Unit 2  Number Sense: Counting to 10

Introduction
In this unit, students will explore the concept of number. They will count, pair numbers with their corresponding quantities and numerals, put numbers in order, and compare quantities (more, less, fewer, as many as). Quantities in this unit will be limited to within 10.

Meeting Your Curriculum
Alberta—All of the lessons in this unit are required.
British Columbia—All of the lessons in this unit are required.
Manitoba—All of the lessons in this unit are required.
Ontario—All of the lessons in this unit are required.

Vocabulary. As you teach each numeral, add it to the word wall on a card that also includes visual examples, as on BLM Number Picture Cards (p C-46). When students need to recognize the numeral, for example, when doing AP Book questions, refer them to the word wall.

Recurring Games, Activities, and Songs
The following games, activities, and songs occur often throughout the unit. The rules and materials will vary as students learn more about numbers.

If You’re Happy and You Know It. When doing the counting part of the following song, say the words normally rather than singing them. Clap once as you say each number, and encourage students to do the same. Counting to the given number (and clapping as you do so) is the action part of the song, in place of clapping, stomping, etc. Count to the number given in the lesson plan. The lyrics are shown below for the counting to three version:

   If you’re happy and you know it, count to three: one, two, three.
   If you’re happy and you know it, count to three: one, two, three.
   If you’re happy and you know it, and you really want to show it
   If you’re happy and you know it, count to three: one, two, three.

Subitizing Identical Dots. Use dot cards A to L (see the Materials section that follows). Hold up card A and SAY: This is one dot. Hold up card E and SAY: This is two dots. Hold up card I and SAY: This is three dots. Then shuffle all the cards, place them face down, and hold up the top card for two seconds. ASK: How many dots is this? Have students signal their answers with their fingers. If students say fewer dots than there are, encourage them to look at the whole card, especially for cards D, E, and J. If students are consistently making errors, you may need to give them three seconds to look at the card. After all students signal their answers, show the card again and allow students to revise their answers. Then say the correct answer. Repeat for all the cards, repeating and rotating the cards for variety. Play this game several times throughout the unit until all students are confidently and correctly subitizing up to 3. When students are ready to subitize four, hold up card B and SAY: This is one dot. Repeat for card F...
(this is two dots), card J (this is three dots), and card M (this is four dots). Then shuffle cards M to R with cards A to L and repeat, again rotating cards for variety.

Spend about two to three minutes on this each class, or during calendar time (see p A-34). The goal is for all students to be confident subitizing within four by the beginning of Unit 4, but we have included six cards with five dots in case students need an extra challenge.

**Making Textured Numbers.** Fold a sheet of paper in half in both directions to make four equal parts. Write the numerals from 0 to 3 using a thick black marker. Repeat for 4 to 7 and 8 and 9. Photocopy the sheets onto cardstock and provide each student with one card (from the numbers done so far). Students can make the numbers in different ways.

Give students who need practice with basic scissors skills long strips of thick coloured paper (about 1.5 cm wide). Have students cut the strips into smaller pieces and glue the pieces onto the numeral. As students gain scissors skills, increase the difficulty incrementally, using the following progression:

1. Cut paper about 1.5 cm wide so that only one stroke is required.
2. Cut paper about 4 cm wide so that two strokes are required.
3. Draw straight lines on the coloured paper so students cut out each strip before cutting them into smaller pieces.

Students who do not need to practise basic scissors skills can form the numerals 0 through 9 out of something textured, such as beads, small clumps of tissue paper, cotton balls, or pipe cleaners, by gluing it onto the numeral.

**Guessing Numbers by Feel.** Students use the textured numbers they made from the activity described above. Have students run their fingers along the textured number they created to see how it feels different than the paper around it. Have students form groups and see how the other numbers feel when they run their fingers along them. Then place the textured numbers in an opaque bag, and players take turns finding numbers from the bag. Player 1 finds 1, then Player 2 finds 2, and so on, alternating turns.

**Memory.** Students turn over two cards at a time. If the cards match by number, students set these cards aside; otherwise, they turn them face down again and continue playing. Play this first as a whole class, with volunteers taking turns. Students can then play individually or co-operatively in pairs. In either case, the goal is to finish all the cards. If playing with a partner, Player 1 leads by choosing and turning over a card and Player 2 follows by choosing and turning over another card. After all pairs are found, players switch roles and play again. Players can help each other by asking questions or making suggestions (EXAMPLE: “I think I know where both 3s are; should I turn one of them over?”), but they are not allowed to tell each other where specific cards are.
Materials

You will need many connecting cubes of different colours for this unit. You will also need to make number cards and dot cards, as described below, to use throughout the unit. (Keep the cards for later use.) For an optional activity in Lesson NS1-5, you will need to bring in many packages labelled with numbers. You might send students home with a letter requesting such packages from their caregivers. You will need to prepare many number charts for Lesson NS1-8.

Number cards and dot cards. You will need to make 11 number cards and 25 dot cards. They will need to be durable, as you will use them repeatedly. After you write the numbers and draw the dots (you can also use round stickers instead of drawing dots), laminate the cards or put them in sheet covers so that you can write on them with erasable markers.

To make number cards, write the numerals 0 through 10 on separate cards. Draw dot cards as shown below. Draw the dots on the front of the card, and write both the letter and the numeral on the back of the card. You can also use these cards for subitizing during calendar time. Also create dot cards exactly like cards A, D, F, G, H, and K, but make each dot bigger. Label these cards on the back: A*, 1; D*, 2; F*, 3; G*, 3; H*, 3; and K*, 3. Keep one card blank and label it Y.

Generic BLMs. In addition to the BLMs provided at the end of this unit, the following Generic BLM, found in section K, is used in Unit 2:

BLM 2 cm Grid Paper (p K-6)

Assessment. The assessment checklist for this unit can be found in section L.
**Number Sense 1-4**

**Goals**

Students will read numerals from 0 to 7.
Students will count out up to seven objects from a larger group.

**PRIOR KNOWLEDGE REQUIRED**

Can count up to five objects by using actions
Can read numerals from 0 to 5
Knows that zero is the number that means nothing

**MATERIALS**

4 connecting cubes of different colours per pair
number cards for 4 to 7 (see unit introduction) per pair
BLM Action Cards (p C-51) per pair
small containers
12 connecting cubes per student
21 similar objects, such as counters, cubes, or crayons per student
cardstock
strips of coloured paper or textured items (such as beads, small clumps of tissue paper, cotton balls, or pipe cleaners)
sissors
 glue
textured numbers 0 to 5 made in NS1-1, NS1-2, and NS1-3
magazines, catalogues, flyers

**Saying the counting sequence from 1 to 7 as a class.** Sing the adapted version of "If You’re Happy and You Know It" for counting to 7. Repeat, this time pausing for students to do the counting on their own.

**Counting up to seven actions.** SAY: Let’s clap seven times. Recite the numbers one at a time, as you and the class clap seven times. SAY: We clapped seven times. Repeat for six claps, drawing zero circles in the air, six knocks, and seven circles in the air, always summarizing by telling students how many times you did each action. Start with a constant pace, then change the pace, ensuring that students still say one number per action.

**Reciting the counting sequence from 1 to 7 individually.** Show students four cubes of different colours and ask them to name the colours. Ask students to close their eyes and count to seven while you hide one of the cubes behind your back. Have students open their eyes and name the colours of cubes they see. ASK: What colour of cube did I hide? Repeat several times.

Have students play in pairs for the following exercise. Give each pair of students four cubes of different colours.
Exercise

Partner A: Close your eyes and count to seven.
Partner B: Hide one of the cubes in your fist or behind your back before your partner gets to seven.
Partner A: Open your eyes and guess which colour is missing.
Partner B: Show the cube.
Switch roles.

Identifying the numeral with the number (spoken). Write the numerals 0 to 7 in order on the board, saying the numbers in order as you point to them. Erase the numbers, write the same numbers in random order, and have students say the numbers as you point to them. Repeat several times.

Counting actions individually. Ask a volunteer to clap five times. ASK: How did you know when to stop clapping? (when I said “five”) SAY: The last number you say when counting tells you how many times you clapped. Have another volunteer clap three times, and another clap four times.

Have students play in pairs for the following exercise. Give each pair of students number cards for 4, 5, 6, and 7, and the four picture cards from BLM Action Cards. Hold up each action card, one at a time, and demonstrate doing the action four times (hop on one foot, clap, jump, do jumping jacks). Have students place the two types of cards face down in separate piles.

Exercise

Partner A: Turn over the top card from each pile. Perform the action that many times.
Partner B: Count your partner’s actions aloud.
Switch roles.

Counting out objects. Take a small container of cubes and SAY: I want to count out six cubes. Count with me as I take one at a time. Then count together, up to six. Reach into the container as if to take another cube and see if students stop you. If they do not, take out another cube, count to seven, and SAY: Wait a minute—I only wanted to take six cubes. Put all the cubes back in the container and repeat, reminding students to tell you when to stop taking cubes. Have volunteers take various numbers of cubes, one at a time, while the class counts together. If necessary, the class can tell the volunteer when to stop.

Give each student 12 cubes in a small container. SAY: When you count out objects, you don’t have to count all of the objects; you only have to count the ones you are taking. Let’s pretend your cubes are teacups and we are have a tea party. NOTE: Students who have trouble with the following exercises can work in pairs: one student counts out the objects and the other student says when to stop.
Exercises

a) There are three people at the party. Count out three teacups. Count the teacups you took to make sure you have three.

b) There are seven people at the party. Count out seven teacups. Count the teacups you took to make sure you took seven.

For the following bonus, students will need 21 similar objects, such as counters, cubes, or crayons.

Bonus

a) How many times can you count out 3, without putting any back?

b) How many times can you count out 7, without putting any back?

Answers: a) 7 times, b) 3 times

ACTIVITIES 1–2 (Optional)

Activity 1 will help students who need pre-writing skills.

1. **Making Textured Numbers** and **Guessing Numbers by Feel** (see unit introduction). Students make the numerals 6 and 7, using the same material they used to make numerals 0 to 5. Then students who used the same materials pair up and take turns picking the numbers in order, 0 to 7, running through the numbers once.

2. Give each student an old magazine, a catalogue, or a flyer. Assign each student a number from 2 to 7. Students will find and cut out pictures where items are in groups of that many. Students can then form groups with other students who had the same number and pool their cut-outs to make a poster for each number.

Extensions

1. Discuss with a partner: How are counting five objects and counting out five objects from a bigger group the same? How are counting five objects and counting out five objects different?

   **Sample answers:** Same: the number counted is the same. Different: with counting, I count everything but with counting out, I only count some.

2. Give students five counters. Have them discuss with a partner: Can you count out six counters? Why or why not?

   **Answer:** No. There are not enough. I need one more.

3. **A counting game for two.** Pairs start counting at 1 and take turns saying the next number until they reach 5. The pair “wins” if the person who started counting also finishes. Demonstrate by playing the game with a volunteer, then have students play in pairs. Have students repeat
the game ending with 6, then 7, 8, 9, and 10. ASK: Was it possible to win every time? What numbers do you need to finish with if you want to win?

**Answer:** Students need to finish with 5, 7, or 9 to win.

4. Have students record what they see on a calculator after they press the buttons in order in each step. (Students are not expected to understand the + symbol yet.)

   **Step 1:** 1
   **Step 2:** + 1 =
   **Step 3:** =
   **Step 4:** =
   **Step 5:** =
   **Step 6:** =
   **Step 7:** =

   **Answers:** 1, 2, 3, 4, 5, 6, 7
**Goals**

Students will read numerals from 0 to 10.
Students will count up to 10 objects using actions.
Students will count forward from any number to any other number within 10.

**PRIOR KNOWLEDGE REQUIRED**

- Can count up to seven objects by using actions
- Can read numerals from 0 to 7
- Knows that zero is the number that means nothing

**MATERIALS**

- 4 connecting cubes of different colours per pair
- BLM Action Cards (p C-51) per pair
- Number cards for 3 to 10 (see unit introduction) per pair
- Cardstock
- Strips of coloured paper or textured items (such as beads, small clumps of tissue paper, cotton balls, or pipe cleaners)
- Scissors
- Glue
- Packages labelled with numbers

**Saying the counting sequence from 1 to 10 as a class.** Sing the adapted version of “If You’re Happy and You Know It” for counting to 10. Repeat, this time pausing for students to do the counting on their own.

**Counting up to 10 actions.** SAY: Let’s clap 10 times. Recite the numbers one at a time, as you and the class clap 10 times. SAY: We clapped 10 times. Repeat for seven claps, drawing eight circles in the air, nine knocks, and drawing 10 circles in the air, always summarizing by telling students how many times you did each action. Start with a constant pace, then change the pace, ensuring that students still say one number per action.

**Reciting the counting sequence from 1 to 10 individually.** Show students four cubes of different colours and ask them to name the colours. Ask students to close their eyes and count to 10, while you hide one of the cubes behind your back. Have students open their eyes and name the colours of cubes they see. ASK: What colour of cube did I hide? Repeat several times.

Have students play in pairs for the following exercise. Give each pair of students four cubes of different colours.
Exercise
Partner A: Close your eyes and count to 10.
Partner B: Hide one of the cubes in your fist or behind your back before your partner gets to 10.
Partner A: Open your eyes and guess which colour is missing.
Partner B: Show the cube.
Switch roles.

**Identifying the numeral with the number (spoken).** Write the numerals 0 to 10 in order on the board, saying the numbers in order as you point to them. Erase the numbers, write the same numbers in random order, and have students say the numbers as you point to them. Repeat several times.

**Counting actions individually.** Ask a volunteer to clap five times. ASK: How did you know when to stop clapping? (when I said “five”) SAY: The last number you say when counting tells you how many times you clapped.
Have another volunteer clap seven times, and another clap eight times.

Have students play in pairs for the following exercise. Give each pair of students number cards for 6, 7, 8, 9, and 10, and the four picture cards from BLM Action Cards. Have students place the two types of cards face down in separate piles.

Exercise
Partner A: Turn over the top card from each pile. Perform that action that many times.
Partner B: Count your partner’s actions out loud.
Switch roles.

**Tracing numerals.** Have students copy you as you trace the numerals 6 to 10 in the air using your tripod fingers. Encourage students to tuck in their other two fingers. Make numerals of different sizes.

For the following exercise, encourage students to use their tripod fingers only. If students struggle to draw the numeral correctly, you might give them number cards to refer to or to place on their partner’s back. Students can hold the card with their non-dominant hand and trace with their dominant hand.

Exercise
Partner A: Draw an 8, 9, or 10 on your partner’s back.
Partner B: What is the number?
Switch roles.

Bonus
Partner A: Draw a number from 0 to 10 on your partner’s back.
Partner B: What is the number?
Switch roles.
Counting from any number. **ASK:** If I want to count, what number do I say first? (1) **SAY:** When counting we normally start at 1, but let’s start at 4 today. **ASK:** What comes after 4? (5) **SAY:** Let’s count from 4 up to 10. Count aloud together from 4 to 10.

For Exercise 1 below, have students work in pairs and provide each pair of students with cards numbered 3 to 6, shuffled. For Exercise 2 below, write the numerals on the board.

**Exercises**

1. **Partner A:** Turn over the top card. Count from 1 to the number on the card.  
   **Partner B:** Continue counting to 10.  
   Switch roles.

2. Say the numbers quietly to yourself. Are they in counting order?  
   a) 3 4 5  b) 4 6 5  c) 4 2 3  d) 2 3 4  
   e) 5 6 7  f) 6 7 3  **Bonus:** 2 3 4 6 5

**Answers:** a) yes, b) no, c) no, d) yes, e) yes, f) no, Bonus: no

**ACTIVITIES 1–2 (Optional)**

Activity 1 will help students who need pre-writing skills.

1. **Making Textured Numbers** and **Guessing Numbers by Feel** (see unit introduction). Students make the numerals 8 and 9 using the same material as they used to make numerals 0 to 7. Then students who used the same materials pair up and take turns picking the numbers in order, 0 to 9, running through the numbers once.

2. Bring in packages that are labelled with numbers. (EXAMPLES: puzzles, marbles, cookies, pencils, pens, erasers, crayons, chalk, paper, resealable bags, garbage bags) You might also send home a letter to parents to send in packages with numbers on them. Have students identify the numbers on the packages. Discuss why numbers are important. Students might wish to package a product themselves and write how many on the package.

**Extensions**

1. If you can write the numbers from 1 to 9, then you can write the numbers in the twenties. Just write “2” before each number. Continue the pattern: 21, 22, 23, 24, ____, ____, ____, ____.  
   **Answer:** 25, 26, 27, 28, 29

2. Hold up pictures of various objects (or the objects themselves) and ask students to say what number the object rhymes with. EXAMPLES: a pen (10), a zoo (2), sticks (6), a line (9), a tree (3), a beehive (5), a gate (8),
a door (4). Give each student one number to focus on, from 1 through 10 (exclude 7). Students draw that number of an object that rhymes with the number (EXAMPLE: three trees). Use the students’ work to build a class poem on a poster. Students can read the poem together as a class, with each student “reading” his or her own line.

3. Have students record what they see on a calculator after they press the buttons in order in each step. (Students are not expected to understand the + symbol yet.)

   Step 1: 1
   Step 2: + 1 =
   Step 3: =
   Step 4: =
   Step 5: =
   Step 6: =
   Step 7: =
   Step 8: =
   Step 9: =

   **Bonus:** Make your calculator count from 4 to 9.

   **Answers:** 1, 2, 3, 4, 5, 6, 7, 8, 9; **Bonus:** press 4 + 1 = = = = =

4. Give students number cards for 1 to 5, face up, but not in order. Have students put the numbers in counting order. Repeat for 1 to 6, 1 to 7, 1 to 8, 1 to 9, or 1 to 10, depending on the level of the student.
**Goals**

Students will write the numerals, first by tracing, then independently. Students will distinguish between numerals written correctly and incorrectly.

**PRIOR KNOWLEDGE REQUIRED**

Can hold a pencil and trace lines  
Can join dots  
Can read numerals 0 to 9  
Can count up to 9 objects

**MATERIALS**

5 cubes of different colours per pair  
BLM Writing Numbers (pp C-52–53)  
BLM Counting Dots (p C-54)

**Saying the counting sequence from 1 to 10 as a class.** Sing the adapted version of “If You’re Happy and You Know It” for counting to 10. Repeat, this time pausing for students to do the counting on their own.

**Reciting the counting sequence from 1 to 10 individually.** Show students five cubes of different colours and ask them to name the colours. Ask students to close their eyes and count to 10 while you hide one of the cubes behind your back. Have students open their eyes and name the colours of cubes they see. ASK: What colour of cube did I hide? Repeat several times.

Have students play in pairs for the following exercise. Give each pair of students five cubes of different colours.

**Exercise**

Partner A: Close your eyes and count to 10.  
Partner B: Hide one of the cubes in your fist or behind your back before your partner gets to 10.  
Partner A: Open your eyes and guess which colour is missing.  
Partner B: Show the cube.  
Switch roles.

**Drawing numbers by starting at the big dot and following the arrow.** Ask students to watch carefully as you draw a 7 on the board. ASK: Did I start drawing the 7 from the top or the bottom? (top) Draw several more 7s to give every student a chance to see what you are doing. Ask a volunteer to come to the board and draw a big dot to show where you started. Ask for a suggestion on how you could show the direction to move in when drawing the 7. Tell students you will draw an arrow, and do so. Have volunteers
draw a 7 the same way you did. Then tell them to watch carefully as you draw a 1. Draw several more 1s before asking a volunteer to add both the dot and the arrow showing where you started and what direction you went in. Repeat with a 4, emphasizing that it needs two starting points, then 0, 9, and 6.

NOTE: The BLMs used in the following exercises are identical to AP Book 1.1 pp 20–21. They allow students additional opportunities to practise writing numerals.

Exercise: Complete BLM Writing Numbers (1).

Then repeat for the numbers 3, 8, 2, and 5, demonstrating how to draw the numbers as shown on BLM Writing Numbers (2).

Exercises

1. Complete BLM Writing Numbers (2).
2. Trace a number on a friend’s back. Can your friend tell the number?

NOTE: Students who need extra practice writing numbers can do Confidence Building Unit, Writing Numbers Challenge Level A.

SAY: When you can write the numbers, it makes it easier for you to show your answers to questions about counting.

BLM Counting Dots asks students to count the corners (marked by dots) of various shapes.

Exercise: Complete BLM Counting Dots.

Answers: 5, 4, 6

Numbers cannot be turned around. Bring a chair to the front of the room. Ask your students what object it is. Then turn the chair around to face the other way. ASK: Is it still a chair? Now put it on its side. ASK: Is it still a chair? Draw the chair in all three positions on the board. ASK: Are all of these chairs? When all students see that the chair is still a chair, ask them if they can do the same thing with letters. Draw a “c” on the board. Then draw it backward. ASK: Is it still a “c”? Then put it on its side. Repeat with “z,” which looks like “N” when turned. It might be helpful to have the letters written on cards so that you can physically turn them around. Then draw a 3 on the board or hold it up on a card. ASK: Is 3 still a 3 when you turn it around? On its side? (Demonstrate doing so.) Are there any numbers that are still the same number when you turn them upside down? (8 and 0; 1 when it is drawn as a straight line) Draw several numbers two ways—correctly and incorrectly—and have students signal the correct way by pointing.
Extensions

1. On BLM Roman Numbers (p C-55), students will count the shapes on playing cards to translate Roman numbers to English numbers.

   **Answers:** 5, 4, 7, 6, 2

2. Draw the following pictures on the board or in individual students’ journals, and have students draw a 3 to finish the picture. Ask: What is the picture of?

   ![Pictures](image)

   **Answers:** a) butterfly, b) the number eight, c) flower

3. Teach students to say the counting sequence in a language other than one that they are familiar with. For example, here is how to count to ten in Cree and Tlingit.

<table>
<thead>
<tr>
<th>English</th>
<th>Cree</th>
<th>Tlingit</th>
</tr>
</thead>
<tbody>
<tr>
<td>one</td>
<td>pe’yak</td>
<td>tléix’</td>
</tr>
<tr>
<td>two</td>
<td>n’iso</td>
<td>déixh</td>
</tr>
<tr>
<td>three</td>
<td>nisto</td>
<td>nás’k</td>
</tr>
<tr>
<td>four</td>
<td>ne’yo</td>
<td>daax’oon</td>
</tr>
<tr>
<td>five</td>
<td>niya’nan</td>
<td>keijín</td>
</tr>
<tr>
<td>six</td>
<td>nikotwa’sik</td>
<td>tłeidooshú</td>
</tr>
<tr>
<td>seven</td>
<td>te’pakohp</td>
<td>daxhradooshú</td>
</tr>
<tr>
<td>eight</td>
<td>ayina’new</td>
<td>nas’gadooshú</td>
</tr>
<tr>
<td>nine</td>
<td>ke’ka’c mita’taht</td>
<td>gooshúkh</td>
</tr>
<tr>
<td>ten</td>
<td>mita’taht</td>
<td>jinkaat</td>
</tr>
</tbody>
</table>

   (Audio pronunciations can be found online, if needed.)
Goals
Students will use a chart in place of counting orally.

PRIOR KNOWLEDGE REQUIRED
Can say the numbers from 0 to 10 and can write the corresponding numerals in sequence
Can count to 10

MATERIALS
counting strips or BLM Counting Cubes (p C-56)
lots of 2 cm connecting cubes
square pieces of paper
10 two-colour counters, coins, or counters

NOTE: This lesson uses two-colour counters, so that some will land on one colour when tossed and some will land on the other colour. Alternatively, you can use coins or regular counters. If you use coins, some will land on heads and some on tails. If you use regular counters, create a page with a line down the middle and provide a copy to each student. Then, some will land on one side of the line and some will land on the other side.

Make a counting strip for each student. Make strips of paper 2 cm wide and 20 cm long divided into numbered squares, as follows:

<p>| | | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
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<td>1</td>
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<td>4</td>
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<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
</tbody>
</table>

Alternatively, copy and cut strips from BLM Counting Cubes.

Teach students to count using a chart. Provide each student with several 2 cm connecting cubes (different numbers of cubes for each student). Ask students to count their cubes. Then have them make a chain with the cubes and place it on the chart, so that each cube covers one square and the chain starts on the 1. Students should exchange cubes with different partners and repeat the exercise several times. Then ask several students: How many cubes did you count? What is the last number covered on the chart? Ask students if anyone notices a pattern. (The last number covered is always the number of cubes in the chain.) Have students repeat the exercise with this pattern in mind. ASK: Does it hold? What is an easy way to know how many cubes there are without counting? (Look at the last number covered.)

The chart does the counting for you. ASK: How is the chart doing the counting for you? (Instead of saying “1, 2, 3, …” as I pick up the cubes, I can just place a cube on 1, another cube on 2, another on 3, and so on.) Demonstrate picking up a cube and placing it on the 1. SAY: I can say “1”
or I can place it on the 1. Pick up another cube and ASK: Instead of saying “2,” what can I do? (put it on the 2) Repeat until seven cubes are placed. SAY: Instead of the last number said, I can use the last number I put the cube on. Pick up the last cube and SAY: Seven is the last square covered, so there are seven cubes.

The chart makes sure that you count all the cubes without counting any twice. ASK: How does the chart help to make sure that you didn’t count any cube twice? (By placing a cube on the chart, I can see that I already counted that cube.) How does the chart help to make sure you didn’t miss any cubes? (If any cubes are left off the chart I know I’ve missed them.)

Demonstrate using the chart incorrectly. Draw the same chart on the board and use square pieces of paper to represent cubes. Place six squares on numbers as shown:

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1  2  3  4  5  6  7  8  9  10
```

Explain to students that because 8 is the last number covered, you think that you put eight squares on the chart. ASK: Am I right? (no) Why not? (Because you have to put the squares on every number in order—you can’t skip numbers.) Then take the squares off and demonstrate counting them incorrectly: 1, 2, 4, 5, 6, 8. SAY: Even when I count them, I still get eight. What did I do wrong now? (You missed two numbers—you didn’t say the numbers in order the right way.) Explain that just as you’re not allowed to miss numbers when counting, you’re not allowed to miss any numbers when using the chart. Repeat with various incorrect placements, always asking students to tell you how this is like missing numbers when counting. EXAMPLE: 2, 3, 4, 5.

ACTIVITY (Essential)

Give each student 10 two-colour counters or coins. Have students toss the counters/coins and then use a chart to count how many turned up red and how many turned up yellow (or heads and tails). Students could place the red counters (or heads) above the chart and the yellow counters (or tails) below the chart.

Extensions

1. Show students how they can make the calculator number 8 using seven toothpicks. Have students make calculator numbers from toothpicks.
   a) How many toothpicks do you need to make 1?
   b) How many toothpicks do you need to make 2?
   c) Challenge students to find a calculator number that uses its own number of toothpicks.

   Answers: a) 2; b) 5; c) 4, 5, or 6
2. a) Tell students that your calculator doesn’t work—it’s not showing the numbers properly. SAY: This is what I see when I press 0, 1, 2, 3, and 4. Draw on the board or use a transparency of the blank template on **BLM Calculator Numbers** (p C-50):

![Diagram of calculator numbers]

Ask a volunteer to draw how they think your calculator will show 5. Have the dotted square “8” outlined for them to draw on. ASK: Why does the calculator show this number correctly? (because a 5 doesn’t have a line at the top right) Which numbers does the calculator show correctly? (5 and 6) Which numbers does the calculator show incorrectly? (0, 1, 2, 3, 4, 7, 8, 9) Are there two numbers that look the same on your calculator? (yes, 6 and 8, and 5 and 9)

b) Tell students that a calculator is missing the top left line. Challenge students to draw each number from 0 to 9 as it would appear on this calculator. Students can record their answers on the template on **BLM Calculator Numbers** or on **BLM 2 cm Grid Paper** (p K-6). ASK: Which numbers does the calculator show correctly? (1, 2, 3, 7) Incorrectly? (0, 4, 5, 6, 8, 9) Are there two numbers that look the same? (yes, 3 and 9)
Goals
Students will count objects in different arrangements, both with and without charts.

PRIOR KNOWLEDGE REQUIRED
Can count up to 10 objects using actions
Can read numerals up to 10

MATERIALS
scissors
BLM 2 cm Grid Paper (p K-6)
10 connecting cubes
an opaque sheet of paper, such as cardstock
BLM Dots (p C-57)

Preparation. Cut out three columns and four ten-frames from BLM 2 cm Grid Paper and prepare the number charts as shown below (you will need one of each chart):

\[
\begin{array}{cccccccccc}
1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 \\
6 & 3 & 2 & 7 & 10 & 1 & 4 & 5 & 8 & 9 \\
10 & 9 & 8 & 7 & 6 & 5 & 4 & 3 & 2 & 1 \\
\end{array}
\]

Also create three number charts on BLM 2 cm Grid Paper as shown on the next page and photocopy enough for each student to have a copy.
Using a chart in different arrangements to count. Display the chart below:

```
1 2 3 4 5 6 7 8 9 10
```

Show students eight connecting cubes and SAY: Let’s count these cubes. Have a volunteer place the cubes on the chart, in order with the numbers. Have the class say the numbers as each cube is placed on that number. ASK: How many cubes are on the chart? (8) How do you know? (8 is the last number covered) SAY: We placed the cubes, one on each number, from 1 to 8 and there are eight numbers from 1 to 8: one, two, three, four, five, six, seven, eight. Then repeat with different volunteers for each of the following charts, one at a time, and with the same eight cubes:

```
1 2 3 4 5 6 7 8 9 10  
1 3 5 7 9
2 4 6 8 10
```

After finishing each arrangement, ASK: Is that the same answer we got before? (yes) When all arrangements are finished, SAY: It doesn’t matter how we arrange the cubes. As long as we follow the numbers in order, we will end on 8 because there are eight cubes. Provide each student with a copy of the three number charts you made on BLM 2 cm Grid Paper and six or seven cubes.

**Exercise:** Count your cubes using all the charts. Make sure you get the same answer each time.

**Counting up to 10 objects in a line by pointing to them, going in any direction.** Display 10 connecting cubes in a row. SAY: Count with me as I point to each one. Demonstrate counting as you use an exaggerated pointing action, counting from left to right. Then place eight cubes in
the row and have a volunteer count them by pointing. ASK: Which side did the volunteer start from? Have another volunteer start from the other side. ASK: Is that the same answer as before? (yes) SAY: It doesn’t matter which way you go when counting; you will get the same answer. Repeat with various linear arrangements of up to 10 dots on the board, including close together, far apart, horizontally, vertically, and diagonally. Start with all the dots the same distance apart, then progress to the dots at different distances apart. Be sure that all students have several chances to volunteer.

**Counting up to 10 objects in a line by uncovering them, going in any direction.** SAY: Instead of pointing, you can also count by sliding a sheet of paper across the objects and counting each object as the paper uncovers it. Draw on the board:

```
. . . . . . . . . .
```

Cover the dots with an opaque sheet of paper, such as cardstock, then slide the paper across at a constant pace and have students count with you as the paper uncovers each dot, starting from the left. ASK: How many dots are there? (9) How do you know? (9 is the last number we said) Repeat starting from the right. After students count the dots, ASK: Is that the same number as before? (yes) Draw on the board:

```
. . . . . . . . . .
```

SAY: For these dots, the paper won’t pass the dots at the same rate, so you will sometimes need to count slow and sometimes count fast. Demonstrate this as you move the paper across at a constant pace, counting as you go (ooone, twooo, three-four, fiiiive, siiiix, seven-eight). Then have the class count with you from the other direction (one-two, threee, fooour, five-six, seveeen, eiiiight).

**Counting objects in a left-to-right but scattered arrangement.** Draw nine dots on the board in a scattered, but generally left-to-right, arrangement, as shown below:

```
  . . . . . . . .
```

SAY: As I slide the paper across, you will need to say some numbers really fast and some numbers really slow. Then count with the class, moving the paper at a constant pace. SAY: Now, instead of counting using the paper, let’s count by circling the dots as we count them. Let’s circle the dots from left to right, because it’s easier than going back and forth. Have the class count as you circle the dots (at first, say the counting sequence with the students to demonstrate).

Repeat with other scattered arrangements, including moving from left to right, from right to left, from top to bottom, and from bottom to top, but have the class count without your help.
For the following exercise, students will need **BLM Dots**, a pencil, and an eraser. You might remind students to write their answer on the BLM before they count the dots another way.

**Exercise:** Circle the dots as you count them. Erase the circles. Count the dots another way. Do you get the same answer?

**Bonus:** Count the dots in as many ways as you can.

**Answers:** There are eight dots, so the answer is always 8.

**Counting objects in arrays from left to right.** Draw on the board:

```
● ● ● ●
● ● ● ●
```

First, cover the dots with a sheet of paper. Tell students that you want them to count the dots as you uncover them and that if they see two dots at the same time, they should say the numbers really fast. Then uncover the dots at a slow pace while students count: one-two…three-four…five-six…seven-eight. **ASK:** How many dots are there? (8) **How do you know?** (we said 8 last) **SAY:** You could count them by pointing at them from left (point to the left side) to right (point to the right side) too. Demonstrate pointing at the dots one at a time, from left to right, starting with either the top or bottom left-most dot, and counting as you do so. Have other volunteers count the dots by pointing again from left to right, then have a volunteer circle the dots from left to right. Emphasize that it doesn’t matter which of the two left dots you start with, but they can always go from top to bottom if it makes it easier. Discuss other ways of counting the dots, such as the top row first and then the bottom row. Have volunteers show some ways of counting the dots and other volunteers show the order the dots were counted by using their fingers.

**Extensions**

1. **Make the same array as shown above:**

```
● ● ● ●
● ● ● ●
```

Cover the dots again, but this time uncover the dots from top to bottom as students count them aloud. Students will have to say one-two-three-four…five-six-seven-eight.

2. **Have students count the dots in a circular arrangement.** Draw a set of dots on a sheet of paper with two dots in different colours than the rest, as shown below:

```
○ ○ ○ ●
○ ○ ○ ○
○ ○ ● ○
```

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Have students count in as many ways as they can by starting at different dots and going around the circle in different directions, or by counting from left to right, right to left, top to bottom, or bottom to top. The first circle might be a different colour, or it might be the top or bottom circle, or the left-most or the right-most circle. Students can work with a partner to find many ways.
Calculator Numbers
Action Cards

- hop on 1 foot
- clap
- jump
- do jumping jacks
Writing Numbers (I)

☐ Join the dots in order.

1 1 4 4 7

☐ Trace

![Trace Image]

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Writing Numbers (2)

3 3 3 3 3

2 2 2 2 2

5 5 5 5 5

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Counting Dots

☐ How many dots?

1 2 3

1 2 3 4 5 6

1 2 3 4 5 6

1 2 3 4 5 6

1 2 3 4 5 6

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Roman Numbers

☐ Translate the Roman numbers to regular numbers.

III = 3

IV = ___

V = ____

VII = ____

VI = ____

II = ____
Counting Cubes

1 2 3 4 5 6 7 8 9 10
1 2 3 4 5 6 7 8 9 10
1 2 3 4 5 6 7 8 9 10
1 2 3 4 5 6 7 8 9 10
1 2 3 4 5 6 7 8 9 10
1 2 3 4 5 6 7 8 9 10
1 2 3 4 5 6 7 8 9 10
1 2 3 4 5 6 7 8 9 10
1 2 3 4 5 6 7 8 9 10
Dots
2 cm Grid Paper