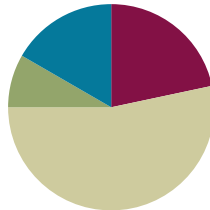# Lesson 4

Objective: Express the length of an object using centimeter cubes as length units to measure with no gaps or overlaps.

Suggested Lesson Structure

■ Fluency Practice   (13 minutes)
■ Application Problem   (5 minutes)
■ Concept Development   (32 minutes)
■ Student Debrief   (10 minutes)
  Total Time   **(60 minutes)**

Fluency Practice (13 minutes)

▪ Race and Roll Addition **1.OA.6**   (4 minutes)
▪ Speed Writing by Twos **1.OA.5**   (3 minutes)
▪ Subtraction Within 20 **1.OA.6**   (6 minutes)

Race and Roll Addition (4 minutes)

Materials: (S) 1 die per pair

Note: This fluency activity reviews the grade level standard of adding within 20.

Partners start at 0. Partners take turns rolling a die and then saying a number sentence by adding the number rolled to the total. (For example, Partner A rolls 6 and says, "0 + 6 = 6." Partner B rolls 3 and says, "6 + 3 = 9.") They continue rapidly rolling and saying number sentences until they get to 20, without going over. Partners stand when they reach 20. (For example, if partners are at 18 and roll 5, they take turns rolling until one of them rolls 2 or 1 two times. Then, they both stand.)

Speed Writing by Twos (3 minutes)

Materials: (T) Timer (S) Personal white board

Note: This fluency activity provides students practice with writing numbers while reinforcing adding 2.

Time students as they count by twos on their boards from 0 to 40 as fast as they can. Students stand and hold up their boards when they get to 40. To add excitement to the game, give the class a point each time a student gets to 40, and see how many points the class can earn in two minutes.

Record the points to use as a motivator the next time students speed write by twos.

Subtraction Within 20 (6 minutes)

Materials: (T) Hide Zero cards (Lesson 2 Fluency Template 1) enlarged (S) Personal white board

Note: This review fluency activity helps strengthen students' understanding of the take from ten and take from the ones subtraction strategies as well as their ability to recognize appropriate strategies based on problem types.

- T: (Show 14 with Hide Zero cards.) How can I take 14 apart to help me subtract?
- S: 10 and 4.
- T: I want to subtract 2 from 14. Write a number sentence to show whether I should subtract 2 from the 4 or the 10.
- S: (Write 4 – 2 = 2.)
- T: Why wouldn't I take from my 10?
- S: You don't need to because you have enough ones.
- T: Yes! It's much easier to just subtract from my ones! Since 4 – 2 = 2, 14 – 2 is what? Write the subtraction sentence.
- S: (Write 14 – 2 = 12.)
- T: (Replace the 4 Hide Zero card with a 2.) Yes!

Repeat with 14 – 5, eliciting that students need to take from ten because there are not enough ones. Repeat with similar problems.

Application Problem (5 minutes)

Joe ran a string from his room to his sister's room to measure the distance between them. When he tried to use the same string to measure the distance from his room to his brother's room, the string didn't reach! Which room was closer to Joe's room, his sister's or his brother's?

Note: This problem directly applies students' learning from Lesson 3 as students use indirect comparison to compare distances. For many students, such problems can be challenging to visualize on the first read. After reading, encourage students to draw a picture to show each part before answering the question. Reread the problem, pausing long enough for students to draw a picture of the comparison of the string and Joe's sister's room before moving on to read the next sentence. Pictures may vary in many ways. As long as the picture demonstrates that Joe's sister's room is closer than Joe's brother's room, any formation can provide an appropriate representation.
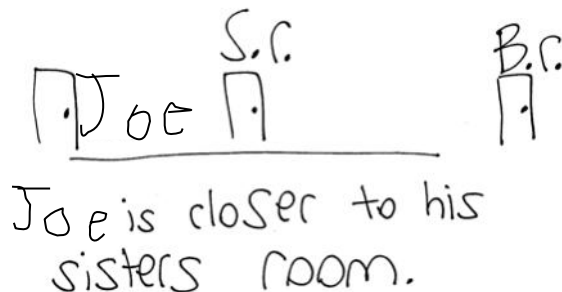
A NOTE ON MULTIPLE MEANS OF ENGAGEMENT:

Challenge students who finish early to try drawing a different way to show their answer or to create their own related problem.

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Lesson 4:   Express the length of an object using centimeter cubes as length units to measure with no gaps or overlaps.

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Concept Development (32 minutes)

Materials: (T) Projector, new crayon (9 cm), unsharpened pencil (19 cm), small glue stick (8 cm), dry erase marker (12 cm), centimeter cubes (S) Bag with 20 centimeter cubes; bag with a new crayon, unsharpened pencil, small glue stick, dry erase marker, jumbo craft stick (15 cm), and small paper clip (3 cm); measurement recording sheet (Template)

Note: Student bags contain items that are used throughout Topic B, although not all items in the bag are used during today's lesson. Collect the bags at the end of the lesson, and keep them in a safe place for future use. Also, collect the bags with centimeter cubes. The centimeter cubes are sent home for use in completing homework for today's lesson and for Lessons 5 and 6.

Have students sit in the meeting area in a semicircle.

T: (Hold up a new crayon.) How can we find out the length of this crayon? Turn and talk to your partner.

S: Use a string. → Use a ruler.

T: (Project centimeter cubes lined up in a column.) Let's find out how long this crayon is using these **centimeter cubes**. What do you notice about the centimeter cubes?

S: They are all exactly the same size. → They have the same length.

T: Since they have the same length, we can figure out how many centimeter cubes long this crayon is. Count with me as I lay down each centimeter cube to match the length of the crayon. (Lay out the first centimeter cube without aligning it to the crayon's endpoint.)

T/S: 1 centimeter cube.

T: Am I off to a good start?

S: No! You have to line up the endpoints. The edge of the centimeter cube is not starting at the same place as the end of the crayon.

T: You are right! Who can come and start us off on the right foot?

S: (Aligns endpoints.) 1 centimeter cube!

T: Now that our endpoints line up, I can continue to see how many centimeter cubes long this crayon is. (Lay down 3 more centimeter cubes correctly.)

MP.3

T/S: 2 centimeter cubes! 3 centimeter cubes! 4 centimeter cubes!

T: (Partly overlap the rest of the centimeter cubes by creating an uneven, almost stacked look as pictured to the right.)

T/S: 5 centimeter cubes, 6 centimeter cubes, …, 11 centimeter cubes!

T: Great. The end of this eleventh centimeter cube lines up with the end of the crayon. So, the crayon is as long as 11 centimeter cubes. Do you agree? Turn and talk to your partner.

S: The centimeter cubes were not laid out correctly. Some parts of the centimeter cubes are under others. Some of them overlap!

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MP.3

T: You are right. That is not an accurate way to measure this crayon. Let me fix it. (Fix some, but leave a gap between two centimeter cubes.) Okay. So, there are no overlaps. Is this correct?

S: No. There's a space between the centimeter cubes. That's not an accurate way to measure. We can't have any spaces between the centimeter cubes.

T: You are right! The crayon isn't broken with a space in the middle, so the centimeter cubes have to be all connected, without overlaps or gaps. Who would like to come up and fix the centimeter cubes? (Choose a student.)

S: (Lays out 9 centimeter cubes correctly.)

T: Are the centimeter cubes laid out correctly? Are we ready to count and find out how many centimeter cubes long this crayon is?

S: Yes! (Count as teacher points to each centimeter cube.) 1 centimeter cube, 2 centimeter cubes, …, 9 centimeter cubes!

T: How many centimeter cubes long is the crayon?

S: 9 centimeter cubes long!

T: Every centimeter cube is exactly the same length, so we can use them as **length units**. Let's try measuring the pencil with our length units. (Hold up the pencil and the crayon.) What is our length unit called?

S: A centimeter cube.

T: Compared to the crayon, do you think it will take more or fewer of these length units to measure the pencil? Turn and talk to your partner.

S: The pencil will need more centimeter cubes because it is longer than the crayon.
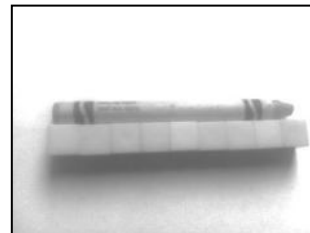
A NOTE ON MULTIPLE MEANS OF ENGAGEMENT:

The abstract term *about* may be difficult for English language learners to understand. While teaching the lesson and using the word *about,* show a visual representation of the objects whenever possible.

Distribute the bags of measuring materials and recording sheets, and have students practice measuring and recording the length of each object from the bag. Students work with their partners as they check each other's work for accuracy. Circulate to provide support for struggling students. If time allows, choose other objects to measure. Long objects can be measured by combining bags of centimeter cubes.

Note: Use the term *about* to describe the length of an object that is not exactly a certain number of centimeter cubes long. For example, if the pencil is closer to 4 centimeter cubes long than to 5, say it is *about* 4 centimeter cubes long.

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Problem Set (10 minutes)

Students should do their personal best to complete the Problem Set within the allotted 10 minutes. For some classes, it may be appropriate to modify the assignment by specifying which problems they work on first. Some problems do not specify a method for solving. Students should solve these problems using the RDW approach used for Application Problems.

For this Problem Set, all objects are measured horizontally unless otherwise noted by a vertical line next to the object.

Student Debrief (10 minutes)

Lesson Objective: Express the length of an object using centimeter cubes as length units to measure with no gaps or overlaps.

The Student Debrief is intended to invite reflection and active processing of the total lesson experience.

Invite students to review their solutions for the Problem Set. They should check work by comparing answers with a partner before going over answers as a class. Look for misconceptions or misunderstandings that can be addressed in the Debrief. Guide students in a conversation to debrief the Problem Set and process the lesson.

Any combination of the questions below may be used to lead the discussion.

- A **length unit** is what we use to measure how long something is. When we measure, we have to be careful that all of the length units we're using are the same size. What length unit did we measure with today? (**Centimeter cubes.**)
- How is measuring with our new length unit different from measuring with a string, as we did in the last lesson?
- What are the ways in which we need to use the centimeter cubes to accurately measure the length of an object? Explain why these are important.
- Look at Problem 10. What mistake might someone make in answering this question?

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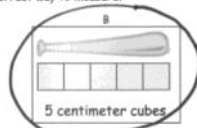**Lesson 4:** Express the length of an object using centimeter cubes as length units to measure with no gaps or overlaps.

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- Look at Problem 11. How would you fix the example showing the incorrect way of measuring? Use your own centimeter cubes to correctly measure the length of the smaller bat.
- Can you use the word *tall* to describe the length of an object? Which objects in the Problem Set could be described as being a certain number of centimeter cubes tall?
- Look at your Application Problem. What was Joe using as his tool to compare lengths? Use your hands to show me the length you imagined for his string. Explain your thinking.

Note: Be sure to send the bag of centimeter cubes home for students to complete their homework.

Exit Ticket (3 minutes)

After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help with assessing students' understanding of the concepts that were presented in today's lesson and planning more effectively for future lessons. The questions may be read aloud to the students.

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Name _____   Date _____

Measure the length of each picture with your cubes. Complete the statements below.

1. The pencil is _____ centimeter cubes long.
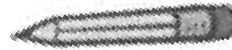
2. The pan is _____ centimeter cubes long.
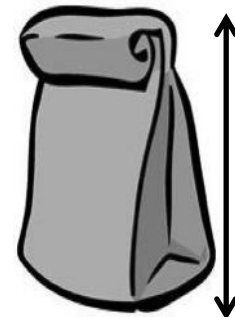
3. The shoe is _____ centimeter cubes long.

4. The bottle is _____ centimeter cubes long.

5. The paintbrush is _____ centimeter cubes long.
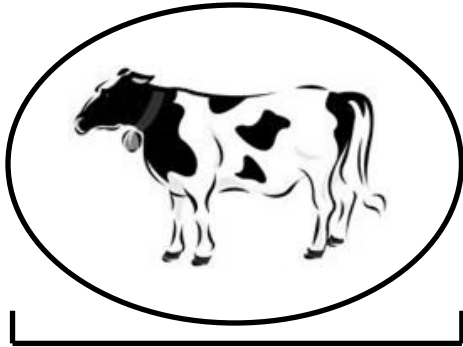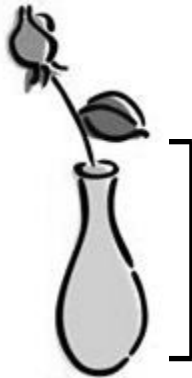
6. The bag is _____ centimeter cubes long.

7. The ant is _____ centimeter cubes long.

8. The cupcake is _____ centimeter cubes long.

9.

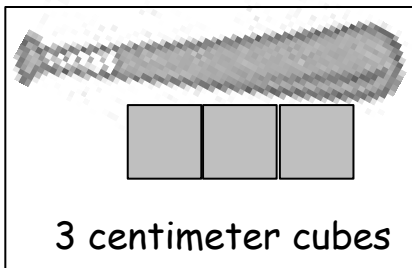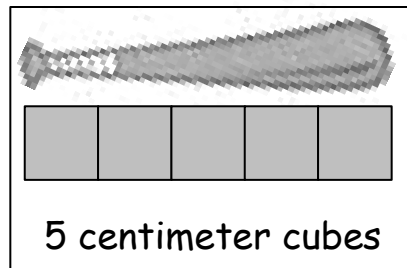The cow sticker is _____ centimeter cubes long.

10.

The vase is _____ centimeter cubes long.

11. Circle the picture that shows the correct way to measure.

A

3 centimeter cubes

B

5 centimeter cubes

12. How would you fix the picture that shows an incorrect measurement?

_____

_____

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Name _____   Date _____

1.

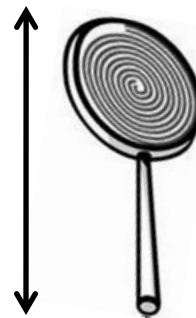The picture frame is about _____ centimeter cubes long.

2.

The boy's *crutch* is about _____ centimeter cubes long.

Name _____   Date _____

Measure the length of each picture with your cubes. Complete the statements below.

1. The lollipop is _____ centimeter cubes long.

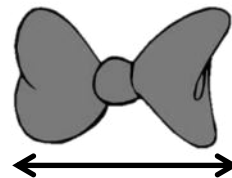2. The stamp is _____ centimeter cubes long.

3. The purse is _____ centimeter cubes long.

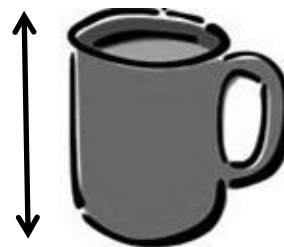4. The candle is _____ centimeter cubes long.

Lesson 4: Express the length of an object using centimeter cubes as length units to measure with no gaps or overlaps.

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5. The bow is _____ centimeter cubes long.

6. The cookie is _____ centimeter cubes long.

7. The mug is about _____ centimeter cubes long.

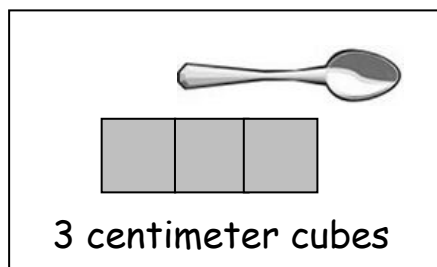8. The ketchup is about _____ centimeter cubes long.
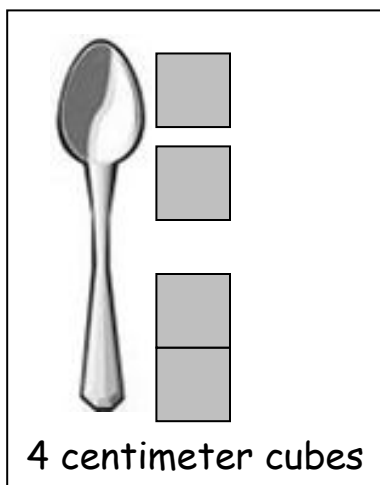
9. The envelope is about _____ centimeter cubes long.

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10. Circle the picture that shows the correct way to measure.

A

3 centimeter cubes

D

4 centimeter cubes

B

4 centimeter cubes

C
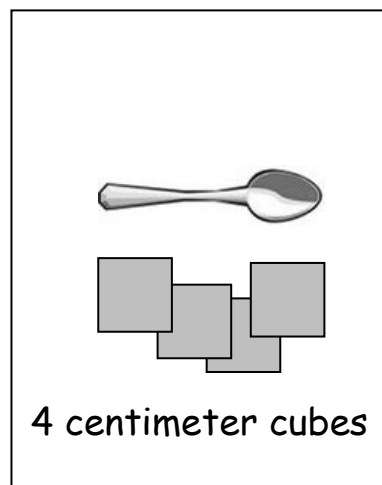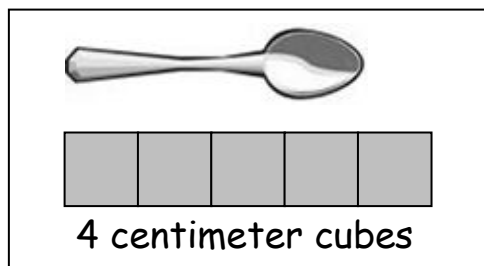
4 centimeter cubes
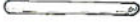
11. Explain what is wrong with the measurements for the pictures you did NOT circle.

_____

_____

_____

Name _____   Date _____

Classroom Objects	Length Using Centimeter Cubes
glue stick	_____ centimeter cubes long
dry erase marker	_____ centimeter cubes long
craft stick	_____ centimeter cubes long
paper clip	_____ centimeter cubes long
	_____ centimeter cubes long
	_____ centimeter cubes long
	_____ centimeter cubes long

measurement recording sheet

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