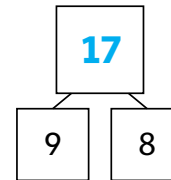
**3** Find the missing number.
Complete the number bond.
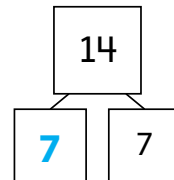
$14 = \underline{\mathbf{7}} + 7$

14

7 | 7

**4** Find the missing number.
Complete the number bond.

$\underline{\mathbf{7}} = 16 - 9$

16

7

9

| 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | (16) | 17 |
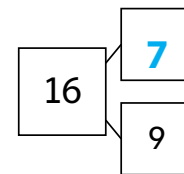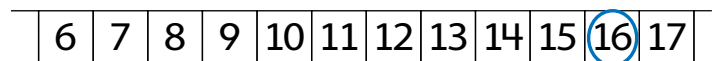
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## Error Alert

| If the error is . . . | Children may . . . | To support understanding . . . |
|---|---|---|
| 7 | have subtracted 7 to get to 10. | Circle 17 and 9 on a number path. Have children draw the necessary jumps to show the difference, stopping at 10 along the way. |
| 9 | have subtracted 9 from 17 and recorded the 9 as the answer. | Review adding on to subtract with a 10-frame, starting with 9 counters and then adding more of the opposite color to get to 17. |
| Any other number | not understand strategies for finding the unknown numbers. | Use counters and 10-frames or number paths to model the problem as you provide verbal coaching to interpret equations. |

## Solutions

**1** Possible approach: Remove 2 counters and remove 3 counters. Add $3 + 2$. 5 are taken away, so $12 - 5 = 7$.
***Basic***

### Practice Finding the Unknown Number

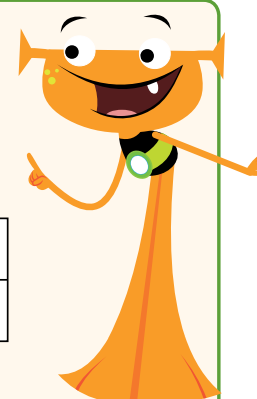**Look at the Example. Then solve problems 1–4.**
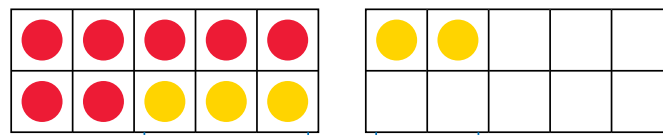
**Example**

Find the missing number.

$11 - ? = 8$
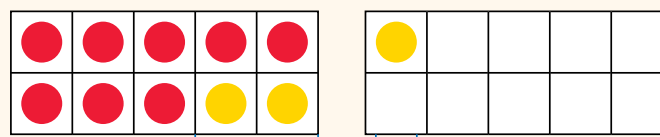
Take away 2.  Take away 1.

$11 - 3 = 8$

**1** Find the missing number.

$12 - \underline{5} = 7$

Take away __3__.   Take away __2__.

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**2** Possible approach: 8 doubled is 16, so
16 = 8 + 8. 8 in the blank square on the
number bond.
***Basic***

**3** Possible approach: 10 doubled is 20, so
10 + 10 = 20.
***Basic***

**4** Possible approach: 7 counters of one color and
8 counters of the opposite color.

7 + 3 = 10; 10 + 5 = 15; 7 + 8 = 15
15 bikes
***Medium***

**2** Find the missing number.

16 = ? + 8

16 = __8__ + 8

8

16

**8**
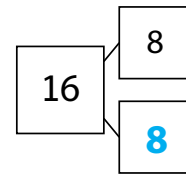
**3** Find the missing number.

10 + __10__ = 20
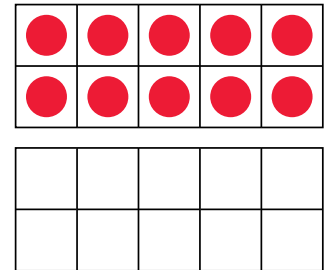
**4** The bike store has 7 green bikes
and 8 blue bikes.
How many bikes in the store?

| 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |

7 + 8 = __15__

__15__ bikes

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**Purpose** In this session, children practice finding the missing number in addition and subtraction equations using 10-frames, number paths, and number bonds.

## Start

### Connect to Prior Knowledge

*Materials* For each child: Activity Sheet *Number Bond Recording Sheet*

**Why** Practice recording sums using number bonds.

**How** Complete each addition equation using number bonds.

Use number bonds to solve.

$12 = \_\_\_ + 6$ | $4 + 8 = \_\_\_$

$\_\_\_ + 5 = 11$ | $8 + \_\_\_ = 18$

**Solutions**
$12 = 6 + 6$
$6 + 5 = 11$
$4 + 8 = 12$
$8 + 10 = 18$

## Apply It

1. Possible approach: Subtract 3 to make 10 and then 1 more to make 9. Add the numbers subtracted [3 and 1], so $13 - 4 = 9$.

   4 stars
   *DOK 2*

2. Possible approach: Add 1 to make 10 and then 6 more to make 16. 7 were added, so $7 + 9 = 16$.
   *DOK 2*

3. Possible approach: Start at 8 and count on 2 to 10; 2 more is 12. $2 + 2 = 4$, so $12 = 4 + 8$.

   4 in blank square of number bond
   *DOK 2*

4. Possible approach: Add 7 to make 10 and then add 2 more so that 9 are added.

   $3 + 9 = 12$
   *DOK 2*

5. Possible approach: Subtract 5 to make 10 and then subtract 1 more.

   $15 - 6 = 9$
   *DOK 2*

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## Refine Finding the Unknown Number

### Apply It

**Solve problems 1–7.**

1. 13 stars are in the box.
   Joy takes some stars.
   9 stars are left.
   How many stars does Joy take?

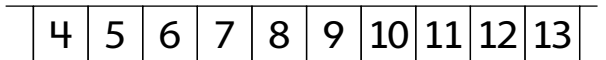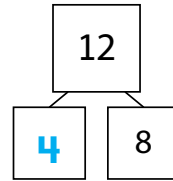   $13 - \underline{4} = 9$     $\underline{4}$ stars

2. Find the missing number.

   $? + 9 = 16$

   $\underline{7} + 9 = 16$
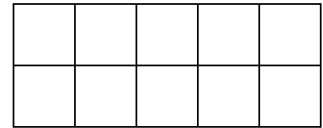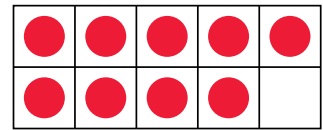
3. Find the missing number.
   Complete the number bond.

   $12 = \underline{4} + 8$

   | 12 |
   | 4 | 8 |

   | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |

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## Differentiated Instruction

### RETEACH

#### ✋ Hands-On Activity
**Finding missing numbers with connecting cubes.**

**Children** struggling to connect addition and subtraction

**Will benefit from** additional work with this concrete representation of related addition and subtraction equations.

*Materials* For each pair: 15 connecting cubes

• Pairs start with a train of 15 connecting cubes.

• One partner removes some cubes without telling how many were removed. She writes $15 - ? = $ [number of cubes left]. For example, $15 - ? = 9$.

• The other partner writes a related addition equation. Example: $9 + ? = 15$. He solves the problem and then writes the corresponding subtraction equation. Example: $15 - 6 = 9$.

• Partners switch roles and repeat the activity using different numbers.

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**6** Possible approach: 10 doubled is 20, so
20 − 10 = 10.
***DOK 2***

**7** 8 + 6 = 14
***DOK 2***

## Close: Exit Ticket

### Math Journal

Have children draw to show how to use a number path to find the unknown number in the equation.

> Show how you can use a number path to find the missing number.
>
> 8 = 12 − ?
>
> | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |

**Possible Solutions**
8 = 12 − 4
Start at 12, draw an arrow back to 10 and then an arrow back to 8. 8 is 12 take away 4.

**Error Alert**  **If** children are confused by the position of the equal sign, **then** discuss the meaning of the equal sign. Read the equation together, replacing the symbol with the words "is the same as." Suggest rewriting the equation with the expression 12 − ____ = 8 to solve the problem, and then read it again as written with the solution filled in to confirm that it makes a true equation.

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**4** Find the missing number.

3 + 9 = __12__

**5** Find the missing number.

15 − 6 = __9__

**6** Find the missing number.

20 − __10__ = 10

**7** Find the missing number.

__8__ + 6 = 14

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## EXTEND

### ⭐ Challenge Activity
**Open-ended unknown number problems.**

**Children** who have achieved proficiency

**Will benefit from** finding unknowns by solving problems that have more than one possible solution.

***Materials***  For each child: 10-frames, number paths, counters, connecting cubes (all optional)

Children interpret these open-ended word problems and write and solve one possible equation.

• Katia has 16 trading cards and Cho has 10. Katia gives away some and now she has fewer than Cho. How many could she have given away?

• Will has 8 shells. Gloria has 11 shells. Will finds some shells on the beach and now has more than Gloria. How many shells could Will have found?

• Pairs can compare solutions and verify that different answers can be true. Children can also make up more similar word problems.

## PERSONALIZE

### 📦 i-Ready®

Provide children with opportunities to work on their personalized instruction path with *i-Ready* Online Instruction to:

• fill prerequisite gaps

• build up grade-level skills

# Word Problems to 20

## Lesson Objectives

### Content Objectives
- Relate addition and subtraction equations to word problems and choose strategies to solve them.
- Solve addition and subtraction word problems within 20 with unknowns in all positions.

### Language Objectives
- Explain how to choose an appropriate strategy to solve a particular word problem.
- Describe how to use implicit and explicit information in word problems.
- Write equations with a missing number to represent a word problem situation.
- Describe the relationships among word problems, models, and equations.

## Prerequisite Skills
- Count on to add.
- Count on and count back to subtract.
- Subtract to compare.
- Use doubles and doubles plus 1 facts.
- Solve missing addend equations.
- Make a ten to add and subtract.
- Use information and models to solve word problems.

## Standards for Mathematical Practice (SMP)

SMPs 1, 2, 3, 4, 5, and 6 are integrated in every lesson through the *Try-Discuss-Connect* routine.*

In addition, this lesson particularly emphasizes the following SMPs:

**1** Make sense of problems and persevere in solving them.

**4** Model with mathematics.

**5** Use appropriate tools strategically.

*See page 1m to see how every lesson includes these SMPs.

## Lesson Vocabulary

There is no new vocabulary. Review the following key terms.
- **count on**  start with one addend and count to find a total.
- **doubles**  an addition fact that has two addends that are the same, such as $4 + 4$.

## Learning Progression

**In Kindergarten** children count objects and use drawings to solve addition and subtraction word problems.

**In Grade 1** children learn a variety of strategies to solve addition and subtraction word problems using models and equations.

**In this lesson** children use addition and subtraction within 20 to solve word problems of all situation types. They choose from known strategies such as counting on, counting back, using doubles, and making a ten, and relate them to models and equations to help them solve problems. Children extend their knowledge of how to interpret information and continue building an algebraic foundation by solving problems with unknowns in all positions.

**In Grade 2** children continue solving word problems involving all types of situations. They extend this work to solving word problems with two-digit numbers and money, and add and subtract within 100.

# Lesson Pacing Guide

## Whole Class Instruction

| | | |
|---|---|---|
| **SESSION 1** <br> **Explore** <br> *45–60 min* | **Solving Word Problems to 20** <br> • Start  *5 min* <br> • Try It  *20 min* <br> • Connect It  *15 min* <br> • Close: Exit Ticket  *5 min* | **Additional Practice** <br> Lesson pages 379–380 |
| **SESSION 2** <br> **Develop** <br> *45–60 min* | **Solving Word Problems to 20** <br> • Start  *5 min* <br> • Try It  *15 min* <br> • Discuss It  *10 min* <br> • Model It  *5 min* <br> • Connect It  *10 min* <br> • Apply It  *5 min* <br> • Close: Exit Ticket  *5 min* | **Additional Practice** <br> Lesson pages 385–386 <br><br> **Fluency** ⬏ <br> Practice Facts to 20 |
| **SESSION 3** <br> **Develop** <br> *45–60 min* | **Solving Word Problems to 20** <br> • Start  *5 min* <br> • Try It  *15 min* <br> • Discuss It  *10 min* <br> • Model It  *5 min* <br> • Connect It  *10 min* <br> • Apply It  *5 min* <br> • Close: Exit Ticket  *5 min* | **Additional Practice** <br> Lesson pages 391–392 <br><br> **Fluency Practice** <br> Solving Word Problems to 20 |
| **SESSION 4** <br> **Refine** <br> *45–60 min* | **Solving Word Problems to 20** <br> • Start  *5 min* <br> • Apply It  *35 min* <br> • Close: Exit Ticket  *5 min* | **Additional Practice** <br> Lesson pages 395–396 |
| **SESSION 5** <br> **Refine** <br> *45–60 min* | **Solving Word Problems to 20** <br> • Start  *5 min* <br> • Apply It  *15 min* <br> • Small Group Differentiation  *20 min* <br> • Close: Exit Ticket  *5 min* | **Lesson Quiz** ⬏ <br> or **Digital** <br> **Comprehension Check** |

### Lesson Materials

| | |
|---|---|
| **Lesson** <br> *(Required)* | *Per child:*  12 two-color counters <br> *Activity Sheets:* ⬏  10-Frames*, Teen Number Paths |
| **Activities** | *Per child:*  15 two-color counters <br> *Per pair:*  25 two-color counters, 2 crayons (1 red, 1 blue) <br> *Activity Sheets:* ⬏  Facts Practice 3, Teen Number Paths |
| **Math Toolkit** | counters, connecting cubes, number paths, number bonds, 10-frames |
| **Digital Math Tool** ⬏ | Counters and Connecting Cubes |

*Used for more than one activity.

## Small Group Differentiation

### PREPARE

**Ready Prerequisite Lesson**

**Grade K**
• Lesson 24  Addition and Subtraction Word Problems to 10

### RETEACH

**Tools for Instruction**

**Grade K**
• Lesson 24  Addition and Subtraction Word Problems

**Grade 1**
• Lesson 17  Solve Word Problems with Totals to 20

### REINFORCE

**Math Center Activity**

**Grade 1**
• Lesson 17  I Went Shopping . . .

### EXTEND

**Enrichment Activity**

**Grade 1**
• Lesson 17  Robot Addition

**i-Ready**

## Independent Learning

### PERSONALIZE

**Learning Game**
• Prerequisite: *Hungry Guppy*

# Connect to Family, Community, and Language Development

The following activities and instructional supports provide opportunities to foster school, family, and community involvement and partnerships.

## Connect to Family

Use the **Family Letter**—which provides background information, math vocabulary, and an activity—to keep families apprised of what their child is learning and to encourage family involvement.

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**Available in Spanish**
**Teacher Toolbox**

### Word Problems to 20

**Dear Family,**

This week your child is learning about using addition and subtraction strategies to solve different kinds of word problems.

Your child has learned different strategies for adding and subtracting numbers:

• Looking for familiar sums such as doubles

• Making a 10 to help with addition or subtraction

• Using a number path to count on or count back

In this lesson, your child will solve word problems that involve addition or subtraction of numbers to 20. Word problems can be thought of as little stories that are missing a piece of information. Your child will practice understanding the story and deciding whether to add or subtract, relating that to an equation, and then choosing a strategy to solve the equation.
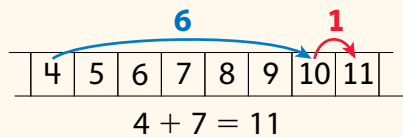
Consider the following problem.
  *Ben has 4 stamps. Tim gives him 7 more stamps. How many stamps does Ben have now?*

Decide: We need to add $4 + 7$.
Choose: We can use a number path to make a ten and solve the equation $4 + 7 = ?$

• Start at 4 and jump 6 spaces to 10.

• Now, jump 1 more space to add 7 in all.

**6**          **1**

| 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |

$$4 + 7 = 11$$

Invite your child to share what he or she knows about solving word problems to 20 by doing the following activity together.

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**Activity**   **Solving Word Problems to 20**

**Do this activity with your child to explore solving word problems to 20.**

*Materials* various objects around your home

Look for opportunities around your home to make up and solve word problems with your child.

• **In the kitchen:** *There are 12 eggs in the carton. If our neighbor borrows 4, how many eggs will be left?*

• **In the bedroom:** *I see 6 stuffed animals on your bed. There are 12 under your bed. How many fewer stuffed animals are on your bed?*

• **At the dog park:** *There are 5 dogs at the dog park. More dogs join them. Now there are 13 dogs. How many more dogs join them?*

Look for other real-life opportunities to practice solving word problems with your child.

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## Goal

The goal of the Family Letter is to explain how children can use familiar addition and subtraction strategies such as doubles, make a 10, and using a number path to solve word problems within 20.

## Activity

Look at the *Solving Word Problems to 20* activity and adjust it if necessary to connect with your children.

## Math Talk at Home

Encourage children to work with their family members to create word problems with familiar household objects, and to think about whether they should use addition or subtraction to solve the problems. Encourage them to create a variety of problems that use both operations.

**Conversation Starters**  Below are additional conversation starters children can write in their Family Letter or math journal, with your guidance, to engage family members:

• *How many are there?*

• *How many are left?*

• *Should I add or subtract?*

## Connect to Community and Cultural Responsiveness

Use these activities to connect with and leverage the diverse backgrounds and experiences of all children.

### Session 1 Use with *Try It*.

- Many cultures rich in oral traditions use chants as a mnemonic device. Lead children in a chant to help them remember to think about which operation and strategy they should use to solve word problems. First teach them the words, then include simple motions. Say: *Decide addition or subtraction. Choose a strategy, then take action!* Have children repeat the chant after you several times. Add motions. Say: *Decide addition or subtraction.* (Turn right hand palm up, then left hand palm up.) Say: *Choose a strategy* (clap), *then take action!* (Pump fist in the air.)

### Session 2 Use with *Try It*.

- The *Try It* problem is about prizes from a piñata. Explain that a piñata is a container made of papier-mâché that is decorated and filled with small candies and treats. Participants use a stick to hit the piñata and try to knock out the prizes. Piñatas are commonly found in celebrations in Mexico, but may have originated from China and traveled into Europe and Spain. Ask children if they have ever attended a party with a piñata.

### Session 3 Use anytime during the session.

- Several of the word problems throughout the session mention hobbies such as karate, dance, soccer, and piano. Brainstorm a list of activities or hobbies that children in the class enjoy. Choose one and model writing a word problem that children can relate to. Have children work in groups to solve the problem.

### Session 4 Use with *Apply It.*

- Introduce a rhyme to help children remember to decide on an operation and choose a strategy. Write it on a poster and circle the first and last words: *Decide which operation you will use; Then a strategy you must choose*. Explain that the term *operation* refers to addition or subtraction.

### Session 5 Use anytime during the session.

- Rehearse the chant from Session 1. Have children choose one problem from the session and explain how they will decide which operation to use and which strategy to choose.

## Connect to Language Development

For ELLs, use the Differentiated Instruction chart to plan and prepare for specific activities in every session.

**ELL English Language Learners: Differentiated Instruction** — **Prepare for Session 1** Use with *Try It*.

| Levels 1–3 | Levels 2–4 | Levels 3–5 |
|---|---|---|
| **Listening/Speaking** After children solve the *Try It* problem, ask: *How can you check your answer?* Think aloud with children to model checking the answer. For example, say: *I can check to see if my answer is correct by adding in any order. I will change the order of the addends and see if my answer still makes sense.* Write *5 + 3 = 8* on the board. Say: *I can count on from 5.* Hold up 3 fingers. Say: *6, 7, 8. Yes, 5 + 3 = 8 is a true equation, so my answer is correct. Is there another way you can check your answer?* If needed, suggest using a number bond or subtraction problem. Call out the following terms as children point to examples and repeat: *add, equals, total, number partners.* | **Listening/Speaking** After children solve the *Try It* problem, ask: *How do you know your equation is true?* Have children raise their hands when they have an idea. Say: *Compare your answer with a partner, then explain how you know your equation is true.* Allow time for children to share, then ask: *How can you check your answer?* Provide a list of possible suggestions such as: *add in any order, use a number bond, make a model, draw a picture.* Have each pair check their answers. If time permits, combine two sets of partners to form a group of four and ask children to share their method for checking the answer with the group. | **Listening/Speaking** After children solve the *Try It* problem, ask: *How can you check your answer?* Allow time for children to think quietly, then provide the following word bank: *total, number bond, true, equation, find out, check, answer, parts, order, addends.* Repeat the question and ask children to use at least two terms from the bank to explain how to check the answer. After the discussion, have children select one of the methods and check their answer. |

**Purpose** In this session, children act out an "add to" word problem with an unknown change and relate it to a missing addend equation. Then children solve a comparison problem with an unknown difference.

## Start

### ✋ Connect to Prior Knowledge

**Materials** For each child: 10 counters

Read the problem aloud. Have children model the problem and write a matching equation.

**Why** Review solving a word problem with known addends to prime children for solving a word problem with an unknown addend.

**How** Use counters to model and solve an addition word problem and write an equation to match it.

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6 chicks sit under the stairs.
4 chicks join them.

How many chicks sit under the stairs now?

____ + ____ = ____

**Possible Solution**
$6 + 4 = 10$

---

## Try It

### Act Out an Addition Word Problem with the Change Unknown

**Materials** For display: 8 counters, small bag

Read the problem aloud together. Choose a child with a pocket to model the problem. Give the child 3 counters to hold, and 5 counters in a small bag to place in their pocket.

**Ask** *What information is given in the problem?*

**Listen for** Rich has 3 coins. He finds more coins in his pocket and now he has 8 coins.

**Ask** *What do you need to find out to solve the problem?*

**Listen for** I need to find out how many coins are in Rich's pocket.

Have children draw and write to solve the problem on the Student Worktext page and record the solution.

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**Learning Target**
• Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions.
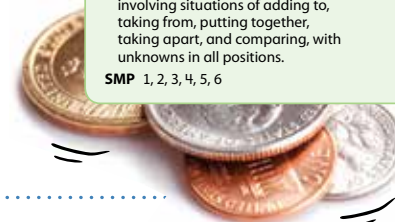**SMP** 1, 2, 3, 4, 5, 6

Rich has 3 coins.
He finds more coins in his pocket.
Now he has 8 coins.
How many does he find?

### Try It

🧰 Math Toolkit
• counters

Children's drawings may show a group of 3 and a group of 5.

$3 + \underline{\textbf{5}} = 8$

Rich found __**5**__ coins.

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### Support Whole Class Discussion

Have children explain how they decided what to draw to solve the problem.

**Ask** *What did you think about when deciding what to draw?*

**Listen for** I drew 3 coins because I know Rich had 3 to start. Then I counted on and drew more coins in a different color until I got to 8 in all. I counted 5 in the different color. That tells how many coins he had in his pocket.

**Ask** *How did you check your answer?*

**Listen for** I used the equations $8 - 3 = 5$ and $3 + 5 = 8$ to check my answer. They are both true. I know that 8 coins is the total, and Rich already had 3 of those coins. I drew a number bond to show 8 as the total and 3 as one of the parts. I know that 3 and 5 are number partners for 8.

**Common Misconception** **If** children have difficulty understanding what they need to find to solve the problem, **then** review the meaning of the word "more" and the numbers in the problem. Clarify that the number of coins "more" is unknown. Use two-color counters to show how counting on can help solve this problem: start with 3 of one color, and count on, using the opposite color, the number of coins needed to make 8 in all.

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## Connect It

**Materials** For each child: 10 counters

### Pose a Different Problem

Read aloud the problem from the Student Worktext page.

Relate it to the problem on the previous page by asking children to compare them. Ensure that they recognize that in the previous problem an addend is unknown and in this one a difference is unknown.

**Ask** *How would you describe the problem in your own words?*

**Listen for** It is about 7 ducks and 3 fish. It asks how many fewer fish than ducks are in the pond.

**Ask** *What do you know about the 7 and the 3 in this problem?*

**Listen for** 7 is greater and 3 is less. I have to find the difference to answer the question.

### Draw a Picture to Model the Problem

Ask children to draw a picture to model the problem on the work mat on the Student Worktext page.

After children have completed their models, ask them to compare them with a partner and describe their work to each other.

**Listen for** I can draw 7 circles in a row to show the ducks and draw 3 circles under the first row to show the fish. Then I can see that there are 4 more ducks, which means there are 4 fewer fish.

### Support Whole Class Discussion

Read the sentence at the bottom of the page together.

**Ask** *How can the equation help you solve the problem?*

**Listen for** When I look at the rows of circles, I cross out the first 3 in both rows because they match. Then I see 4 circles are left and that shows the difference. The subtraction equation $7 - 3 = 4$ also shows the difference.

Complete the last sentence together.

## Connect It

**7 ducks swim in the pond.**

**3 fish swim in the pond.**

**How many fewer fish than ducks?**

> Children's drawings may show a group of 7 and a group of 3 being compared.

$7 - 3 = $ __4__

__4__ fewer fish
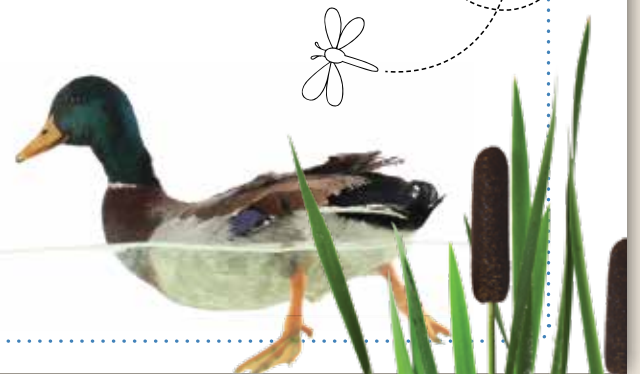
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## Close: Exit Ticket

Read the problem and have children solve.

6 small dogs play ball.
2 big dogs play ball.

How many fewer big dogs than small dogs play ball?

$6 - 2 = $ __  __ fewer big dogs

**Solution**

$6 - 2 = 4$

4 fewer big dogs

**Common Misconception** **If** children struggle with understanding "how many fewer," **then** have children model the two quantities with counters to compare.

### Real-World Connection

Encourage children to think about everyday places or situations where people might need to solve problems where the difference is unknown. Have volunteers share their ideas. Examples: seats and people, comparing groups of boys and girls, number of points scored by teams in a game.

## Solutions

### Support Vocabulary Development

**1** Choral read the problem. Remind children that number bonds show relationships among numbers. If children need support to complete the graphic organizer, group them in fours and have them sit in circles. Give each child a marker and a blank piece of paper. Have them fold the piece of paper in half lengthwise and then fold it in half again widthwise. Then have them write their name on one section. In that section, have them draw an example of a number bond. Have them pass the paper to the child to their right. Instruct children to choose a section of the paper, write their name, and draw an example of a number bond. Continue until all four sections are completed. Return the papers to the original owner and have that child use the paper as their notes for completing the graphic organizer.

**2** If children need support to write a word problem, lead the group in a brainstorming activity to generate possible topics for word problems. Possible ideas include: animals, friends, toys, articles of clothing, vehicles.

### Supplemental Math Vocabulary

- *doubles*
- *count on*

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Name: _____ **LESSON 17 SESSION 1**

## Prepare for Solving Word Problems to 20

**1** Think about what you know about number bonds. Fill in each box. Use words, numbers, and pictures. Show as many ideas as you can.
**Possible answers:**
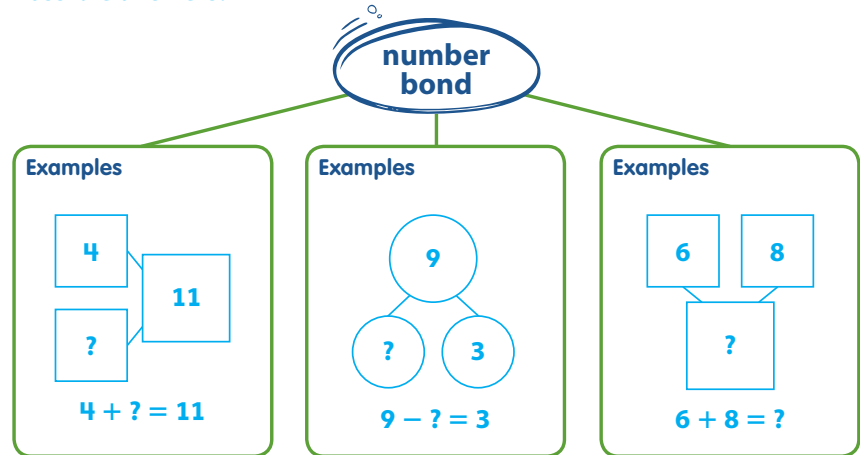


**2** Use the number bond to make up a word problem.

**Possible answer: I have 12 oranges. I gave 5 oranges to my friends. How many oranges do I have left?**



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**3** Assign problem 3 to provide another look at solving a word problem.

This problem is very similar to the problem about how many fewer fish than ducks are in the pond. In both problems, children are given a comparison word problem to solve. Children must complete the equation and solution sentence for the problem. The question asks how many fewer robins than crows are on the rail.

Children may want to use counters, connecting cubes, paper clips, or pennies.

Suggest that children read the problem three times, asking themselves one of the following questions each time:

• *What is this problem about?*

• *What is the question I am trying to answer?*

• *What information is important?*

**Solution:**

$9 - 4 = 5$

5 fewer robins
*Medium*

**3** Solve the problem. Draw to show your work.

**9 crows sit on a rail. 4 robins sit on a rail. How many fewer robins than crows?**

> Children's drawings may show a group of 9 and a group of 4 being compared.

$9 - 4 = \underline{\textbf{5}}$

$\underline{\textbf{5}}$ fewer robins

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**ELL** **English Language Learners: Differentiated Instruction**

**Prepare for Session 2** Use with *Model It*.

| Levels 1–3 | Levels 2–4 | Levels 3–5 |
|---|---|---|
| **Writing/Speaking** Give four sticky notes to each child. Write the term *number path* on the board. Say it and have children repeat. Ask them to copy the term onto a sticky note and use it to label the number path on the *Model It*. Repeat the process with the terms: *subtract, jump,* and *make a 10*. After children have labeled the *Model It*, pair them up and ask them to explain the *Model It* to a partner using the terms on the labels. | **Speaking/Listening** Put children in small groups and provide a flowchart to guide discussion: <br><br>*Subtraction* <br>*Number Path* <br>*Jumps* <br>*Make a 10* <br>*Solve* <br><br> Ask children to explain the *Model It* by taking turns and each giving a part of the explanation using the flow chart as a guide. For example, the first child uses the term *subtraction* to explain that the *Model It* solves a subtraction problem with a missing number. The next child uses the term *number path* in their part of the explanation. Continue until all terms are used. | **Writing/Speaking** Put children in groups of three. Provide each group with a set of notecards containing the terms: *subtraction, number path, jumps, make a 10, solve*. Mix the cards up and have groups work to arrange them in an order that can be used to guide an explanation of the *Model It*. After groups have arranged the cards in their chosen order, have them write an explanation of the *Model It* in their notebooks, using the terms in that order. |

**Purpose** In this session, children use models, drawings, and equations to illustrate known strategies for solving a comparison problem. The purpose is for children to select and apply different strategies as they solve different types of word problem within 20.

## Start

### ✋ Connect to Prior Knowledge

**Materials** For each child: 12 counters, Activity Sheet *10-Frames*

**Why** Review making a ten to subtract to prime children for solving similar subtraction word problems using teen numbers.

**How** Make a ten to solve a subtraction word problem. Decompose the number being subtracted into the part that makes 10 and then the rest.

| | Solutions |
|---|---|
| 12 balloons. 5 balloons pop. How many balloons are left? $12 - \_\_ = 10$ $10 - \_\_ = 7$   So, $12 - 5 = \_\_$ There are $\_\_$ balloons left. | $12 - 2 = 10$ $10 - 3 = 7$ $12 - 5 = 7$ There are 7 balloons left. |

### Develop Language

**Why** Clarify the meaning of the terms *decide* and *choose* as they are used in a problem-solving process.

**How** Explain that *decide* and *choose* both mean to select something. Write this sentence frame on the board: _____ *if you should use addition or subtraction.* Complete the sentence first with one of the words, and then with the other, noting that both make sense. Either way, one must select addition or subtraction.

## Try It

### Make Sense of the Problem

Read the problem aloud. To support children in making sense of the problem, prompt them to relate the problem to the previous session. Prompt children to identify the relevant information in the problem by rephrasing it in their own words.

**Ask** *How is this problem like one of the problems you did in the previous session? How is it different?*

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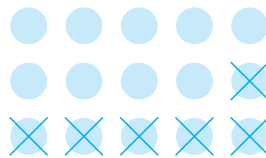## Develop Solving Word Problems to 20

**Jenny gets 15 prizes from the piñata. Ken gets 6 prizes from the piñata. How many fewer prizes does Ken get than Jenny?**
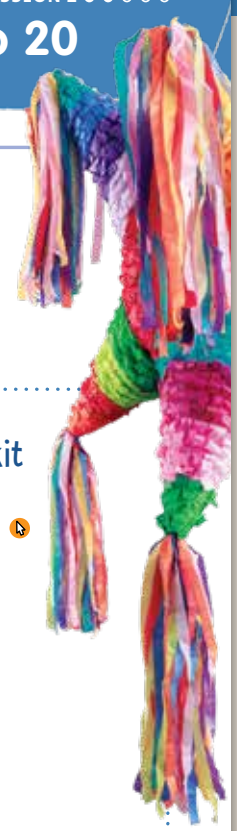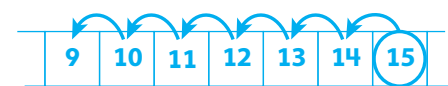
### Try It

**Possible student work:**

**Sample A**



$15 - 6 = 9$

**Ken gets 9 fewer prizes than Jenny.**

**Sample B**



$15 - 6 = 9$

**Ken gets 9 fewer.**

### 🧰 Math Toolkit
- counters
- connecting cubes
- number paths
- number bonds
- 10-frames

**DISCUSS IT**
Which subtraction strategy can help solve this problem?

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## Discuss It

### Support Partner Discussion

Encourage children to use the term *decide* as they discuss their solutions.

Support as needed with questions such as:
- *How did you get started?*
- *What do you notice about your partner's strategy?*
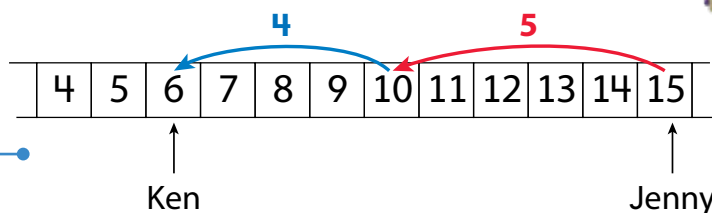- *Do you agree with your partner?*

**Common Misconception** **If** children have difficulty deciding how to model the problem, **then** provide counters and prompt children to show how many prizes Jenny and Ken each got, guiding them to use two rows vertically aligned to show one-to-one correspondence as in previous problems.

## Select and Sequence Solutions

One possible order for whole class discussion:

- 2 rows of counters vertically aligned, comparing 15 counters and 6 counters
- number path showing jumps counting back 6 from 15 to 9
- 10-frames and counters showing making a ten to subtract as: $15 - 5 = 10$; $10 - 1 = 9$; so $15 - 6 = 9$
- equations showing make a ten to subtract: $15 - 5 = 10$; $10 - 1 = 9$; so $15 - 6 = 9$

## Support Whole Class Discussion

**Compare and connect** the different representations and strategies and have children identify how they are related.

**Ask** *How do the different models show how many fewer prizes Ken has than Jenny?*

**Listen for** Children may comment on how the different models compare the two numbers to find the difference between 15 and 6.

## Model It

**If no child presented the model** shown on the Student Worktext page, connect the subtraction equations for making a ten and the number path to the children's models by having children identify how to represent the problem.

**Ask** *What strategy does* Model It *show? How do you know?*

**Listen for** Model It shows making a ten to subtract. I know because the first jump goes to 10.

**Ask** *What do the jumps on the number path show? How do you know?*

**Listen for** One big jump from 15 to 6 would tell how many more prizes Jenny has than Ken. Two smaller jumps from 15 to 10 and from 10 to 6 on the number path show how to make a ten to subtract to find $15 - ? = 6$. Either way, the distance from 15 to 6 is still 9.

**Ask** *How does using a number path help you figure out how many fewer prizes Ken has than Jenny?*

**Listen for** Ken's number of prizes and Jenny's number of prizes show how far apart 15 and 6 are. I can make two jumps: from 15 to 10 and from 10 to 6, and use teen numbers and number partners for 10 to know the jumps are 5 and 4.

Jenny gets 15 prizes from the piñata. Ken gets 6 prizes from the piñata. How many fewer prizes does Ken get than Jenny?

## Model It

Solve $15 - ? = 6$.



Ken          Jenny

$15 - \underline{5} = 10$

$10 - \underline{4} = 6$

$15 - \underline{9} = 6$

Ken gets $\underline{9}$ fewer prizes than Jenny.

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## Deepen Understanding

### Comparison Word Problems

**SMP 1** Make sense of problems.

When discussing the equations and number path in *Model It*, prompt children to communicate how they can connect the problem to strategies and models.

**Ask** *How would you describe what you are trying to find?*

**Listen for** One child got fewer prizes than another child. Jenny got 15 and Ken got 6. It is asking how many fewer prizes Ken got than Jenny.

**Ask** *How did you begin solving this problem?*

**Listen for** I started at 15 and subtracted 5 and then 1 to get to 9.

**Ask** *Could you begin solving it a different way?*

**Listen for** Start at 15 and subtract 5 and then 4 to get to 6.

**Generalize** *Could you use addition to solve this problem?* Listen for children's understanding that the missing addend equation $6 + ? = 15$ would also solve this problem.

## Connect It

**Support Whole Class Discussion**

Ask children to look at what they drew or wrote to solve the problem and compare it to the equation and counters in *Model It*.

**1** Help children make sense of the equations and number path models by comparing them to their own models.

> **Ask** *How did you show the difference between 15 and 6? How does* Model It *show the difference?*

> **Listen for** Children may explain a variety of ways they interpreted the problem and solved it. Listen for children to acknowledge that either equation $15 - 6 = ?$ or $15 - ? = 6$ can be used to solve the problem. If no one suggests this connection between the equations, mention it and discuss.

**2** **Ask** *What did Boom do wrong?*

> **Listen for** Boom started at 11 and jumped back 1 to make a ten. Then Boom jumped back 8 more from 10 to 2. Boom subtracted 9 by doing those two jumps instead of 8. He should have jumped back 7 more from 10, which would be 3. $11 - 8 = 3$.

## Apply It

Explain that the next problems are an opportunity for children to practice using a model and applying strategies to solve other word problems.

Make counters available.

**3** $7 + 3 = 10$

$10 + 1 = 11$

4 cats join.

---

## Connect It

**1** How is your way like **Model It**? How is it different?

**Children may say they also wrote an equation but they wrote $15 - 6 = 9$.**

**2** Boom says $11 - 8 = 2$. What did Boom do wrong?

8          1

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
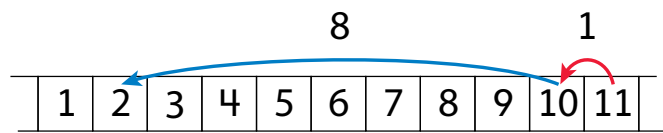
**Possible answer: Boom counted back too many. He should have counted back 1 and 7.**

## Apply It

**3** 7 cats sleep in the box. More cats join them. Now there are 11 cats. How many more cats join?

$7 + \underline{\textbf{3}} = 10$

$10 + \underline{\textbf{1}} = 11$

$\underline{\textbf{4}}$ cats join.

**383**

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### ✋ Hands-On Activity
**Model making a ten to subtract with a number path.**

**If . . .** *children are unsure about subtracting in a comparison problem*

**Then . . .** *use the activity below to connect the model on the Student Worktext page to a concrete representation.*

**Materials** For each pair: 2 crayons (1 red, 1 blue), Activity Sheet *Teen Number Paths*

• Provide children with the fourth number path on the Activity Sheet (ranging from 6 to 15).

• Have one partner use a red crayon to circle the number of prizes Jenny got [15] and draw an arrow from 15 to 10. She counts the jumps from 15 to 10 and labels the arrow with a red "5."

• The other partner uses a blue crayon to circle the number of prizes Ken got [6] and draws an arrow from the 10 to the 6. He counts the jumps and labels the arrow with a "4."

• Ask: *What is the difference between the number of prizes Jenny and Ken got?* [The difference is 9 because the numbers 6 and 15 are 9 away from each other.]

**4** Work backward to start with the 5 remaining flowers and add back the 8 that were picked to find the unknown starting quantity of 13.

5 + 8 = 13; 13 flowers

**5** 11 − 6 = 5; 5 crayons

## Support Whole Class Discussion

When children have completed problems 3–5, discuss the answers as a class.

**Ask**  *How did you solve problem 4?*

**Listen for**  I had to find how many flowers were in the garden to start with. I imagined the story working backward and started with the parts I know: 5 flowers still in the garden and 8 flowers picked. If I put those two parts back together by adding, I found that there were 13 flowers in the garden to start.

## Close: Exit Ticket

Display and read the problem aloud. Have children write an equation that can be used to solve the problem, and then find the solution.

> Kim has 14 pins.
> Kim has 5 more pins than Amy.
>
> How many pins does Amy have?
>
> Amy has ___ pins

**Possible Solutions**
5 + 9 = 14; 14 − 5 = 9; Amy has 9 pins.

**Look for**  Children may express that they know 14 is 5 more than some number. That is the number they are trying to find.

**Error Alert  If** children get 19 as the answer, **then** they may think this is an addition problem involving joining when they see the word "more." Use counters to have children show a row representing 14 pins. Label it "Kim." Ask children whether Amy's row will be longer or shorter than Kim's row. Connect the words "Kim has more" to the idea that Amy must have fewer. Have children show 5 fewer by making a row of 9 counters to show Amy's pins.

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**4** Some flowers are in Rina's garden.
Rina picks 8. Now there are 5 flowers.
How many flowers were in the garden to start?
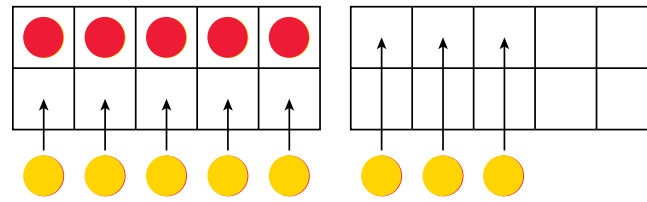
5 + 8 = __13__

__13__ flowers

**5** Aram has 11 crayons.
Aram has 6 more crayons than Ray.
How many crayons does Ray have?

| | | | | | | |
|5|6|7|8|9|10|11|

11 − 6 = __5__

__5__ crayons

## SESSION 2 Additional Practice
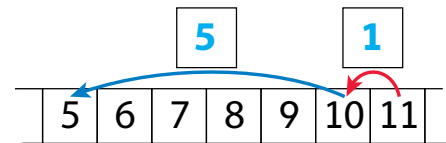
### Solutions

**1** 8 + 4 = 12
12 bottles
*Basic*

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## Practice Solving Word Problems to 20

**Look at the Example. Then solve problems 1–4.**
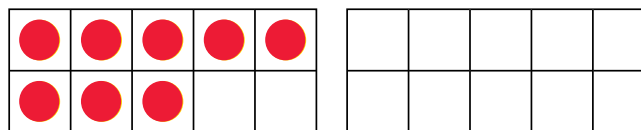
### Example

Mr. Piña has 18 snacks.
He has 9 bananas. The rest are
apples. How many are apples?

9 are apples.

**1** 8 bottles have milk. 4 bottles have juice.
How many bottles in all?

8 + 4 = **12**

**12** bottles

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### Fluency Practice

**Practice facts to 20.**

*Materials* For each child: Activity Sheet *Facts Practice 3*

• Have children complete Activity Sheet *Facts Practice 3*.

• Then have pairs review the facts. One partner reads the
problem aloud and the other partner says the number
that completes the fact.

**2** $17 - 8 = 9$

8 pages

*Medium*

**3** $12 - 7 = 5$

7 fewer balls

*Medium*

**4** $7 + 8 = 15$

15 marbles

*Basic*

**2** 17 coloring pages are on the table.
Tanya colors some. There are 9 pages left.
How many pages does Tanya color?

| 1 | | 7 |
| --- | --- | --- |

| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
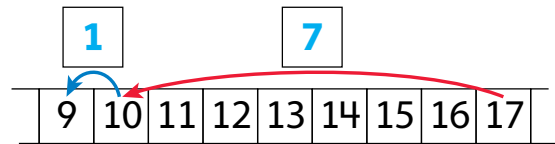
$17 - \underline{8} = 9$

$\underline{8}$ pages

**3** Isabella has 12 balls. Ryan has 5 balls. How many fewer balls does Ryan have than Isabella?

$12 - \underline{7} = 5$

$\underline{7}$ fewer balls

**4** Sofia has 8 more marbles than Olaf. Olaf has 7 marbles. How many marbles does Sofia have?

$7 + 8 = \underline{15}$

$\underline{15}$ marbles

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**Prepare for Session 3**
Use with *Connect It*.

### Levels 1–3

**Writing/Listening** Read *Connect It* problem 1 aloud. Draw the following chart on the board and have children replicate it in their math journals:

| | Model It | My Way |
| --- | --- | --- |
| Model | Counters, 10-frames | |
| Strategy | Make a 10 | |
| Equation | $8 + 6 = 14$ | |

Think aloud to model completing the column for the *Model It*. Allow time for children to complete the *My Way* column. Then reread *Connect It* problem 1. Have children point to one way their way is like the *Model It* and one way their way is different from the *Model It*.

### Levels 2–4

**Speaking/Writing** Choral read *Connect It* problem 1. Draw the following chart on the board and have children replicate it in their math journals.

| | Model It | My Way |
| --- | --- | --- |
| Model | Counters, 10-frames | |
| Strategy | Make a 10 | |
| Equation | $8 + 6 = 14$ | |

Have children work with a partner to complete the *Model It* column. Tell them to complete the *My Way* column independently. After both partners have completed the chart, have them reread *Connect It* problem 1 and use the chart to explain their answer to their partner.

### Levels 3–5

**Writing/Reading** Draw the following chart on the board and have children replicate it in their math journals.

| | Model It | My Way |
| --- | --- | --- |
| Model | Counters, 10-frames | |
| Strategy | Make a 10 | |
| Equation | $8 + 6 = 14$ | |

Have children work in pairs to read *Connect It* problem 1, then complete the *Model It* column of the chart. Have them complete the *My Way* column independently. Ask children to use the chart to guide their writing as they complete the sentence stems: *My way is like the Model It because _____ . My way is different from the Model It because _____ .*

**Purpose** In this session, children solve a word problem where the starting number is unknown. The purpose is to focus on interpreting the structure of the problem and consider how to use a model, strategy, and equation to solve.

## Start

### Connect to Prior Knowledge

**Materials** For each child: Activity Sheet *Teen Number Paths*

**Why** Review making a ten to subtract to solve a word problem and relate it to equations.

**How** Use a number path and make a ten to subtract. Model and solve the word problem and complete the equations.

| | |
|---|---|
| 12 children are playing tag. 4 children go home. How many play tag now? $12 - \underline{\phantom{xx}} = 10$ $10 - \underline{\phantom{xx}} = \underline{\phantom{xx}}$  So, $12 - 4 = \underline{\phantom{xx}}$ $\underline{\phantom{xx}}$ children play tag now. | **Solution** $12 - 2 = 10$; $10 - 2 = 8$ $12 - 4 = 8$ 8 children play tag now. **Look for** Jumps from 12 to 10 and from 10 to 8 on the number path. |

### Develop Language

**Why** Support children as they verbalize thinking about using addition and subtraction to solve the same problem.

**How** Display the equations $6 + \underline{\phantom{xxxx}} = 14$ and $14 - \underline{\phantom{xxxx}} = 6$. Pair children to compare the equations. Ask: *How are the equations alike? How are they different?* Provide the following bank of terms for children to use in their explanations: *whole, part, missing number, more, fewer*. Guide them to notice that the relationship between the whole and the part can be used in different ways.

## Try It

### Make Sense of the Problem

Read the problem aloud. To support children in making sense of the problem, prompt them to identify the need to find the number of lemons that were in the basket before Matt put 6 more in.

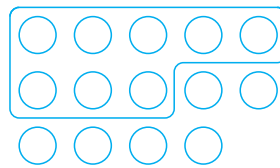**Ask** *How many lemons were in the basket at first? How many are there now?*

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Jody puts some lemons in a basket.
Matt puts 6 more lemons in the basket.
Now there are 14 lemons in the basket.
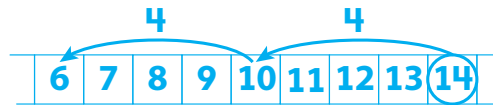How many lemons does Jody put in?

### Try It

**Possible student work:**

**Sample A**



$8 + 6 = 14$

**Jody puts in 8 lemons.**

**Sample B**



$14 - 4 = 10$
$10 - 4 = 6$

**Jody puts in 8 lemons.**

**🧰 Math Toolkit**
- counters
- connecting cubes
- number paths
- number bonds
- 10-frames

**DISCUSS IT**
A subtraction equation that can help solve the problem is . . .

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## Discuss It

### Support Partner Discussion

Encourage children to name the model or strategy they used as they discuss their solutions.

Support as needed with questions such as:

- *How did you know what the problem is asking?*
- *Did you use a drawing or model to help you solve the problem? Why?*
- *What do you think of your partner's strategy?*

**Common Misconception** **If** children struggle with understanding the structure of the word problem, **then** provide practice using 10-frames and counters to model the problem. Elicit reasoning about showing what they know and thinking about what they need to find out. For example, they can start with 6 counters for the 6 lemons Matt put in or 14 counters for the 14 total lemons. Whichever they start with, visualizing the problem with the 10-frame and counters will help them connect to the part they need to find.

## Select and Sequence Solutions

One possible order for whole class discussion:

- 8 counters of one color and 6 counters of another color
- drawing 6 counters, then drawing more to make 14
- making a ten to subtract on a number path: finding how many were subtracted to get from 14 to 6
- writing addition equations to find $8 + 6 = 14$ or $6 + 8 = 14$
- make a ten to add using equations: $6 + 4 = 10$; $10 + 4 = 14$, so $6 + 8 = 14$.

## Support Whole Class Discussion

**Compare and connect** the parts of the word problem with different representations. Have children identify how they are related.

**Ask** *What kinds of different strategies worked to find the answer?*

**Listen for** Children may comment on how either subtraction or addition can be used to find the unknown quantity.

### Model It

**If no child presented the model** shown on the Student Worktext page, connect the 10-frame model to the children's models by having children identify how it represents the problem.

**Ask** *What does the 10-frame model show?*

**Listen for** I can solve $6 + ? = 14$ to find the answer. I can start with the part I know, 6, add 4 to make 10 and then add 4 more to make 14.

**Ask** *How could you use the equations to help you to solve the problem?*

**Listen for** Children may explain they know they can add in any order. They can use the missing addend equation and then re-write the same addends in the order that makes more sense to match the problem.

Jody puts some lemons in a basket.
Matt puts 6 more lemons in the basket.
Now there are 14 lemons in the basket.
How many lemons does Jody put in?

### Model It

Solve $? + 6 = 14$.

What number added to 6 equals 14?

$? + 6 = 14$ is the same as $6 + ? = 14$.
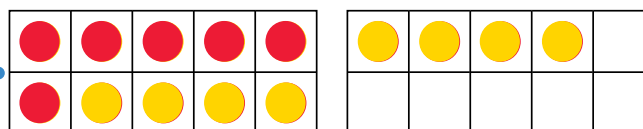


$6 + $ __**8**__ $ = 14$, so

__**8**__ $ + 6 = 14$.

Jody   Matt

Jody puts in __**8**__ lemons.

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## Deepen Understanding

**Representing and Solving Problems with Start Unknown**

**SMP 4** Model with mathematics.

When discussing the 10-frames in *Model It,* prompt children to identify how they can think about the quantities in different ways.

**Ask** *Does it matter that the 6 red counters come first in the 10-frame?*

**Listen for** Even though the 6 more lemons come second in the word problem, it doesn't make a difference in the total. It helps to start with 6 and add more until there are 14.

**Ask** *How do the 10-frames help show $14 - 6$?*

**Listen for** The 10-frames show 14 counters in two parts. If I cover (or take away) the 6 red counters, the 8 yellow counters show the amount left.

**Generalize** *Why can you use addition or subtraction to solve this problem?* Listen for children's awareness that even though they are finding the starting quantity, they are still just finding one missing part, so they can use the relationship between the whole and the part they know in different ways.

## Connect It

**Support Whole Class Discussion**

Ask children to look at what they drew or wrote to solve the problem and compare it to the 10-frames and equations in *Model It*.

**1** Help children make sense of the 10-frame model by comparing it to their own.

> **Ask** *What strategy did you use to solve the problem? What strategy does* Model It *show?*
>
> **Listen for** Children may comment on how their strategy involved counting by ones or decomposing numbers into two parts to solve the problem.

**2** Help children make sense of the 10-frame model by comparing it to their own model.

> **Ask** *What do you notice about making a ten to solve the problem?*
>
> **Listen for** Thinking about 10 helps break the problem up. It is easier to add 6 + 4 to make 10 and then 10 + 4 to make 14. Adding 4 and then 4 more is the same as adding 8.

## Apply It

Explain that the next problems are an opportunity for children to practice using strategies, models, and equations to solve other word problems.

Make counters, 10-frames, and connecting cubes available.

**3** 7 + 8 = 15

7 ants

---

## Connect It

**1** How is your way like **Model It**? How is it different?

**Children may say that they used a number path to count back 6 from 14, while Model It makes a ten using a 10-frame.**

**2** How does making ten help you solve the problem?

**Possible answer: It is easier to add and subtract with 10.**

## Apply It

**3** Some ants are at a picnic.

8 more ants join them. Now there are 15 ants.

How many ants were at the picnic to start?

**_7_** + 8 = 15

**_7_** ants

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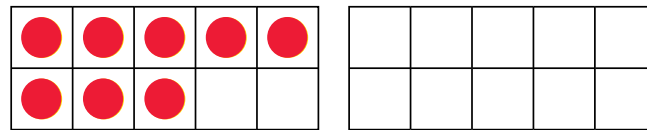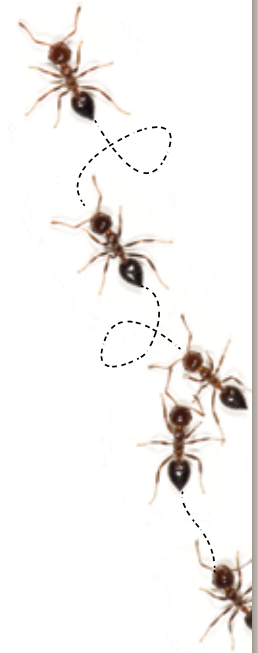
## ✋ Hands-On Activity

**Connect 10-frames and Make a Ten to solve problems.**

**If . . .** *children are unsure about making a ten to solve the problem,*

**Then . . .** *use the activity below to connect the model on the Student Worktext page to a concrete representation.*

***Materials*** For each child: 14 two-color counters, Activity Sheet *10-Frames*

- Write the equations 6 + 4 = ____ , 10 + ____ = 14 and 6 + ____ = 14.
- Have children put 6 red counters in a 10-frame. Ask them to add yellow counters until they reach 10. Continue adding yellow counters until there are 14 in all.
- Record this in the equations to show 6 + 4 = 10 and 10 + 4 = 14.
- Have children look at the equation 6 + ? = 14. Explain that this is the equation representing the combined actions of the other two equations. Ask them to find the number that represents all of the yellow counters they added. [8]
- Prompt children to notice that each group of yellow counters represents a number partner for 8 that was used to make a ten to add.
- Connect this equation to ? + 6 = 14 by showing the counters in a different order.

**④** 12 − 5 = 7

5 blocks

**⑤** 11 − 2 = 9

9 desks

## Support Whole Class Discussion

When children have completed problems 3–5, discuss the answers as a class.

**Ask** *In problem 3, how can you use 10-frames to find the number of ants there were at the beginning?*

**Listen for** I can model the problem starting with what I know. I know 8 ants joined so I put 8 counters in a 10-frame. I know there are a total of 15 ants, so I add 2 more counters to the 10-frame and then put 5 more counters in another 10-frame to make 15. I added 7 counters so that means there were 7 ants to start.

**Ask** *How can you check your answer?*

**Listen for** Now that I know there were 7 ants to start, I can clear the 10-frames and solve it again. I put 7 to start, 8 that joined, and see if the total is 15.

## Close: Exit Ticket

✋ *Materials* For each child: 12 two-color counters, Activity Sheet *10-Frames*

Have children solve the problem using counters and 10-frames and complete the subtraction equations.

| | |
|---|---|
| 12 nuts. Ty eats some. Now there are 9 nuts. How many nuts does Ty eat? 12 − __ = 10 10 − __ = 9  So, 12 − __ = 9 Ty eats __ nuts. | **Solutions** 12 − 2 = 10; 10 − 1 = 9; 12 − 3 = 9; Ty eats 3 nuts. |

**Error Alert** **If** children get 9 for an answer after subtracting 12 − 2 and 10 − 1, **then** re-read the question and guide them to interpret what the question is asking. In this case, it is the change that is unknown, so the focus of the question is on how many were taken away to leave 9, not on the 9 that are left.

**④** Janice has 12 blocks. She gives some to Pat.

Now she has 7 blocks.

How many does Janice give to Pat?
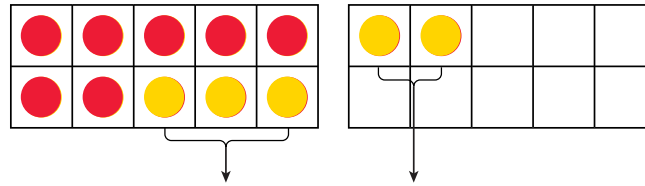


12 − **5** = **7**

**5** blocks

---

**⑤** Mr. Peters has 2 fewer desks than Mr. Dans.

Mr. Dans has 11 desks.

How many desks does Mr. Peters have?



**11** − **2** = **9**

**9** desks

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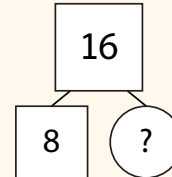## Solutions

**1** 5 + 9 = 14
14 children
*Basic*

---

Name: _____

## Practice Solving Word Problems to 20

**Look at the Example. Then solve problems 1–4.**
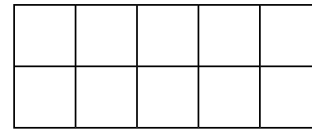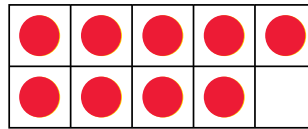
### Example

Sasha has 16 erasers.

8 are square. The rest are round.

How many erasers are round?

8

8 + 8 = 16

8 erasers are round.

16

8   ?

**1** 5 children dance on stage.

9 more children join them.

How many children are dancing now?

__5__ + __9__ = __14__        __14__ children

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## Fluency & Skills Practice   Teacher Toolbox

**Assign *Solving Word Problems to 20***

In this activity, children solve word problems that involve subtracting numbers within 20. Children may experience similar real-world situations involving subtraction. For example, children may subtract to find how many children are absent from class on a given day, or how much more money one board game costs than another.

### Fluency and Skills Practice

**Solving Word Problems to 20**      Name _____

**1** Amy has some crayons.
She finds 7 more crayons.
Now she has 18 crayons.
How many crayons did she have at the start?

__11__ + 7 = 18
____ crayons

**2** There are 15 fish in a tank.
7 of the fish are orange.
The rest are white.
How many are white?

15

15 − ____ = ____
____ white fish

**3** Marco has 16 flowers.
He gives some to Alex.
Now Marco has 8 flowers.
How many did he give to Alex?

16 − ____ = ____
____ flowers

**4** There are 12 bagels in a box.
Some bagels are eaten.
Now there are 4 bagels.
How many bagels were eaten?
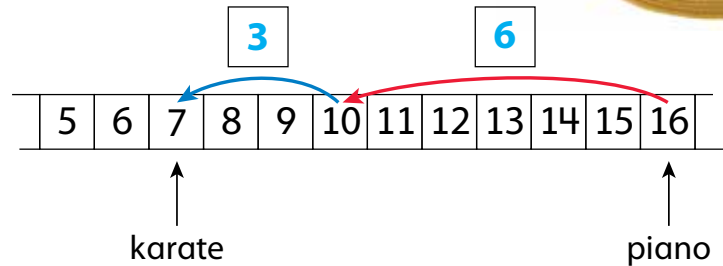
12 − ____ = ____
____ bagels

**2** 16 − 7 = 9

9 fewer friends

*Medium*

**3** 9 + 7 = 16

16 books

*Basic*

**4** 12 − 4 = 8

8 eggs

*Medium*

**2** 7 friends do karate.

16 friends play piano.

How many fewer friends do karate?



| 3 | | 6 | |
|---|---|---|---|

| 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|----|----|----|----|----|----|----|

↑ karate                    ↑ piano

16 − 7 = __9__          __9__ fewer friends

**3** 9 large books and 7 small books are on the shelf.

How many books are there in all?

9 + 7 = __16__          __16__ books

**4** 12 eggs are in a carton.

4 are brown. The rest are white.

How many eggs are white?

__12__ − __4__ = __8__          __8__ eggs

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**ELL** **English Language Learners:** **Prepare for Session 4**
**Differentiated Instruction**  Use with *Apply It*.

| Levels 1–3 | Levels 2–4 | Levels 3–5 |
|---|---|---|
| **Reading/Speaking**  Echo read *Apply It* problem 3. Remind children to decide if they will use addition or subtraction to solve the problem. Have them circle clues in the problem that help them decide which operation to use. [Possible answers: 10 red shoes, 10 pink shoes, in all] Then guide children to choose a strategy that will help them solve the problem. Encourage them to look for relationships among the known numbers. Ask the following questions: *What do you need to find? Will you use addition or subtraction? What strategy can help you add/subtract?* | **Reading/Speaking**  Have children work in pairs to read *Apply It* problem 3. Have each child decide independently which operation they will use to solve the problem. Then have the partners discuss the operation they chose, and explain to their partner why they chose this operation. | **Reading/Speaking**  Pair children up and give each pair two notecards: one with a picture of 10 pink shoes and one with a picture of 10 red shoes. Have children read *Apply It* problem 3 independently, then take turns covering up the problem with a sticky note and using the notecards as graphic support for retelling the problem. Remind children of the "decide and choose" chant. Ask: *How does the question help you decide which operation to use?* [Possible answer: The words *in all* help me know to add.] |

**Purpose** In this session, children continue to practice using models and strategies to solve addition and subtraction word problems to 20 with unknowns in all positions.

## Start

### Connect to Prior Knowledge

**Why** Build numerical reasoning to solve word problems with start unknown.

**How** Solve an equation with the start unknown to answer a question in a word problem.

Some boys sing.
7 more boys join them.
Now 15 boys sing.

How many boys were singing to start?

___ + 7 = 15

### Solution

8 + 7 = 15

*Listen for* Children may say how they started with 7 and added 8 to get 15, or they subtracted 15 − 7 to find 8.

## Example

Read the Example problem aloud and have children describe the 10-frame and number bond models and equations.

**Ask** *How can you use the models and equations to help you solve the problem?*

**Listen for** I can compare red and yellow counters in the 10-frames to the partners in the number bond. Then I think about the parts and the whole to help me complete the addition and subtraction equations and solve the problem.
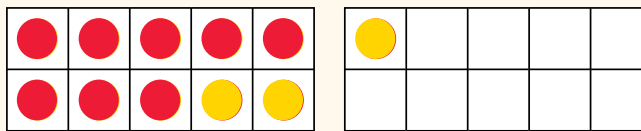
## Apply It

**1** 17 − 9 = 8

8 soccer balls

Fill in number bond square: 8

*DOK 2*

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**Complete the Example. Then solve problems 1–4.**
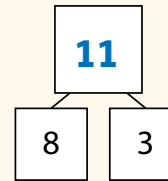
**Example** Some hamsters are in a cage.
Josef lets 3 out. Now there are 8 in the cage.
How many were in the cage to start?



8 + 3 = 11

__11__ − 3 = 8

__11__ hamsters

11
/    \
8      3

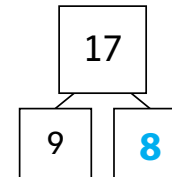## Apply It

**1** 17 soccer balls are on the field.
Asher kicks 9 of them away.
How many soccer balls are there now?

17 − 9 = __8__

__8__ soccer balls

17
/    \
9      8

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**2**  15 − 9 = 6

6 more rocks

Label the number jump from 15 to 10 with the number 5 and label the jump from 10 to 9 with the number 1.
*DOK 2*

**3**  20 shoes
*DOK 2*

**4**  9 birds fly away.
*DOK 2*

## Close: Exit Ticket

### Check for Understanding

*Materials*  For remediation: 12 two-color counters, Activity Sheet *10-Frames*

Ask children to model the problem and complete the equation.

| | |
|---|---|
| 12 butterflies sit on a bush. Some fly away. Now there are 5. How many fly away? 12 − __ = 5   __ fly away. 4 5 6 7 8 9 10 11 12 13 | **Solution** 12 − 7 = 5; 7 fly away. *Look for*  Children may count back by ones or may take away 2 to get to 10 and then 5 more to get to 5. |

**Error Alert**  For children who are still struggling, use the table on the right to guide remediation.

After providing remediation, check children's understanding of the following problem:
Kari has 15 pencils. Kari gives some away some. There are 6 left. 15 − _____ = 6. How many pencils did Kari give away? [9]

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**2**  Barry has 15 pet rocks. Don has 9 pet rocks.
How many more rocks does Barry have?
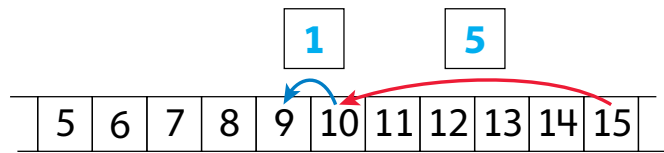


15 − **9** = **6**          **6** more rocks

**3**  10 red shoes are on the floor.
10 pink shoes are on the floor.
How many shoes in all?

**20** shoes

**4**  14 birds sit on a fence.
Some birds fly away. Now there are 5.
How many birds fly away?

**9** birds fly away.

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## Error Alert

| If the error is . . . | Children may . . . | To support understanding . . . |
|---|---|---|
| 17 | have added 12 + 5 because they do not understand the part and whole relationship. | Have children fill 10-frames with 12 counters and flip over 5 counters to represent the butterflies that are left after some fly away. Have children use the 10-frame model to figure out how many flew away. |
| 12 or 5 | not understand the relationship of the numbers to the meaning of the problem. | Label the 2 squares of a number bond as "stayed" and "flew away". Explain that these are the 2 parts of the whole group. Have children fill in the numbers 12 and 5 , and use that to figure out that 7 is the other part. |
| A number that is not 12, 5, or 7 | have made an error in adding or subtracting. | Ask children to show you their method and guide them to use precision as needed. |

## Solutions

1  Label both number path jumps 3.

$13 - 6 = 7$

7 pens

Fill in number bond square: 7

*Medium*

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## Practice Solving Word Problems to 20

**Look at the Example. Then solve problems 1–4.**

### Example

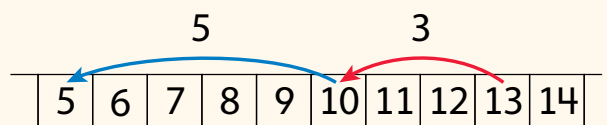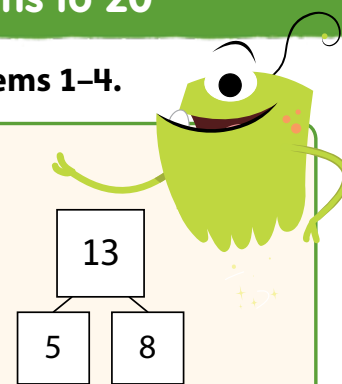13 children are on the baseball team.
5 are boys. The rest are girls.
How many girls on the team?
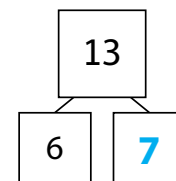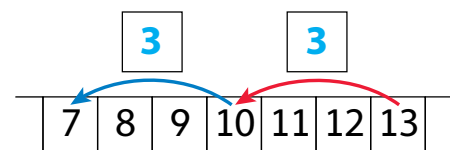
$13 - 3 = 10$

$10 - 5 = 5$

$13 - 8 = 5$

8 girls

| 13 |
| 5 | 8 |

5                3

| 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |

1  Ron has 13 pens. Brianna has 6 fewer pens than Ron. How many pens does Brianna have?

3        3

| 7 | 8 | 9 | 10 | 11 | 12 | 13 |

| 13 |
| 6 | 7 |

$13 - 6 = \underline{7}$

$\underline{7}$ pens

**2** Possible approach: Show removing 4 counters by drawing arrows down from the 10-frames.
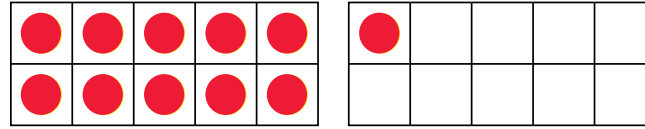
11 − 4 = 7

7 toys
*Basic*

**3** 3 fewer rainbow stickers
*Medium*

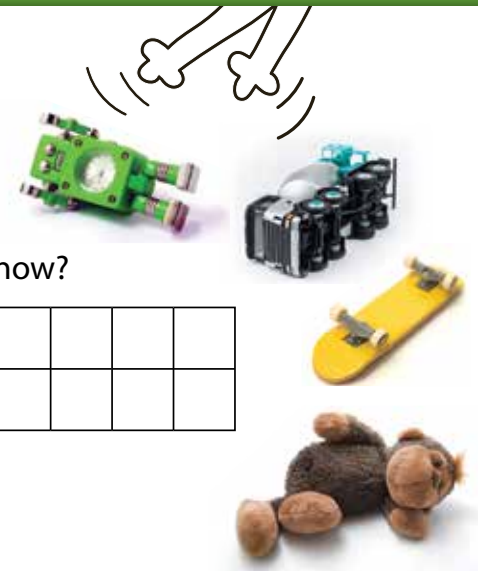**4** Possible approach: Adding 7 + 3 to make 10, and add 2 more to make 12.

5 fish
*Challenge*

**2** 11 toys are on the shelf.
The cat pushes off 4 toys.
How many toys on the shelf now?

**11** − **4** = **7**

**7** toys

**3** 11 star stickers are in the box.
8 rainbow stickers are in the box.
How many fewer rainbow stickers?

**3** fewer rainbow stickers

**4** Stanley has 7 more fish than Bob.
Stanley has 12 fish.
How many fish does Bob have?

**5** fish

## Purpose
In this session, children continue to refine and apply the use of different models and strategies to solve addition and subtraction word problems to 20.

## Start

### ✋ Develop Fluency

*Materials* For each child:12 two-color counters, Activity Sheet *10-Frames*

*Why* Use numerical reasoning to understand the meaning of numbers in word problems and relate them to a visual model.

*How* Have children turn over some counters to the opposite color to represent Yara's pens. Have them check their work by reading the problem again with their answer inserted into the problem to see if it makes sense.

Rafa has 13 pens.
She has 7 more than Yara.
How many pens does
Yara have?
__ + 7 = 13
Yara has __ pens.

**Solution**
6 + 7 = 13; Yara has 6 pens.

*Listen for* If Yara has 6 pens and Rafa has 7 more, then Rafa has 13 pens. That is what the problem stated.

## Apply It

**1** 6 + 6 = 12; 12 spots
*DOK 2*

**2** 11 − 5 = 6; 6 songs
*DOK 2*

**3** 6 + 8 = 14; 14 berries
*DOK 2*

**4** 4 more toy planes
*DOK 2*

**5** 15 coins
*DOK 2*

**6** 10 tennis balls
*DOK 2*

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### Apply It

**Solve problems 1–6.**

**1** Fido has 6 more spots than Pup.
Pup has 6 spots.
How many spots does Fido have?

__**6**__ + __**6**__ = __**12**__    | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |

__**12**__ spots

**2** Tara sings 5 fewer songs than Danny.
Danny sings 11 songs.
How many songs does Tara sing?

__**11**__ − __**5**__ = __**6**__

__**6**__ songs

**3** 6 berries are in the bowl.
Amal puts 8 more in the bowl.
How many berries are there now?

__**6**__ + __**8**__ = __**14**__        __**14**__ berries

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## Differentiated Instruction

### RETEACH

#### ✋ Hands-On Activity
**Subtract to solve a comparison word problem.**

**Children** struggling to solve comparison problems
**Will benefit from** additional work with concrete representations.

*Materials* For each pair: 25 two-color counters

• Pose this problem: *Marta has 16 feathers. Tina has 9 feathers. How many fewer does Tina have?*

• Have each child make a row of counters showing one person's feathers. Ensure that the rows are vertically aligned.

• Ask children how many more Marta has and how many fewer Tina has.

• Ask how the equation 16 − 9 = _____ connects to this problem. Cover up the two rows of 9 so that the difference of 7 is showing. Verbalize the equation as: *the difference between 16 and 9 is 7.*

## Close: Exit Ticket

### Math Journal

Have children draw a model and explain how to use the model and an equation to solve the problem.

17 cars in the lot.
Some drive away.

Now there are 8 cars.

How many cars drive away?

17 − __ = __

__ cars drive away.

**Possible Solutions**
Number bond with a 17, 8, and 9; Number path or 10-frames showing make a ten to subtract $17 − 8 = 9$; 9 cars drive away.

**Error Alert**  If children get 8 for an answer, **then** have them use a number bond model to show the doubles fact $8 + 8 = 16$. Ask if this matches the numbers in the word problem. Help children to recognize that if they need to increase 16 to 17 for the total, they need to adjust one of the number partners to a 9.

4  Kris has 8 toy planes. He makes more. Now he has 12 toy planes. How many more does Kris make?

__4__ more toy planes

5  Paul has 9 fewer coins than Hasina. Paul has 6 coins. How many coins does Hasina have?

__15__ coins

6  20 tennis balls are on the table. Some roll off. Now there are 10. How many roll off?

__10__ tennis balls

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## EXTEND

### ⭐ Challenge Activity
**Retell a comparison word problem another way.**

**Children**  who have achieved proficiency

**Will benefit from**  deepening understanding of comparison situations.

**Materials**  For each child: 15 two-counters

• Write this problem on the board: *Peter sees 6 tadpoles. He sees 7 fewer than Rena. How many tadpoles does Rena see?* [13]

• Ask children to discuss how they know who sees more tadpoles by having them focus on the meaning of the word "fewer."

• Challenge children to re-tell the problem using the word "more" but keeping the context the same. Listen for understanding that Peter seeing 7 fewer than Rena means the same as Rena seeing 7 more than Peter.

• Have children model the problem concretely, write an equation, and solve.

## PERSONALIZE

### 📘 i-Ready®

Provide children with opportunities to work on their personalized instruction path with *i-Ready* Online Instruction to:

• fill prerequisite gaps

• build up grade-level skills