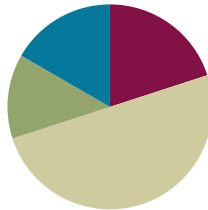


Lesson 1

Objective: Connect measurement with physical units by using multiple copies of the same physical unit to measure.

Suggested Lesson Structure

■ Fluency Practice	(12 minutes)
■ Application Problem	(8 minutes)
■ Concept Development	(30 minutes)
■ Student Debrief	(10 minutes)
Total Time	(60 minutes)



Fluency Practice (12 minutes)

- Happy Counting 20–40 **2.NBT.2** (2 minutes)
- Two More **2.OA.2** (1 minute)
- Sprint: Before, Between, After **2.NBT.2** (9 minutes)

Happy Counting 20–40 (2 minutes)

Note: Counting helps students prepare for counting centimeter cubes in the lesson.

- T: Let's count by ones starting at 20. Ready? (Rhythmically point up until a change is desired. Show a closed hand, and then point down. Continue, mixing it up.)
- S: 20, 21, 22, 23. (Switch direction.) 22, 21, 20. (Switch direction.) 21, 22, 23, 24, 25. (Switch direction.) 24, 23, 22, 21, 20. (Switch direction.) 21, 22, 23, 24, 25, 26, 27, 28, 29, 30. (Switch direction.) 29, 28, 27. (Switch direction.) 28, 29, 30, 31, 32. (Switch direction.) 31, 30, 29, 28. (Switch direction.) 29, 30, 31, 32, 33, 34. (Switch direction.) 33, 32, 31, 30, 29. (Switch direction.) 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40.
- T: Excellent! Try it for 30 seconds with your partner starting at 28. Partner A, you are the teacher today.

Two More (1 minute)

Note: Students practice adding two more to make a ten, which builds fluency when crossing a ten.

- T: For every number I say, you will say the number that is 2 more. If I say 2, you would say 4. Ready? 3.
- S: 5.

Continue with the following possible sequence: 6, 8, 9, 18, 38, 58, 78, 79, 19, 29, and 39.

Sprint: Before, Between, After (9 minutes)

Materials: (S) Before, Between, After Sprint

Note: Students identify the missing number in a pattern to build fluency counting up and back.



**NOTES ON
MULTIPLE MEANS
OF EXPRESSION:**

To avoid inhibiting children's natural drawings during the RDW process, be careful not to communicate that the tape diagram is the best or "right" way. If a drawing makes sense, it is right. Regularly guide students through the modeling of a problem with the tape so that this important model gradually enters their tool kit.

Application Problem (8 minutes)

Vincent counts 30 dimes and 87 pennies in a bowl.
How many more pennies than dimes are in the bowl?

30 dimes

 $30 + 57 = 87$

There are 57 more pennies than dimes.

$87 - 30 = 57$

There are 57 more pennies than dimes.

Note: This *compare with difference unknown* problem presents an opportunity to work through the common misconception that *more* means add. After drawing the two tapes, ask guiding questions such as, "Does Vincent have more dimes or pennies?" "Does Vincent have 30 pennies?" (Yes!) "Tell me where to draw a line to show 30 pennies." "This part of the tape represents 30 pennies. What does this other part of the pennies tape represent?" (The part that is more than the dimes.) This will help students recognize that they are comparing, not combining, the quantities.

This problem has an interesting complexity because, though there are more of them, the pennies are worth less. Ask students, "Could you buy more with Vincent's pennies or with his dimes? How do you know?"

Concept Development (30 minutes)

Materials: (T) 2–3 crayons of varying lengths, 2 pencil boxes (S) Per pair: small resealable bag with 30 or more centimeter cubes, small resealable bag of used crayons

T: (Call students to sit in a circle on the carpet.) I was looking at my pencil box this morning, and I was very curious about how long it might be. I also have this handful of centimeter cubes, and I thought I might be able to measure the length of my pencil box with these cubes. Does anyone have an idea about how I might do that?

S: You could put the cubes in a line along the pencil box and count how many!

- T: Does anyone want to guess, or **estimate**, about how many centimeter cubes long it will be?
- S: (Make estimates.)
- T: Let's see how many centimeter cubes we can line up along the length of the pencil box.
(Place cubes along the length of the first pencil box with random spaces between the cubes.)
- T: OK. Should I go ahead and count my cubes now?
- S: No!
- T: Why not?
- S: You need to put the cubes right next to each other.
→ You need to start measuring at the beginning of the pencil box.
- T: You are right! There should be no gaps between the cubes. Also, we need to begin measuring where the object begins. That's called the **endpoint**.
- T: Come show me how you would place the cubes to measure this second pencil box. (Student volunteer lays the cubes along the length of the second pencil box starting at the beginning with no spaces between the cubes. Demonstrate in the center of the circle so students can see the alignment.)
- T: Let's count the cubes my way and your way. (Count the cubes chorally with students, and write both measurements on the board.)
- T: Turn to your neighbor and tell them why there is a difference between my number of cubes and your number of cubes.
- S: You had fewer cubes because there were some empty spaces. → If you push all the cubes together, you have a lot of extra space not measured. → You didn't start at the endpoint.
- T: Let's look at a set of used crayons. Each crayon will be a different length, and some may not be an exact measurement.
- T: (Hold up a crayon with a measurement that will be rounded up.)
- T: Notice that this crayon is almost 8 centimeter cubes long. It is more than 7 and one-half cubes but not quite 8. I can say this crayon is about 8 centimeter cubes long.
- T: (Hold up a crayon with a measurement that will be rounded down.)
- T: Notice that this crayon is close to 6 centimeter cubes long. It is just a little bit longer than 6 cubes and not halfway to 7 cubes. How long would you say this crayon is?
- S: About 6 centimeter cubes.
- T: Yes, and we can simply say the crayon is about 6 centimeters.
- T: You will now work with a partner to measure a set of used crayons. As you measure, be sure to use the word *about* to describe a measurement that is not exact. Turn to your neighbor and estimate how many centimeter cubes you think you will need for each crayon in the bag. (Alternative items to measure are scissors, each other's pencils, and erasers.)
- S: (Share estimates with their partner, and then begin measuring their crayons.)
- T: Let's practice some more measuring on our Problem Set.



NOTES ON MULTIPLE MEANS OF REPRESENTATION:

Post conversation starters during think-pair-share while measuring with cubes:

- Your solution is different from mine because
- Your error was
- My strategy was to

These sentence starters will also be useful in the Student Debrief.

Problem Set (10 minutes)

Students should do their personal best to complete the Problem Set within the allotted 10 minutes. Some problems do not specify a method for solving. This is an intentional reduction of scaffolding that invokes MP.5, Use Appropriate Tools Strategically. Students should solve these problems using the RDW approach used for Application Problems.

For some classes, it may be appropriate to modify the assignment by specifying which problems students should work on first. With this option, let the purposeful sequencing of the Problem Set guide the selections so that problems continue to be scaffolded. Balance word problems with other problem types to ensure a range of practice. Consider assigning incomplete problems for homework or at another time during the day.

Student Debrief (10 minutes)

Lesson Objective: Connect measurement with physical units by using multiple copies of the same physical unit to measure.

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.

MP.3

- Turn to your partner and compare your answers to Problems 1–4. Explain what you had to do to measure correctly.
- Did anyone find, when sharing your work, that you had a different measurement than your partner? (Students will share that they may have not lined up the object with the edge of the first

NYS COMMON CORE MATHEMATICS CURRICULUM Lesson 1 Problem Set 2•2

Name Lauren Date _____

Use centimeter cubes to find the length of each object.

1. The picture of the fork and spoon is about 6 centimeter cubes long.



2. The picture of the hammer is about 5 centimeters long.



3. The length of the picture of the comb is about 7 centimeters.



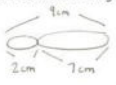
COMMON CORE Lesson 1: Connect measurement with physical units by using multiple copies of the same physical unit to measure. 5/3/14 engage^{ny} 2.A.9

NYS COMMON CORE MATHEMATICS CURRICULUM Lesson 1 Problem Set 2•2

4. The length of the picture of the shovel is about 9 centimeters.



5. The head of a grasshopper is 2 centimeters long. The rest of the grasshopper's body is 7 centimeters long. What is the total length of the grasshopper?

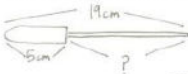


$2 + 7 = 9$

The total length of the grasshopper is 9cm.

6. The length of a screwdriver is 19 centimeters. The handle is 5 centimeters long.

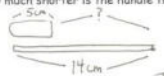
a. What is the length of the top of the screwdriver?



$5 + 14 = 19$

The top of the screwdriver is 14cm.

b. How much shorter is the handle than the top of the screwdriver?



$14 - 5 = 9$

The handle is 9cm shorter than the top.

COMMON CORE Lesson 1: Connect measurement with physical units by using multiple copies of the same physical unit to measure. 5/3/14 engage^{ny} 2.A.10

centimeter cube or that they left spaces between cubes. This is an excellent opportunity to discuss **endpoint.**)

- How did your drawings help you to answer Problems 5 and 6? What new (or significant) vocabulary did we use today to talk about measurement? (Length, **estimate**, and longer.)
- What did you learn about how to measure with centimeter cubes? Could you have measured with a pocketful of coins?

Exit Ticket (3 minutes)

After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help you assess the students' understanding of the concepts that were presented in the lesson today and plan more effectively for future lessons. You may read the questions aloud to the students.

Note: Discuss Homework Problems 3 and 4 during the next day's lesson to point out that students should not count the extra cubes.

A

Number Correct: _____

Before, Between, After

1.	1, 2, ____	
2.	11, 12, ____	
3.	21, 22, ____	
4.	71, 72, ____	
5.	3, 4, ____	
6.	3, ____, 5	
7.	13, ____, 15	
8.	23, ____, 25	
9.	83, ____, 85	
10.	7, 8, ____	
11.	7, ____, 9	
12.	____, 8, 9	
13.	____, 18, 19	
14.	____, 28, 29	
15.	____, 58, 59	
16.	12, 13, ____	
17.	45, 46, ____	
18.	12, ____, 14	
19.	36, ____, 38	
20.	____, 19, 20	
21.	____, 89, 90	
22.	98, 99, ____	

23.	99, ____, 101	
24.	19, 20, ____	
25.	119, 120, ____	
26.	35, ____, 37	
27.	135, ____, 137	
28.	____, 24, 25	
29.	____, 124, 125	
30.	142, 143, ____	
31.	138, ____, 140	
32.	____, 149, 150	
33.	148, ____, 150	
34.	____, 149, 150	
35.	____, 163, 164	
36.	187, ____, 189	
37.	____, 170, 171	
38.	178, 179, ____	
39.	192, ____, 194	
40.	____, 190, 191	
41.	197, ____, 199	
42.	168, 169, ____	
43.	199, ____, 201	
44.	____, 160, 161	

B

Before, Between, After

Number Correct: _____

Improvement: _____

1.	0, 1, ____	
2.	10, 11, ____	
3.	20, 21, ____	
4.	70, 71, ____	
5.	2, 3, ____	
6.	2, ____, 4	
7.	12, ____, 14	
8.	22, ____ 24	
9.	82, ____, 84	
10.	6, 7, ____	
11.	6, ____, 8	
12.	____, 7, 8	
13.	____, 17, 18	
14.	____, 27, 28	
15.	____, 57, 58	
16.	11, 12, ____	
17.	44, 45, ____	
18.	11, ____, 13	
19.	35, ____, 37	
20.	____, 19, 20	
21.	____, 79, 80	
22.	98, 99, ____	

23.	99, ____, 101	
24.	29, 30, ____	
25.	129, 130, ____	
26.	34, ____, 36	
27.	134, ____, 136	
28.	____, 23, 24	
29.	____, 123, 124	
30.	141, 142, ____	
31.	128, ____, 130	
32.	____, 149, 150	
33.	148, ____, 150	
34.	____, 149, 150	
35.	____, 173, 174	
36.	167, ____, 169	
37.	____, 160, 161	
38.	188, 189, ____	
39.	193, ____, 195	
40.	____, 170, 171	
41.	196, ____, 198	
42.	178, 179, ____	
43.	199, ____, 201	
44.	____, 180, 181	

Name _____

Date _____

Use centimeter cubes to find the length of each object.

1. The picture of the fork and spoon is about _____ centimeter cubes long.



2. The picture of the hammer is about _____ centimeters long.



3. The length of the picture of the comb is about _____ centimeters.



4. The length of the picture of the shovel is about _____ centimeters.



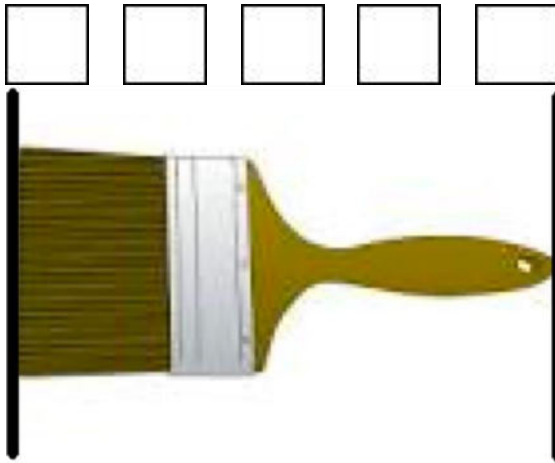
5. The head of a grasshopper is 2 centimeters long. The rest of the grasshopper's body is 7 centimeters long. What is the total length of the grasshopper?
6. The length of a screwdriver is 19 centimeters. The handle is 5 centimeters long.
- What is the length of the top of the screwdriver?
 - How much shorter is the handle than the top of the screwdriver?

Name _____

Date _____

Sara lined up her centimeter cubes to find the length of the picture of the paintbrush.

Sara thinks the picture of the paintbrush is 5 centimeter cubes long.



Is her answer correct? Explain why or why not.

Name _____

Date _____

Count each centimeter cube to find the length of each object.



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1. The crayon is _____ centimeter cubes long.



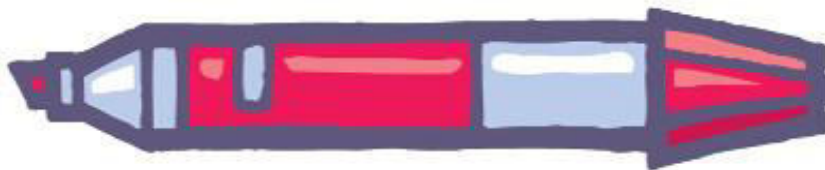
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2. The pencil is _____ centimeter cubes long.



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3. The clothespin is _____ centimeter cubes long.



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4. The length of the marker is _____ centimeter cubes.

5. Richard has 43 centimeter cubes. Henry has 30 centimeter cubes. What is the length of their cubes altogether?
6. The length of Marisa's loaf of bread is 54 centimeters. She cut off and ate 7 centimeters of bread. What is the length of what she has left?
7. The length of Jimmy's math book is 17 centimeter cubes. His reading book is 12 centimeter cubes longer. What is the length of his reading book?