Module 2
Combinations & Story Problems

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Module 2
Combinations & Story Problems

Overview
The activities in this module continue to focus on addition and subtraction story problems and fact strategies to 20. Students make double-flap dot cards and picture cards, writing sets of fact family equations and story problems to match. They model and solve addition combinations to 20 on their number racks, identifying such strategies as working with easier combinations like 10 + 4 and 7 + 7 to solve more challenging combinations such as 9 + 4 and 7 + 8. A game at the end of the module, Pick Two to Make Twenty, sets work with addition combinations in an appealing and challenging context. The module concludes with a short checkpoint assessment.

Planner

<table>
<thead>
<tr>
<th>Session &amp; Work Places</th>
<th>P&amp;I</th>
<th>WP</th>
<th>A</th>
<th>HC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Session 1</strong> Double-Flap Dot Cards Ten to Twenty</td>
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<tr>
<td>After a short warm-up, the teacher shows students a Double-Flap Dot Card and its total number of dots. Then she opens the flaps one at a time and works with the class to generate addition equations. Next, they start with both flaps open and repeat the process for subtraction. Students make their own dot cards and write their own fact family of equations.</td>
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<tr>
<td><strong>Session 2</strong> Double-Flap Penguin Picture Cards</td>
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<tr>
<td>Following a quick warm-up, the teacher introduces Double-Flap Penguin Picture Cards. Students are shown penguins under one flap, determine how many are under the other flap, and write a story problem and generate addition equations. They repeat the process for subtraction. Then students make their own picture cards, write their own fact family of equations, and write a story problem for one of their equations.</td>
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<tr>
<td><strong>Session 3</strong> Penguins Marching Two by Two</td>
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<tr>
<td>This session focuses on Doubles and Doubles Plus or Minus One addition facts as students work together to determine whether different quantities of penguins can march in pairs or not. After a whole-group investigation, students work on a related assignment in their Student Books and go out to Work Places as they finish.</td>
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<td><strong>Session 4</strong> Addition Facts Flash</td>
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<tr>
<td>After a short warm-up, the teacher reviews the addition fact strategies, building an example of each on the number rack and asking students to volunteer other examples. The teacher flashes a combination on the rack, has students record an equation to match on their whiteboards, and works with them to classify the fact as a Double, Double Plus or Minus One, Add Ten, Add Nine, or Make Ten.</td>
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<tr>
<td><strong>Work Place 6B</strong> What’s Missing?</td>
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<td>Players take turn rolling two dice dotted 1–6, then two dice numbered 1–5, recording the totals for each roll. They use their number racks to compare the numbers, and then they record the difference and choose a plus or minus sign to show how to get from the first dice total to the second. After three rounds, they add up their differences from each round.</td>
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<tr>
<td><strong>Session 5</strong> Pick Two to Make Twenty</td>
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<td>The teacher plays a new game against the class. Each team is given three numbers and asked to pick two that, when added, are as close to 20 as possible without going over. Teams record the difference between 20 and the sum of the two numbers. After five rounds, the team with the lowest combined differences is the winner. The session concludes with a brief assessment.</td>
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</table>

P&I – Problems & Investigations, WP – Work Place, A – Assessment, HC – Home Connection
# Materials Preparation

Each session includes a complete list of the materials you’ll need to conduct the session, as well as notes about any preparation you’ll need to do in advance. If you would like to prepare materials ahead of time for the entire module, you can use this to-do list.

<table>
<thead>
<tr>
<th>Task</th>
<th>Done</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Copies</strong></td>
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</tr>
<tr>
<td>Run copies of Teacher Masters T1–T13 according to the instructions at the top of each master.</td>
<td></td>
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<tr>
<td>Run a single display copy of Student Book page 41.</td>
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<tr>
<td>If students do not have their own Student Books, run a class set of Student Book page 41.</td>
<td></td>
</tr>
<tr>
<td>If students do not have their own Home Connections books, run a class set of the assignments for this module using pages 91–94 in the Home Connections Book.</td>
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<tr>
<td><strong>Work Place Preparation</strong></td>
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</tr>
<tr>
<td>Prepare the materials for Work Place 6B using the lists of materials on the Work Place Guides (Teacher Master T8).</td>
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**Additional Resources**

Please see this module’s Resources section of the Bridges Educator site for a collection of resources you can use with students to supplement your instruction.
Session 1

Double-Flap Dot Cards
Ten to Twenty

Summary

After a short warm-up, the teacher shows students a Double-Flap Dot Card and its total number of dots. Then she opens the flaps one at a time and works with the class to generate addition equations. Next, they start with both flaps open and repeat the process for subtraction. After the teacher guides students through two more cards in this way, students make their own dot cards and write their own fact family of equations.

Skills & Concepts

- Apply the commutative property of addition to add (1.OA.3)
- Solve subtraction problems by finding an unknown addend (1.OA.4)
- Use the relationship between addition and subtraction to add and subtract within 20 (1.OA.6)
- Use strategies to add and subtract within 20 (1.OA.6)
- Solve for the unknown in an addition or subtraction equation involving 3 whole numbers (1.OA.8)
- Reason abstractly and quantitatively (1.MP.2)
- Look for and make use of structure (1.MP.7)
- Look for and express regularity in repeated reasoning (1.MP.8)

Materials

<table>
<thead>
<tr>
<th>Problems &amp; Investigations</th>
<th>Kit Materials</th>
<th>Classroom Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Double Flap Dot Cards Ten to Twenty (see Preparation)</td>
<td>- Double Ten-Frame Five-Wise Display Cards in random order</td>
<td>- student whiteboards, markers, and erasers (class set) - copy paper (1 full sheet per student plus a few extras) - half-sheets of copy paper (1 per student plus a few extras) - crayons, markers, or colored pencils (class set) - scissors (class set) - Unifix cubes, a few containers set out around the room</td>
</tr>
</tbody>
</table>

Work Places in Use

5B Pattern Block Puzzles (introduced in Unit 5, Module 1, Session 4)
5C Cube Predictions (introduced in Unit 5, Module 2, Session 4)
5D Pyramid Predictions (introduced in Unit 5, Module 2, Session 5)
5E Triangular Prism Predictions (introduced in Unit 5, Module 4, Session 1)
5F Shape Sorting & Graphing (introduced in Unit 5, Module 4, Session 2)
6A Spin to Win Bingo (introduced in Unit 6, Module 1, Session 4)

Vocabulary

An asterisk [*] identifies those terms for which Word Resource Cards are available.

add*, addition, equal*, equation*, fact family*, minus, plus, subtract*, subtraction, sum or total*

Preparation

Follow the instructions at the top of the Double-Flap Dot Cards Teacher Masters to make three cards. Use card stock or heavy paper so that the dots cannot be seen through the flaps. Be sure to label the back of each card with the correct numeral: 13, 19, or 16.
Problems & Investigations

Double-Flap Dot Cards Ten to Twenty

1 Ask students to join you in the discussion area. Let them know that you’re going to start with a short warm-up activity. Then you’re going to show them some new double-flap dot cards, and they’ll each get to make one of their own to practice adding and subtracting with numbers to 20.

2 Begin the warm-up activity by holding up one of the Double Ten-Frame Five-Wise Cards and asking students to report the number of dots they see.
   • Hold up the first card in the stack. Give students a few moments to examine it quietly and show thumbs up when they know how many dots there are on the card.
   • When most students are showing thumbs up, have the class report the total aloud. Then invite several volunteers to share their counting strategies with the class. How did they determine the number of dots so quickly?

3 Flash each of the other cards in the set, and have students report the number of dots they see.
   • Hold each of the cards up for 2 or 3 seconds before hiding it, giving students the opportunity to register the number of dots without counting them one by one.
   • As soon as you hide the card, have all the students report the number of dots aloud.

4 Now use several of the Double Ten-Frame Cards to play the familiar game of I Have, You Need with the class.
   • Hold up one or two cards in the set, and note with students that there are 20 boxes in all. Some of the boxes have dots in them, others do not, but there are 20 boxes in all.
   • Then tell students that you are going to play the game of I Have, You Need with them. You will flash one of the cards to show the students what you have. They will respond by telling you how many more dots you would need to make a total of 20.
   • Hold up one of the cards to practice the game.

   Teacher Let’s do one practice round together, and then we’ll play the game for real. I have (holds up one of the cards).

   Students I knew it was 10 on top. Then I saw 5 and 2 more on the bottom. That’s 7, so it’s 17 on the whole card. I saw 5 and 5 and 5. That’s 15, and then 2 more is 17. I saw 10 on one side, and 7 on the other, so I knew it was 17.
Teacher (Still holding the card up) How many more dots would I need to have a total of 20? Whisper the answer to your neighbor. OK, everyone tell me. Say “You need,” and tell me how many.

Students You need 7!

Teacher Terrific! Now we’ll play for real. I’ll flash the next card and then hide it. You’ll need to pay really close attention to see how many I have. As soon as I hide the card, you all tell me how many I need to make 20. Ready?

- Flash three or four of the cards in the set. Each time you flash a card, say “I have” and then hide the card. Have students respond “You need,” and report how many more dots you would need to have a total of 20.

5 Move into the main activity by holding up the back of the first Double-Flap Dot Card (6 dots and 7 dots) so students can see the numeral you have written: 13.

6 Turn the card over, but do not lift the flaps yet, and explain that the black dots under one flap and the white dots under the other flap add up to 13.

7 Ask students to pair-share some ideas about the number of dots there might be under each flap. Then invite volunteers to share with the class.

8 Lift the first flap so they can see the 6 dots. Have them pair-share ideas about how many dots are under the other flap, and invite a few students to share their thinking.
Student  I think it’s going to be 7 under there.

Teacher  Why?

Student  ’Cause 6 and 6 is 12 and 1 more is 13.

Teacher  So you used the Doubles Plus One strategy. Any other ideas?

Students  It is 7! I counted up from 6—7, 8, 9, 10, 11, 12, 13—and kept track on my fingers.
I thought that it’s 4 more to get to 10 and 3 more to get to 13, so that’s 7 more.

9  Now lift the second flap so students can see both sets of dots. Work with their input to record an addition equation that reflects the quantities on both sides of the card and the total.

\[
6 + 7 = 13
\]

10  Close both flaps and show them the numeral 13 on the back of the card again. Now flip the card over so the flaps open downward instead of upward, and open the flap to show the 7 white dots. Ask:

- How many dots are there under the other flap?
- How do you know?

Student  It has to be 6 under there!

Teacher  Do you all agree? Thumbs up if you do. How do you know?

Students  It was 6 before on that other side.
You just turned it the other way.
You can go both ways, like 6 + 7 or 7 + 6. They both make 13.
11 After some discussion, pull the second flap down to reveal the 6 black dots. Then work with input from the class to record another addition equation.

\[
\begin{align*}
6 + 7 &= 13 \\
7 + 6 &= 13
\end{align*}
\]

- How is this equation like the first one we wrote?
- How is it different?

12 Now rotate the card so the flaps are both open upward again, and work with students to generate a subtraction equation.

- How many dots are there in all? (13)
- How many dots will you see if I close the first flap and leave the second flap open. How do you know?
- Close the first flap to hide 6 of the dots, and work with input from the class to record a subtraction equation to match.

\[
\begin{align*}
6 + 7 &= 13 \\
7 + 6 &= 13 \\
13 - 6 &= 7
\end{align*}
\]
13 Open both flaps again and repeat Step 12, closing the second flap.

14 Read all four equations with the students, and remind them that these are called a fact family.

15 Hand out whiteboards, markers, and erasers.

16 Repeat the procedure with the second dot card (9 dots and 10 dots), simplifying the process, and have students record the addition and subtraction equations along with you.

- Show the back of the new card, and tell students they are looking for a way to make 19.
- Have them volunteer their ideas for the combinations of dots.
- Open the first flap, determine how many dots are under the other flap, open it, and work with input from the class to write an addition equation for that fact on the board as students do so on their whiteboards.
- Repeat with the card turned upside-down.
- With the card open, close one flap, determine how many dots are covered and how many are still showing, and work with input from the class to write a subtraction equation for that fact on the board as students do so on their whiteboards.
- Repeat while closing the other flap.
- Read the four equations aloud with the students.

17 When you get to the third card (7 black dots and 9 white dots), simply show students the open card and generate the four equations that go with it.

18 Tell students they are each going to make their own double-flap dot card, and write the fact family that goes with it. Then model the process for the class.

- Fold a full sheet of copy paper in fourths. Open the piece of paper out flat, and cut the top half as shown to create two flaps.
• Choose a number from 11 to 20 for your total. Write it on the back of the folded card.

• Quickly model how to use Unifix cubes in two different colors to plan the two sets of dots before you draw and color them.

• Draw and color two sets of dots that combine to make your chosen total. Use one color for the first set and a second color for the second set.

• Write the fact family for your double-flap dot card on a half-sheet of copy paper.

19 When students understand what to do, give them each a piece of paper and send them back to their seats to work on their cards. Remind them that they can use Unifix cubes to help plan how many dots they will put on each side of their card.

Ask students to each choose a total from 11 to 20 with which to work today.

**SUPPORT** If work with quantities above 10 isn’t appropriate for any students, allow them to choose and make a card for a quantity from 5 to 10 instead.

20 Circulate and assist as needed. As they finish their dots cards, give them each a half-sheet of paper to record their fact family.

**SUPPORT** Some students might write equations that do not relate to the numbers on their card. Remind them that this is a “family” and each member (number) of the family needs to be in each equation. Also remind them that there are two equations each for addition and subtraction.

21 As students complete their work, post the cards and fact family sheets grouped by totals (11s, 12s, 13s, and so on) on the wall for students to read and enjoy.
Work Places

22 As students finish, invite them to spend the rest of the session at Work Places.
   - Have early finishers get out their Work Place folders, set out a few of the Work Place bins in areas where they won’t disturb students who are still working on their double-flap cards, and start work.

23 Close the session.
   - Give students a moment to mark their Work Place Logs to indicate which games or activities they completed today.
   - Have students put away the Work Place materials and hand in their Work Place folders.
Session 2

Double-Flap Penguin Picture Cards

Summary
Following a quick game of I Have, You Need, the teacher introduces Double-Flap Penguin Picture Cards. Students are shown penguins under one flap, determine how many are under the other flap, and write a story problem and generate equations. They repeat the process for subtraction. Then students make their own picture cards, write their own fact family of equations, and write a story problem for one of their equations. Finally, the teacher introduces and assigns the Double-Dot Cards for Eleven & Twelve Home Connection.

Skills & Concepts
- Solve addition story problems with sums and minuends to 20 (1.OA.1)
- Apply the commutative property of addition to add (1.OA.3)
- Solve subtraction problems by finding an unknown addend (1.OA.4)
- Use the relationship between addition and subtraction to add and subtract within 20 (1.OA.6)
- Use strategies to add and subtract within 20 (1.OA.6)
- Solve for the unknown in an addition or subtraction equation involving 3 whole numbers (1.OA.8)
- Reason abstractly and quantitatively (1.MP.2)
- Look for and make use of structure (1.MP.7)
- Look for and express regularity in repeated reasoning (1.MP.8)

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<tr>
<td>Problems &amp; Investigations</td>
<td>Double-Flap Penguin Picture Cards</td>
<td></td>
</tr>
<tr>
<td>TM T4–T6 Double-Flap Penguin Picture Cards (see Preparation)</td>
<td>• Double Ten-Frame Five-Wise Display Cards in random order</td>
<td>• student whiteboards, markers, and erasers (class set)</td>
</tr>
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<td></td>
<td>• drawing or copy paper (1 sheet per student plus a few extras)</td>
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<td></td>
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<td>• lined writing paper (1 per student plus a few extras)</td>
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<td>• crayons, markers, or colored pencils (class set)</td>
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<td>• scissors (class set)</td>
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<td>• Unifix cubes (see Preparation)</td>
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<td>• small stickers or rubber stamps and ink pads (optional, see Preparation)</td>
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Work Places in Use

| SB Pattern Block Puzzles (introduced in Unit 5, Module 1, Session 4) |
| SC Cube Predictions (introduced in Unit 5, Module 2, Session 4) |
| SD Pyramid Predictions (introduced in Unit 5, Module 2, Session 5) |
| SE Triangular Prism Predictions (introduced in Unit 5, Module 4, Session 1) |
| SF Shape Sorting & Graphing (introduced in Unit 5, Module 4, Session 2) |
| 6A Spin to Win Bingo (introduced in Unit 6, Module 1, Session 4) |

Home Connection

| HC 91–92 Double-Dot Cards for Eleven & Twelve |

Vocabulary

An asterisk [*] identifies those terms for which Word Resource Cards are available.

add*
addition
equal*
equation*
fact family*
minus

HC – Home Connection, SB – Student Book, TM – Teacher Master

Copy instructions are located at the top of each teacher master.
Preparation

- Follow the instructions at the top of the Double-Flap Penguin Picture Cards Teacher Master to make three cards. Use card stock or heavy paper so that the penguins cannot be seen through the flaps. Be sure to label the back of each card: 14 on the first card, 13 on the second, and 13 on the third.
- Divide your Unifix cubes into baskets, one for each table or cluster of desks. You will also need 20 Unifix cubes, 10 in one color and 10 in another to use when you demonstrate how to make a double-flap picture card.
- If you have a large supply of small stickers (particularly penguins or other sea creatures), or access to a set of small rubber stamps and ink pads, these would be great alternatives to students drawing the pictures on their cards.

Problems & Investigations

Double-Flap Penguin Picture Cards

1. Ask students to join you in the discussion area. Open the session by explaining that you have a different kind of double-flap card to share with them today, and then they will get to make their own, but first, you’re going to play a quick game of I Have, You Need together.

2. Show students the stack of Double Ten-Frame Five-Wise Cards, and review how to play this version of the familiar game.
   - You will flash one of the cards to show the students what you have. They will respond by telling you how many more dots you would need to make a total of 20.
   - Hold up one of the cards to practice the game.

   Teacher Let’s do one practice round together, and then we’ll play the game for real. I have (holds up one of the cards).

   Teacher (Still holding the card up) How many more dots would I need to have a total of 20? Whisper the answer to your neighbor. All right, everyone tell me. Say, “You need,” and tell me how many.

   Students You need 4!

   Teacher Terrific! Now we’ll play for real. I’ll flash the next card and then hide it. You’ll need to pay really close attention to see how many I have. As soon as I hide the card, you all tell me how many I need to make 20. Ready?

   - Flash three or four of the cards in the set. Each time you flash a card say, “I have,” and then hide the card. Have students respond, “You need,” and report how many more dots you would need to have a total of 20.

About This Session

Students studied rockhopper penguins and king penguins earlier in the year and now find little blue penguins (also known as fairy penguins) on one of the Double-Flap Dot Cards. Here is some information on the little blue penguin:

- They live in burrows, holes, or even under buildings in Australia and New Zealand.
- They have blue-grey feathers and white bellies, with pinkish-orange feet and yellow eyes.
- They spend a lot of their lives in the sea but they parade along the shore at sundown.
- They grow up to weigh 2–3 pounds and stand 16” tall.
- They eat small fish, squid, and crustaceans.
Move into the main activity by holding up the back of the first Double-Flap Penguin Picture Card so students can see you’ve written the numeral 14.

Turn the card over, but don’t lift the flaps yet, and explain that there are some rockhopper penguins under one flap and some more under the other, and the number of penguins in all is 14.

Ask students to pair-share some ideas about the number of rockhoppers under each flap. Then invite volunteers to share with the class, and record their ideas on the whiteboard or chart paper.

As students share, guide them toward thinking in terms of the targeted strategies: Add Nine, Add Ten, Doubles Plus One.

Students: Maybe it’s 7 and 7.
It could be 10 plus 4. Or maybe it’s 13 and 1 more.
But there’s never more than 10 on one side, right?

Teacher: Yes, that’s right. And I’ll give you another clue—it will be either a Doubles Plus or Minus One fact, an Add Ten, or an Add Nine.

Students: Then it can’t be 7 + 7 — that’s a double.
But it could be 10 + 4.
Or 5 + 9, cause 5 + 10 makes 15 and take away 1!

7 + 7 = 14
10 + 4 = 14
13 + 1 = 14
5 + 9 = 14

Then lift the first flap on the card, so they can see the 4 penguins. Have them pair-share ideas about how many penguins are under the other flap, and invite a few students to share their thinking.

Now lift the second flap so students can see both sets of penguins. Work with their input to record two addition sentences that reflect the quantities on both sides of the card and the total.

Explain that you are going to write a story to match one of the equations. Have students read the words as you write them and decide which equation your story matches. Work with their input to circle the matching equation.

4 + 10 = 14
10 + 4 = 14

There were 4 rockhoppers in the water. Ten more jumped in. How many in all?
9 Starting with the card open, close one flap at a time as you work with input from the students to write two subtraction equations.

10 Have students pair-share ideas for a story that matches one of the equations, and then call on a volunteer to share a story with the class. Ask the others to listen carefully so they can figure out which equation their classmate has chosen.

*Student* Fourteen penguins were on the ice ledge, and 4 jumped into the water.

*Teacher* Which subtraction equation matches that story?

*Students* It's 14 take away 4 because 4 of the penguins swam away. I know the answer! It's 10! There's 10 penguins left because the other guys jumped in the water.

11 Record the story problem for all to see, and ask a student to circle the matching equation.

14 – 4 = 10
14 – 10 = 4
14 penguins were on the icy ledge. 4 jumped into the water. How many were left?

12 Hand out whiteboards, markers, and erasers.

13 Repeat the process with the second picture card (6 king penguins and 7 more king penguins), but this time generate all four equations as students record them on their boards.

- Show the numeral 13 on the back of the new card, and explain that there are a total of 13 penguins under the two flaps on this card.
- Ask students to share their ideas about the numbers of penguins there might be under each flap, first in pairs and then as a whole group.
- Open one flap, have students determine how many penguins are under the other flap, open it, and work with input from the group to generate two addition equations. Have students record both equations on their whiteboards.
- Write a story problem on the board to match one of the equations, have students determine which equation it is, and circle the matching equation on their boards.
- With the card open, close one flap, determine how many penguins are covered and how many are still showing, and work with input from the class to generate two subtraction equations. Have students record both on their whiteboards.
• Ask a volunteer to tell a story problem to match one of the subtraction equations. Record the story problem on the board, have students determine which equation it matches, and circle that equation on their whiteboards.

14 When you get to the third card (9 little blue penguins and 4 more little blue penguins), simply show students the open card and work with their input to generate the four equations that go with it. Have them record each of the equations on their whiteboards as you go.

\[
\begin{align*}
9 + 4 &= 13 \\
4 + 9 &= 13 \\
13 - 9 &= 4 \\
13 - 4 &= 9
\end{align*}
\]

15 Then have students each circle one of the four equations on their board and share a story about that equation with the person sitting next to them.

16 Tell students they are each going to make their own double-flap picture card, and model the process of folding and cutting the paper as you did during the previous session.

• Choose a number from 11 to 20 for your total. Write it on the back of the folded card.
• Model how to use Unifix cubes in two different colors to plan the two sets before you make your pictures on the card.
• Quickly draw and color two sets of simple pictures that combine to make your chosen total. You can use small stickers or rubber stamps as an alternative to drawing. *Penguins might be difficult and time-consuming to draw. Discuss other possible sea creatures to draw: sea stars, clams, fish. Students can also draw any simple pictures of their choice.*

17 Work with input from the class to write the fact family for your double-flap picture card on a piece of lined paper.

• Then write a story to match one of the equations.
• Read the story with the class, and ask students to identify the matching equation.

\[
\begin{align*}
8 + 4 &= 12 \\
4 + 8 &= 12 \\
12 - 4 &= 8 \\
12 - 8 &= 4
\end{align*}
\]

Nora saw 12 fish. She tried to catch them, but 4 got away. How many did she catch?

**Math Practices in Action 1.MP.8**

Students look for and express regularity in repeated reasoning as they repeat the process of writing equations and story problems to match the picture cards. This repetition reinforces students’ understanding of the operations of addition and subtraction, as well as the inverse relationship between the two operations.
When they understand what to do, give each student a piece of copy paper and send them back to their tables to work on their cards. Encourage them to use Unifix cubes to help plan how many pictures (or stickers or stamps) they will put on each side of their card.

Circulate and assist as needed. As they finish their picture cards, give them each a sheet of lined paper to record their fact family along with a story problem that matches one of the equations. 

ELL: Encourage students to write their story problems in their primary language if that is easier for them.

When students are finished, have them share their work with at least one other person. Have them challenge their partner to figure out which equation matches their story problem.

Consider posting the collection of picture cards and stories in the hall with a sign that invites passersby to identify the equations that match the story problems on the displayed papers.

**Work Places**

There might not be time for Work Places today. Assure students that they will have a long time for Work Places in the next session.

If there are students who finish early, invite them to spend the rest of the session at Work Places.

Close the session.

- Have any students who used Work Places help clean up the bins and put them away.
- Take a moment to admire the double-flap picture cards students made today.

**Home Connection**

Introduce and assign the Double-Dot Cards for Eleven & Twelve Home Connection, which provide more practice with the following skills:

- Apply the commutative property of addition to add (1.OA.3)
- Use the relationship between addition and subtraction to add and subtract within 20 (1.OA.6)
- Use strategies to add and subtract within 20 (1.OA.6)
- Solve for the unknown in an addition or subtraction equation involving 3 whole numbers (1.OA.8)
Session 3
Penguins Marching Two by Two

Summary
This session focuses on Doubles and Doubles Plus or Minus One addition facts as students work together to determine whether different quantities of penguins can march in pairs or not. After a whole-group investigation, students work on a related assignment in their Student Books and go out to Work Places as they finish.

Skills & Concepts
- Solve addition story problems with sums to 20 involving situations of adding to and putting together (1.OA.1)
- Solve story problems involving addition of 3 whole numbers whose sum is less than or equal to 20 (1.OA.2)
- Use strategies to add with sums to 20 (1.OA.6)
- Count by 2s to 20 (supports 1.NBT)
- Group and count objects by 2s (supports 1.NBT)
- Reason abstractly and quantitatively (1.MP.2)
- Look for and make use of structure (1.MP.7)
- Look for and express regularity in repeated reasoning (1.MP.8)

Materials

<table>
<thead>
<tr>
<th>Copies</th>
<th>Kit Materials</th>
<th>Classroom Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problems &amp; Investigations</td>
<td>Penguins Marching Two by Two</td>
<td></td>
</tr>
<tr>
<td>TM T7 Can They March in Pairs?</td>
<td>demonstration number rack</td>
<td>student number racks, class set</td>
</tr>
<tr>
<td>SB 41* Penguins Marching Two by Two</td>
<td>piece of copy paper to mask portions of the display master</td>
<td>3” x 5” index card</td>
</tr>
</tbody>
</table>

Work Places in Use

- SB Pattern Block Puzzles
- SC Cube Predictions (introduced in Unit 5, Module 2, Session 4)
- SD Pyramid Predictions (introduced in Unit 5, Module 2, Session 5)
- SE Triangular Prism Predictions (introduced in Unit 5, Module 4, Session 1)
- SF Shape Sorting & Graphing (introduced in Unit 5, Module 4, Session 2)
- 6A Spin to Win Bingo (introduced in Unit 6, Module 3, Session 1)

Vocabulary
An asterisk [*] identifies those terms for which Word Resource Cards are available.
- add*
- addition
- chart
- combination
- double
- equal*
- pair
- partner

HC – Home Connection, SB – Student Book, TM – Teacher Master
Copy instructions are located at the top of each teacher master.
Problems & Investigations

Penguins Marching Two by Two

1. Open this session by explaining that the penguins are going to help the class learn more about adding numbers to 20.

2. Quickly review with students the activity in which they counted penguin eggs.
   - On the board, write 3 penguins, each penguin lays 2 eggs.
   - Draw a ten-frame on the board.
   - Ask students for suggestions as to how to fill in the ten-frame given that there are 3 penguins, and that each will lay 2 eggs.

3. Next, draw their attention to the demonstration number rack, and ask them if it is possible to model the same situation—3 penguins, each penguin lays 2 eggs—on the number rack.
   - Have them pair-share ideas for a few moments, and then call on a volunteer to come up to the rack and move the beads to represent the situation.
   - Hold the rack up next to the ten-frame drawing on the board, and ask them to compare the two representations. How are they alike? How are they different?

   - Acknowledge their comments. Then ask a student to choose another number of penguins between 1 and 10.
   - Then ask the class how many eggs there would be if that number of penguins each laid 2 eggs. Have students pair-share to determine the solution. Then call on a couple of volunteers to explain their thinking.
   - Build the situation on the demonstration rack to confirm students’ thinking.
   - Repeat with two other numbers of penguins between 1 and 10 suggested by students.

4. Now let students know that you’re going to do some more work with pairs and doubles today, using the theme of penguins learning to march together.

About This Session

Using different arrangements of a number on a number rack gives students multiple ways to visualize, represent, and operate upon a given number.

The ten-wise representation helps students anchor on 10 to see the number 12 as 10 and 2 more.

The pair-wise arrangement helps young learners work with Doubles relationships. Here, they can see that 12 is 6 plus 6, or 6 doubled. They might even see the number 12 as “2 fives and 2 ones.” Pair-wise arrangements also help students develop intuitions about even and odd numbers. By focusing not only on Doubles, but on Doubles Plus or Minus One, they can come to understand that even numbers are those that can be illustrated in a pair-wise representation in which every column is completely filled. That is, even numbers will never have a column with only 1 bead; odd numbers always have a column with only 1 bead.
Display the text and the picture at the top left of the Can They March in Pairs? Teacher Master, using an index card and a piece of copy paper to keep the rest of the sheet covered for now.

5  Discuss the problem with the class.
   • Give students a few moments to examine the picture quietly.
   • Read the text and explain that milling about means that the penguins are just kind of wandering around. Today, however, they are going to take marching lessons and learn how to march two by two, in pairs.
   • Ask them to consider the problem. Can this group of 6 penguins march in pairs? Are there enough penguins for each one to have a partner?
   • When students have had a little time to discuss this in pairs, pull the index card aside to reveal the solution.

SUPPORT  Before you reveal the solution, have 6 children stand up in front of the group and work with help from their classmates to pair up. Are there enough children for each to have a partner? How many pairs are there? If the pairs line up, one behind another, does this look like a good marching arrangement?

6  Model the solution to the problem on your number rack, and ask students do so on theirs.

   Teacher  Here are our 6 penguins, marching in pairs. How many pairs are there?
   Students  Three!
   Teacher  And how many penguins are there in each line?
   Students  Three!
   It's 3 and 3, that makes 6!
   It's also 2 and then 2 and then 2, like 2, 4, 6.

7  Now reveal the second problem on the teacher master. Can 8 penguins march in pairs? If so, how many pairs will there be?
• Ask students to model and solve the problem on their number racks. If there are 8 penguins, will each penguin have a partner? Can they show the penguin pairs on their number rack?
• Have them share and compare their work with the people nearest them and then hold up their racks for all to see, including you.
• Let them know that you have an idea to share with them. On your demonstration rack, pull pairs of beads (1 in the top row, 1 in the bottom row) over to the left, one pair at a time, as you and the students count by 2s—2, 4, 6, 8.
• Finish your demonstration by stating, “Four plus 4, or double 4, equals 8.”

8 Reveal the third problem on the teacher master. Can 9 penguins march in pairs?
• Repeat the first two actions described in step 7.
• After students have had a chance to work with the problem and share their thinking with classmates, model the situation on your demonstration rack.
  » After pushing 8 beads to the left (4 pairs of 2), pause and ask the students to choral count: How many beads do we have so far? (2, 4, 6, 8)
  » Ask students how many more beads need to be pushed to the left in order to have 9 penguins.
  » Slide the 9th bead to the left, but leave a small gap between the group of 8, and the single remaining bead. It might be helpful to use a pencil to separate the 9th bead.

• Introduce the idea of “Doubles Plus One More.”
• State and repeat with the students: “Four plus 4 and 1 more equal 9, or double 4 plus 1 more equal 9.”

9 Now display your copy of the Penguins Marching Two by Two page as students find the corresponding page in their Student Books.
• Give students a few moments to examine the page quietly.
• Then explain that they are going to help the penguins find out which groups can march in pairs and which can’t.

10 Do the first problem with the class. Can 10 penguins line up in pairs?
• Have students show thumbs up if they think so, thumbs down if not, and thumbs sideways if they’re not sure.
• Take a moment to have students check to see that they have all the beads on their number racks pushed all the way over to the right in the start position.
• Then slide pairs of beads—1 on top, 1 on the bottom—over to the left side of your rack as students do the same on their racks. Count by 2s with the class as you work—2, 4, 6, 8, 10.
• Do all 10 penguins have a partner? Circle the correct answer on your sheet as students do so on theirs.
• Complete the equation in the first row by writing 10 = 5 + 5. Then read this with the students as “Ten is the same as 5 plus 5, or double 5.”

As students gain a deeper understanding of equality in the years to come, they will begin to use more mathematically accurate language to express equality. For example, “10 is equal to 5 plus 5.” For now, however, the goal is for students to understand that the equal sign
describes a relationship between two quantities that have the same value, and we find that using the term “the same as” as a synonym for equals is developmentally appropriate for first graders.

11 Do the second problem with the class. Can 7 penguins line up in pairs?
- Have students show thumbs up if they think so, thumbs down if not, and thumbs sideways if they’re not sure.
- After moving all the beads back to the start position on your rack, slide 3 pairs to the left as students do the same on their number racks. Count by 2s as you work—2, 4, 6.
- Work with students to figure out what to do next. Have you moved 7 beads over yet? Can you keep moving the beads in pairs and get 7? Why or why not?
- Move 1 more bead over in the top row as students do so on their racks.
- Record the results on the Penguin Pairs page as students do so. Read the equation that results with the students as “Seven is the same as 3 + 3 and 1 more, or double 3 plus 1 more.

<table>
<thead>
<tr>
<th>Number of penguins</th>
<th>Do all the penguins have a partner?</th>
<th>Write an equation using doubles.</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Yes</td>
<td>10 = 3 + 3 + 1</td>
</tr>
<tr>
<td>7</td>
<td>No</td>
<td>7 = 3 + 3 + 1</td>
</tr>
</tbody>
</table>

12 When students understand what to do, let them go to work on their own. Circulate to observe and assist as needed.

**SUPPORT** Work more of the problems on the sheet with the class. If some of the students are eager to work on their own, let them do so while you continue to work with the rest of the class.

13 As students finish, have them share and compare their work with at least one classmate.
Encourage them to resolve any differences there may be on their sheets by working the problem again together or consulting with a third classmate.

### Work Places

14 When students finish the assignment, invite them to spend the rest of the session at Work Places.
- Have early finishers get out their Work Place folders, set out a few of the Work Place bins in areas where they won’t disturb any students who are still working on their double-flap cards, and start work.

15 Close the session.
- Give students a moment to mark their Work Place Logs to indicate which games or activities they completed today.
- Have them put away the Work Place materials and hand in their Work Place folders.
Session 4
Addition Facts Flash

Summary
This session opens with a short warm-up in which students build different quantities on their number racks. Then the teacher reviews the addition fact strategies the class has been using recently, building an example of each on the number rack and asking students to volunteer other examples. The teacher flashes a combination on the rack, has students record an equation to match on their whiteboards, and works with them to classify the fact as a Double, Double Plus or Minus One, Add Nine, or Make Ten. Finally, the teacher introduces a new Work Place game, What’s Missing? and then sends students out to Work Places.

Skills & Concepts
• Use strategies to add with sums to 20 (1.OA.6)
• Group and count objects by tens, fives, and twos (supports 1.NBT)
• Demonstrate an understanding that numbers from 11 to 19 are composed of a 10 and some more ones (1.NBT.2b)
• Reason abstractly and quantitatively (1.MP.2)
• Model with mathematics (1.MP.4)
• Look for and make use of structure (1.MP.7)

Materials

<table>
<thead>
<tr>
<th>Copies</th>
<th>Kit Materials</th>
<th>Classroom Materials</th>
</tr>
</thead>
</table>
| **Problems & Investigations** Addition Facts Flash | • demonstration number rack | • a bandana or cloth to cover the number rack

| **Work Places** Introducing Work Place 6B, What’s Missing? |
| **TM T8** Work Place Guide 6B What’s Missing? | • 2 dice dotted 1–6 | • student number racks (class set)
| **TM T9** Work Place Instructions 6B What’s Missing? | • 2 dice numbered 0–5 | demonstration number rack
| **TM T10** 6B What’s Missing? Record Sheet 1 & 2 | |

| **Work Places in Use** |
| 5C Cube Predictions (introduced in Unit 5, Module 2, Session 4) |
| 5D Pyramid Predictions (introduced in Unit 5, Module 2, Session 5) |
| 5E Triangular Prism Predictions (introduced in Unit 5, Module 4, Session 1) |
| 5F Shape Sorting & Graphing (introduced in Unit 5, Module 4, Session 2) |
| 6A Spin to Win Bingo (introduced in Unit 6, Module 1, Session 4) |
| 6B What’s Missing (introduced in this session) |

Vocabulary
An asterisk [*] identifies those terms for which Word Resource Cards are available.
add*
addition
Add Nine fact
Add Ten fact
Doubles fact
Doubles Plus or Minus One fact
equation*
Make Ten fact
**Preparation**

- Label a piece of chart paper with the titles of the different addition fact strategies, and post it where all the students will be able to see it during the lesson.

<table>
<thead>
<tr>
<th>Different Kinds of Addition Facts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doubles</td>
</tr>
<tr>
<td>Doubles Plus or Minus One</td>
</tr>
<tr>
<td>Add Tens</td>
</tr>
<tr>
<td>Add Nines</td>
</tr>
<tr>
<td>Make Tens</td>
</tr>
</tbody>
</table>

- In today’s session, you’ll introduce Work Place 6B What’s Missing? Before this session, you should review the Work Place Guide and Work Place Instructions and use the materials listed in the Guide to assemble the bin for Work Place 6B, which replaces Work Place Work Place 5B Pattern Block Puzzles. The Work Place Guide also includes detailed suggestions for differentiating the game to meet students’ needs.

About This Session

In this session, the addition strategies that students have been working on much of the year during Bridges and Number Corner are made explicit. These strategies are listed with examples below.

- Doubles
  - 7 + 7 = 14
  - 5 + 5 = 10

- Doubles Plus or Minus One
  - 7 + 8 = 15
  - 5 + 6 = 11

- Make Ten
  - (Combinations of 10)
  - 7 + 3 = 10
  - 6 + 4 = 10

- Add Tens (+10)
  - 10 + 5 = 15
  - 8 + 10 = 18

- Add Nines (+9)
  - 9 + 5 = 14
  - 7 + 9 = 16

**Problems & Investigations**

**Addition Facts Flash**

1. Open the session by letting students know that you’re going to do some work with addition facts together. Then you’ll introduce a new Work Place game and send them out to visit Work Places.

2. Start with a warm-up in which you build quantities on the number rack, using the fewest pushes possible, and ask the students to tell how many.
   - Draw their attention to your demonstration number rack. Review the start position for working with the rack—all 20 beads pushed over to the far right.
   - As students watch, slide 5 beads in the top row over to the left side of the rack, and ask them to show with their fingers how many beads there are on the left.
   - Push all the beads back to the start position and move 6 of them to the left (5 red beads, 1 white bead). Have students show with their fingers how many beads are on the left now, and ask them to explain how they knew there were six beads. Listen for evidence that students are subitizing, or recognizing smaller groups and quickly combining them. For example, “Well, I know there are 5 red beads. I saw all the reds, plus one more white bead. So I knew there were 6 beads.” This is a very different explanation than the student who reports, “I counted all the beads. There are 6 beads.”

3. Now have students get out their number racks and build the quantities you give them, using the fewest possible pushes possible. Start with 10.
   
   **Teacher** Now it’s your turn. With your own number rack, make sure all the beads are over to the right side. Now… show me 10 beads. Move 10 beads to the left. When you are done, hold up your number racks to show everyone.

   Some students might show all 10 beads on the top row. Others might show 5 red beads on both the top and bottom row.

4. Repeat the activity with the following numbers: 9, 4, 5, 7, 8, 11, and 15.
   - Remind students to return the beads to the start position between each quantity.
   - Encourage them to move the beads in as few pushes as possible.
Requiring students to use as few pushes as possible will encourage them to subitize and to avoid counting the beads one by one.

5 Now move into a copy-cat activity, in which you show a combination on the demonstration rack and students replicate your work on their number racks. During this activity, you will model each of the different types of addition facts and classify them with the students.

- As the students watch, build 6 + 6 on your number rack, 6 in the top row, 6 in the bottom row.
- Have them copy what you have done on their own racks.
- Ask them to whisper the total to their neighbors and chorus the parts and the whole aloud: 6 and 6 makes 12.
- Draw students’ attention to the chart paper you posted with the names of the different types of addition facts, and ask them to classify 6 + 6. Is it an Add Ten or an Add Nine fact? Is it a combination that makes 10? No, it’s a double.
- Record 6 + 6 = 12 in the Doubles column on the chart.

### Different Kinds of Addition Facts

<table>
<thead>
<tr>
<th>Doubles</th>
<th>Doubles Plus or Minus One</th>
<th>Add Ten</th>
<th>Add Nine</th>
<th>Make Ten</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 + 6 = 12</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Then ask students to each build an example of a different Doubles fact on their number rack, share it with their neighbors, and hold it up for everyone to see. Reinforce their work by reflecting back to them the accurate responses you see (and ignoring the incorrect responses for now).

**Teacher** Wow! I’m looking around the room, and I see all kinds of Doubles on people’s racks. I see 2 and 2, 7 and 7, 4 and 4, 5 and 5, and even 10 and 10. Nice work!

6 Next, model and discuss a Doubles Plus or Minus One fact.

- Slide all the beads on your demonstration rack back to the start position. Then build 5 + 6 on the rack; 5 in the top row, and 6 in the bottom.
- Have students copy your work on their racks, whisper the total to their neighbors, and chorus the parts and the whole: 5 and 6 makes 11.
- Work with input from the students to classify this fact as a Double Plus or Minus One. To do this, explain that for some students 5 + 6 is a challenging combination until they see that it’s just 5 and 5 plus 1 more, or 6 and 6 minus 1. Emphasize the addition or subtraction of 1 from a related double by using a pencil to separate the extra bead.
- Record 5 + 6 = 11 in the Doubles Plus or Minus One column on the chart.
Then ask students to each build an example of a different Doubles Plus or Minus One fact on their number rack. You might remind them that these facts are the type that show up when an odd number of penguins try to pair up for marching practice. Everyone has a partner except the last penguin. Invite students to use their pencils the same way you used yours to show the bead that does not have a partner.

Have students share their combinations with their neighbors, and hold them up for everyone to see. Reinforce their work by reflecting back to them the accurate responses you see (and ignoring the incorrect responses for now).

Teacher  OK! I’m seeing lots of Doubles Plus or Minus One facts all around the room. I see 2 plus 3, 5 plus 4, 6 plus 7, and oh, there’s 9 + 10.

7 Repeat steps 5 and 6 to model, classify, and have students build and discuss examples of Add Ten, Add Nine, and Make Ten facts.

Now explain that you’re going to flash a combination on the number rack, building it under cover where the students can’t see it, lifting the cover for a few seconds, and then hiding it again. Each time, they will record an addition equation to show what they saw.

8 Have helpers pass out whiteboards, pens, and erasers to all the students.
9 Give the students a little practice by allowing them plenty of time to see a couple of the combinations you build, rather than flashing them.

- With a bandana or other cover over the demonstration rack, slide 5 in the top row and 5 in the bottom row over to the left.
- Remove the cover and set it aside. Ask the students to show the combination they see with their fingers.
- When there is general agreement that the combination is 5 and 5, have them record the equation (5 + 5 = 10) on their whiteboards.
- Ask students to classify the combination. Then record it in the appropriate column on your chart.
- Repeat the sequence of actions with 10 + 3 and then 9 + 5.

*After students have recorded each equation and classified it, model the strategy on the number rack to confirm their thinking.*

**Teacher** You’re telling me that 9 + 5 is an example of an Add Nine fact. How can we use the number rack to help get the answer?

**Student** Take 1 off the 5 and give it to the 9. Now it’s 10 plus 4, and that’s easy—it’s 14.

10 Now speed up the process, flashing each combination for two to four seconds and then hiding it again.

- With a bandana or other cover over the demonstration rack, slide 4 in the top row and 5 in the bottom row over to the left.
- Lift the cover for two–four seconds and then place it over the beads again.
- Have students write an equation (two addends and the total) to represent what they just saw, and hold up their whiteboards for all to see.
- Confirm their responses by lifting the cover again, reading the bead combination with the students (4 plus 5), and modeling the strategy on the rack to get the total.

**Teacher** To get the answer to this one, we need to be able to see the double hiding inside. I’m going to use my pencil to show it. So, now … help me out. We have 4 and 4 makes 8, and 1 more is 9.

- Ask students to classify the combination. Then record it in the appropriate column on your chart.
- Repeat the sequence of actions with the following combinations:

  10 + 5 7 + 7 7 + 6 9 + 3 7 + 3 6 + 10
Work Places

Introducing Work Place 6B What’s Missing?

11 Have students put their whiteboards, pens, and erasers away and meet you in the discussion area with their number racks.

12 Let them know that you are going to teach them how to play a new Work Place game, What’s Missing?

13 Display a copy of the What’s Missing? Record Sheet and ask for observations. If it’s convenient to use your projector with the students seated in the discussion area, do so. If not, post the record sheet on an easel or other handy location in your discussion area.

14 Summarize the game, pointing to the relevant parts of the record sheet and showing the two pairs of dice.

Partners take turns rolling 2 dice dotted 1–6, recording the total in the box marked “1st Roll” on the record sheet, and then rolling 2 dice numbered 1–5 and recording this total in the box marked “2nd Roll.” Players use their number racks to compare the numbers, then write the difference in the box with the question mark. They circle either the plus or minus sign to show how to get from the first dice total to the second dice total. After three rounds (A, B, and C), they add up their differences from each round. The player with the higher score is the winner.

15 Displaying two record sheets, write “Teacher” at the top of one and “Class” at the top of the other.

16 Play the game, following the instructions on the Work Place Guide 6B What’s Missing? Teacher Master. Take turns with the class, inviting a student up to play for the class on each turn.

Demonstrate finding the difference between the two rolled numbers on your number rack, and have students do the same on their racks.

17 Show them the contents of the Work Place bin, and point out the picture of the new Work Place on the Work Place Log.

18 Invite students to spend the rest of the session at Work Places.

• Hand out their Work Place folders and have them consider where they will begin today.
• Circulate as students work to observe and assist as needed. You might need to sit with students playing What’s Missing? today and for several days to come, helping with each of the steps in the game until several students develop enough confidence to teach their classmates.

19 Close the session.

• Give students a moment to mark their Work Place Logs to indicate which games or activities they completed today.
• Have them put away the Work Place materials and hand in their Work Place folders.
Session 5
Pick Two to Make Twenty

Summary
This session introduces a game the teacher plays against the class. Each team is given three numbers and asked to pick two that, when added, are as close to 20 as possible without going over. Teams record the difference between 20 and the sum of the two numbers. After five rounds, the team with the lowest combined differences is the winner. The session concludes with a brief assessment, and the teacher assigns the Combinations & Story Problems Home Connection.

Skills & Concepts
• Solve addition story problems with sums to 20 involving situations of adding to and putting together, with unknowns in all positions (1.OA.1)
• Add and subtract with sums and minuends to 20 (1.OA.6)
• Use strategies to add with sums to 20 (1.OA.6)
• Make sense of problems and persevere in solving them (1.MP.1)
• Reason abstractly and quantitatively (1.MP.2)
• Construct viable arguments and critique the reasoning of others (1.MP.3)

Materials

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<th>Classroom Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problems &amp; Investigations</td>
<td>Pick Two to Make Twenty</td>
<td></td>
</tr>
<tr>
<td>TM T11</td>
<td>Pick Two to Make Twenty (see Preparation)</td>
<td>• demonstration number rack</td>
</tr>
<tr>
<td>Assessment</td>
<td>Combinations &amp; Stories Checkpoint</td>
<td>• student number racks (class set)</td>
</tr>
<tr>
<td>TM T12–T13</td>
<td>Combinations &amp; Stories Checkpoint</td>
<td>• privacy screens (class set)</td>
</tr>
</tbody>
</table>

Work Places in Use

| SC | Cube Predictions (introduced in Unit 5, Module 2, Session 4) |
| SD | Pyramid Predictions (introduced in Unit 5, Module 2, Session 5) |
| SE | Triangular Prism Predictions (introduced in Unit 5, Module 4, Session 1) |
| SF | Shape Sorting & Graphing (introduced in Unit 5, Module 4, Session 2) |
| 6A | Spin to Win Bingo (introduced in Unit 6, Module 1, Session 4) |
| 6B | What’s Missing (introduced in Unit 6, Module 2, Session 4) |

Home Connection

HC 93–94 Combinations & Story Problems

Preparation
Run a copy of the Pick Two to Make Twenty Teacher Master. Then cover each set of 3 numbers with a 1 1/2” x 2” sticky note. These sticky notes will be removed during the course of the lesson.

Vocabulary
An asterisk [*] identifies those terms for which Word Resource Cards are available.
add* addition closest to combination combine difference* join subtract* subtraction sum or total*
Problems & Investigations

Pick Two to Make Twenty

1. Open today’s session by explaining that you are going to play a new game with the class called Pick Two to Make Twenty.
   - Explain that the game will help them learn more about adding numbers to 20.
   - Ask the students to get out their number racks. They will work as a team against you today.
   - Have helpers give each student a whiteboard, pen, and eraser.

2. Display the Pick Two for Twenty Teacher Master. Read the text at the top of the sheet with the class, and note with students that it is covered with sticky notes.
   - Explain that there are three numbers under each sticky note. When it is their turn, the students will get to remove one of the sticky notes from the sheet, look at the three numbers, and choose the two that will add to make a total that is closest to 20 without going over.

3. To provide an example, write the following numbers on the board: 9, 7, 10.
   - Ask students to share ideas, first in pairs, and then as a whole class, about which two of these three numbers will add to make a total closest to 20 without going over.
   - Encourage students to use their number racks or whiteboards to experiment with the three numbers.
   - When they have had a minute or two to work with the problem, invite several volunteers to tell which of the two numbers they think come closest and explain their thinking.
     Students: I think it’s 7 and 10. That makes 17, but if you try 9 and 7, it’s only 16.
     I think it’s 9 and 10. If you add those you get 19, and that’s closer.
     Oh, you’re right! I didn’t try adding 9 and 10.

4. Work with input from the class to systematically list and solve each of the three possible combinations, and then choose the one that sums closest to 20 without going over.
   - Write each of the possible combinations on the board:
     » 9 + 7
     » 7 + 10
     » 9 + 10
   - Model and solve each on the demonstration number rack, and encourage students to work along with you on their number racks.
   - Write the answer to each, and then ask the students to select the combination that sums closest to 20.

5. Then explain that the score a team gets is the difference between the closest sum and 20. Ask students to whisper to their neighbor the difference between 19 and 20, and then have the whole class report the difference aloud.

SUPPORT: For students who still aren’t quite sure what is meant by finding and showing the difference, you might pose the question a little differently: we got a score of 19—how many more would we need to get up to 20?
6  Draw students’ attention back to the Pick Two to Make Twenty Teacher Master. Tell them you’re going to start the game, and you’ll take the first turn so they can see how to play.

- Select one sticky note, and remove it.
- Give students a few moments to examine the three numbers and choose the two they think would total closest to 20.
- Choose the pair you think is best. Tell the students which two numbers you have selected, and why. Then add the two on your number rack. If the two don’t total exactly 20, experiment with the other two combinations to see which pair make a sum closest to 20 without going over.
- Circle the two numbers you finally select. Find the difference between 20 and your total.
- Record the difference in the box in the lower right corner of the sheet.

7  Choose a student to remove one of the sticky notes, and work with the class to choose a number combination.

- Once the student helper removes the sticky note, have students to look carefully at the three numbers now revealed, use their number racks or whiteboards to experiment, and pair-share which two they think will work best.
- Write the three possible combinations on the board (without the answers). Ask the students to vote by show of hands for the combination they believe is closest to 20.
- Invite two or three volunteers to make a case for the combination they think works best by explaining their thinking to the class. Encourage them to demonstrate on the large number rack if it would be helpful.
- If the issue is not settled at this point, work with students to solve each combination, write the answers on the board, and have the class choose the combination that does, in fact, come closest to 20 without going over.
- Circle the two numbers they selected, and have them find the different between the sum of the two and 20.
- Record the difference on the students’ line in the score box at the bottom of the sheet.

8  Continue taking turns with the class until all ten sticky notes have been removed and each team has had five turns.

9  To determine the winner, work with the students to add the 5 numbers scored by each team. The team with the lower total wins the game.

**SUPPORT** For some students, it may be necessary to alter the game so that the target is 10 rather than 20. Of course, this will require preparing new number combinations appropriate for a target of 10.

**Note** If you’re running short of time, you can bring the game to a close after each team has taken 3 or 4 turns instead of 5. Students may be satisfied to leave it at that, but if they’re not, promise to return to the game and finish it at some point in the near future.
Assessment

Combinations & Stories Checkpoint

10 Let students know that you’re going to conduct a written checkpoint to see how they’re doing with adding, subtracting, and story problems right now. Tell them that they can keep their number racks out and use them to help solve some of the problems if they’d like.

11 Have students get out their pencils as you hand out privacy screens and get everyone settled.

Remind the class that when you conduct an assessment like this, you need to see what students can each do on their own. Change the seating arrangements to spread students apart if necessary, and give them each a privacy screen. Show them how to use the screen to shield their work, and explain that even though you usually ask them to work together, this time, they need to do their own work.

12 Give each student a copy of the Combinations & Stories Checkpoint Teacher Master, and place a copy on display.
   • Read and explain the instructions for each problem.
   • When students understand what to do, let them go to work.
   • Circulate as they work to assist as needed. Let students know that it’s fine to raise their hand and ask you to read one or more of the problems to them again.

SUPPORT Depending on the needs and strengths of your students, you may choose to keep the class together, and work through the checkpoint item by item as you have done on many of the other assessments this year. Or, you may choose to let some students work on their own after reviewing the items with the class, while you keep the rest of the students together.

13 Have students who finish before their classmates read or do some other quiet activity.

SUPPORT If some of the students aren’t able to complete the checkpoint before the end of the session, give them additional time later to finish it.

Note
See the Grade 1 Assessment Guide for scoring and intervention suggestions.

Home Connection

14 Introduce and assign the Combinations & Story Problems Home Connection, which provides more practice with the following skills:
   • Solve subtraction story problems with minuends to 20 involving situations of taking from, taking apart, and comparing, with unknowns in all positions (1.OA.1)
   • Add with sums to 20 (1.OA.6)
   • Add fluently with sums to 10 (1.OA.6)
   • Make sense of problems and persevere in solving them (1.MP.1)
Run 1 copy on card stock or heavy paper. Cut away the edges, leaving the large rectangle. Cut along the dotted line and fold in half at the arrowheads. Write a large numeral 13 on the back of the portion of the sheet that looks like a domino.
Run 1 copy on card stock or heavy paper. Cut away the edges, leaving the large rectangle. Cut along the dotted line and fold in half at the arrowheads. Write a large numeral 19 on the back of the portion of the sheet that looks like a domino.

Double-Flap Dot Cards Ten to Twenty page 2 of 3
Run 1 copy on card stock or heavy paper. Cut away the edges, leaving the large rectangle. Cut along the dotted line and fold in half at the arrowheads. Write a large numeral 16 on the back of the portion of the sheet that looks like a domino.

Double-Flap Dot Cards Ten to Twenty page 3 of 3
Run 1 copy on card stock or heavy paper. Cut away the edges, leaving the large rectangle. Cut along the dotted line and fold in half at the arrowheads. Write a large numeral 14 on the back of the portion of the sheet with the pictures on it.

**Double-Flap Penguin Picture Cards** page 1 of 3

(continued on next page)
Run 1 copy on card stock or heavy paper. Cut away the edges, leaving the large rectangle. Cut along the dotted line and fold in half at the arrowheads. Write a large numeral 13 on the back of the portion of the sheet with the pictures on it.
Session 2  
Run 1 copy on card stock or heavy paper. Cut away the edges, leaving the large rectangle. Cut along the dotted line and fold in half at the arrowheads. Write a large numeral 13 on the back of the portion of the sheet with the pictures on it.

Double-Flap Penguin Picture Cards  page 3 of 3
Can They March in Pairs?

1. Here are 6 penguins milling about. Can they march in pairs?

   Yes!

2. Here are 8 penguins milling about. Can they march in pairs? Use your number rack to find out.

3. Here are 9 penguins milling about. Can they march in pairs? Use your number rack to find out.
Work Place Guide 6B What’s Missing?

Summary
Partners take turns rolling two dice numbered 1–6, recording the total in the box marked “1st Roll” on the record sheet, and then rolling two dice numbered 1–5 and recording this total in the box marked “2nd Roll.” Players use their number racks to compare the numbers, then write the difference in the box with the question mark. They circle either the plus or minus sign to show how to get from the first dice total to the second dice total. After three rounds (A, B, and C), they add up their differences from each round. The player with the higher score is the winner.

Skills & Concepts
- Solve subtraction problems by finding an unknown addend (1.OA)
- Use strategies to add with sums to 20 (1.OA)
- Solve for the unknown in an addition or subtraction equation involving 3 whole numbers (1.OA)

Materials

<table>
<thead>
<tr>
<th>Copies</th>
<th>Kit Materials</th>
<th>Classroom Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>TM T8 Work Place Guide 6B What’s Missing?</td>
<td>• 6 dice dotted 1–6</td>
<td>• Unifix cubes (three sets of 24 cubes, 12 each in two different colors, in three small zip-top bags)</td>
</tr>
<tr>
<td>TM T9 Work Place Instructions 6B What’s Missing?</td>
<td>• 6 dice numbered 0–5</td>
<td></td>
</tr>
<tr>
<td>TM T10 6B What’s Missing Record Sheet</td>
<td>• student number racks, 1 per student (Have students bring these with them when they visit this Work Place.)</td>
<td></td>
</tr>
</tbody>
</table>

Assessment & Differentiation
Here are some quick observational assessments you can make as students begin to play this game on their own. Use the results to differentiate as needed.

<table>
<thead>
<tr>
<th>If you see that...</th>
<th>Differentiate</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>A student or group of students is struggling to add the numbers rolled on the dice, not using any strategies, or confusing the strategies</td>
<td>SUPPORT Play with the student or group and review the various strategies for adding as you play (Count On, Doubles, Doubles Plus One, Add Zero, and Make Ten).</td>
<td>The combination 6 + 2 is rolled. Teacher Which strategy would work here? Students Count 6, 7, 8! Counting on!</td>
</tr>
<tr>
<td>A student or pair of students is struggling with the complexity of the game (many steps, potentially large number to add, and so on)</td>
<td>SUPPORT Have them use just 1 each of the two different dice. Once they have played this simpler form, they might be able to try the original game again.</td>
<td>Roll 1 die dotted 1–6 and 1 die numbered 0–5, record the numbers rolled, find the difference, and determine whether to add or subtract.</td>
</tr>
<tr>
<td>A student or pair of students solves the problems quickly and easily</td>
<td>CHALLENGE Invite students to play Game Variations A or B.</td>
<td></td>
</tr>
</tbody>
</table>

English-Language Learners Use the following adaptations to support the ELL students in your classroom.

- Play through the first round of the game with the student.
- Have ELL students play with a student who is able to “show and tell” what they are doing.
Work Place Instructions 6B What’s Missing?

1. Partners need two dice dotted 1–6, two dice numbered 0–5, and two What’s Missing? Record Sheets. Each player should also bring his or her number rack.
   - Players might also need a bag of 24 Unifix cubes, 12 each in two different colors, but they can leave these in the bin until needed.

2. The first player rolls the two dice dotted 1–6, adds, and records the total in the box above the words “1st Roll” on their record sheet.

3. Then the player rolls the two dice numbered 0–5, adds, and records the total in the box above the words “2nd Roll” on their record sheet.

4. The player uses the number rack to compare the two amounts and records the difference in the box above the question mark.
   - In most cases, students can display the first amount on the top row of their number rack, the second on the bottom row of their number rack, and find the difference between the two quantities by comparing the two sets of beads.
   - When the first total is 11 or 12, have students who need visual support to find the difference between two quantities build the first and second quantities with Unifix cubes instead.

5. The player also records the difference on the Score side of the record sheet in the box above the letter A.

6. Now the player figures out what operation he needs to use to get from the first number rolled to the second—addition or subtraction. Then he circles the plus or minus sign on the record sheet to show.

7. The players take turns until each has had three turns.

8. Each player adds their three differences on the Score side of the record sheet to get a final score.
   - The player with the higher score is the winner.

Game Variations

A. Play as usual, but use two dice numbered 4–9, instead of one pair of dice dotted 1–6 and one pair of dice numbered 0–5. Roll the two dice and add the numbers for the first and for the second roll.

B. Play as usual, but roll three dice of each kind instead of two.
6B What's Missing? Record Sheet

<table>
<thead>
<tr>
<th></th>
<th>1st Roll</th>
<th>+</th>
<th>2nd Roll</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

My Score

A? B? C?
Pick Two for Twenty

Remove a sticky note. Then pick the two numbers that come closest to making 20.

Score Box
Teacher _____ + _____ + _____ + _____ + _____ = _____
Class _____ + _____ + _____ + _____ + _____ = _____
Combinations & Stories Checkpoint  page 1 of 2

1. Which two numbers add up to 20?
   - Circle the two numbers in each set that add up to 20.
   - Write an equation with those two numbers.

   ex
   \[
   \begin{array}{c}
   18 \quad 9
   \\
   \hline
   2
   \\
   \hline
   _______ + _______ = _______
   \end{array}
   \]

   a
   \[
   \begin{array}{c}
   12 \quad 10
   \\
   \hline
   8
   \\
   \hline
   _______ + _______ = _______
   \end{array}
   \]

   b
   \[
   \begin{array}{c}
   6 \quad 7
   \\
   \hline
   13
   \\
   \hline
   _______ + _______ = _______
   \end{array}
   \]

   c
   \[
   \begin{array}{c}
   10 \quad 5
   \\
   \hline
   15
   \\
   \hline
   _______ + _______ = _______
   \end{array}
   \]

   d
   \[
   \begin{array}{c}
   14 \quad 8
   \\
   \hline
   6
   \\
   \hline
   _______ + _______ = _______
   \end{array}
   \]

2. Find the difference (subtract).
   a  \[20 - 10 = _______
   
   b  \[20 - 13 = _______
   
   c  \[18 - 6 = _______
   
   d  \[14 - 8 = _______

(continued on next page)
Solve each problem below.

- Read the problem.
- Use numbers, pictures, or words to help solve the problem.
- Show all your work.
- Write the answer on the line.

a  Ten penguins are on the ice. Four more penguins join them. How many penguins in all?

There are _______ penguins in all.

b  Seven penguins are swimming. How many more penguins to make 10?

It takes _______ more penguins to make 10.
**Penguins Marching Two by Two**

The penguins are learning how to march in pairs. Can you help them?

<table>
<thead>
<tr>
<th>Number of penguins</th>
<th>Do all the penguins have a partner?</th>
<th>Write an equation using doubles.</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Yes No</td>
<td>10 = ____ + ____</td>
</tr>
<tr>
<td>7</td>
<td>Yes No</td>
<td>7 = ____ + _____ + 1</td>
</tr>
<tr>
<td>6</td>
<td>Yes No</td>
<td>6 = ____ + ____</td>
</tr>
<tr>
<td>12</td>
<td>Yes No</td>
<td>12 = ____ + ____</td>
</tr>
<tr>
<td>8</td>
<td>Yes No</td>
<td>8 = ____ + ____</td>
</tr>
<tr>
<td>13</td>
<td>Yes No</td>
<td>13 = ____ + _____ + 1</td>
</tr>
<tr>
<td>15</td>
<td>Yes No</td>
<td>15 = ____ + _____ + 1</td>
</tr>
<tr>
<td>14</td>
<td>Yes No</td>
<td>14 = ____ + ____</td>
</tr>
<tr>
<td>9</td>
<td>Yes No</td>
<td>9 = ____ + _____ + 1</td>
</tr>
<tr>
<td>11</td>
<td>Yes No</td>
<td>11 = ____ + _____ + 1</td>
</tr>
<tr>
<td>18</td>
<td>Yes No</td>
<td>18 = ____ + ____</td>
</tr>
<tr>
<td>16</td>
<td>Yes No</td>
<td>16 = ____ + ____</td>
</tr>
</tbody>
</table>
1. Draw the dots on the right side of each card to make 11. Then write a fact family to match.

   **Example (ex):**
   
   - $6 + 5 = 11$
   - $5 + 6 = 11$
   - $11 - 6 = 5$
   - $11 - 5 = 6$

2. Fill in the missing numbers.

   - $9 + \square = 11$
   - $\square + 1 = 11$
   - $5 + 6 = \square$
   - $11 + \square = 11$
   - $11 - \square = 6$
   - $\square - 1 = 10$
   - $11 - 4 = \square$
   - $11 - \square = 8$

(continued on next page)
3. Draw the dots on the right side of each card to make 12. Then write a fact family to match.

\[
\begin{align*}
7 + 5 &= 12 \\
5 + 7 &= 12 \\
12 - 7 &= 5 \\
12 - 5 &= 7
\end{align*}
\]

4. Fill in the missing numbers.

\[
\begin{array}{|c|c|c|c|}
\hline
9 + \square &= 12 & \square + 7 &= 12 & 6 + 6 &= \square & 12 + \square &= 12 \\
\hline
12 - \square &= 0 & \square - 2 &= 10 & 12 - 8 &= \square & 12 - \square &= 5 \\
\hline
\end{array}
\]
Combinations & Story Problems page 1 of 2

1. For each problem below:
   - Circle the two numbers that make a total that is as close to 10 as possible. (If you don't find two that make 10 exactly, choose the two that come the closest, under or over.)
   - Write an equation to match.

<table>
<thead>
<tr>
<th>ex</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>( 4 + 6 = 10 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>3</td>
<td>4</td>
<td>7</td>
<td>( _ _ _ + _ _ _ = _ _ _ _ )</td>
</tr>
<tr>
<td>b</td>
<td>8</td>
<td>2</td>
<td>6</td>
<td>( _ _ _ + _ _ _ = _ _ _ _ )</td>
</tr>
<tr>
<td>c</td>
<td>9</td>
<td>5</td>
<td>1</td>
<td>( _ _ _ + _ _ _ = _ _ _ _ )</td>
</tr>
<tr>
<td>d</td>
<td>7</td>
<td>4</td>
<td>8</td>
<td>( _ _ _ + _ _ _ = _ _ _ _ )</td>
</tr>
</tbody>
</table>

2. For each problem below:
   - Circle the two numbers that make a total that is as close to 20 as possible. (If you don't find two that make 20 exactly, choose the two that come the closest, under or over.)
   - Write an equation to match.

<table>
<thead>
<tr>
<th>ex</th>
<th>9</th>
<th>11</th>
<th>4</th>
<th>( 9 + 11 = 20 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>17</td>
<td>3</td>
<td>12</td>
<td>( _ _ _ + _ _ _ = _ _ _ _ )</td>
</tr>
<tr>
<td>b</td>
<td>7</td>
<td>5</td>
<td>15</td>
<td>( _ _ _ + _ _ _ = _ _ _ _ )</td>
</tr>
<tr>
<td>c</td>
<td>18</td>
<td>2</td>
<td>4</td>
<td>( _ _ _ + _ _ _ = _ _ _ _ )</td>
</tr>
<tr>
<td>d</td>
<td>10</td>
<td>12</td>
<td>8</td>
<td>( _ _ _ + _ _ _ = _ _ _ _ )</td>
</tr>
</tbody>
</table>

(continued on next page)
3  Rosa had 14 shells. She gave 3 of the shells to her sister and 4 of the shells to her brother. How many shells did Rosa have left? Show your work.

Rosa had ______ shells left.

4  Jared has 5 coins in his pocket. They are worth 18¢ in all. What coins does Jared have? Show your work.

Here are the 5 coins Jared has in his pocket: