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Objective

To measure the length of an object using non-standard units and understand that the number of units is the length

1 Introduction

Discuss using objects of equal length, or units, to measure the length of a longer object. Emphasize that the units must be the same size, and they are lined up along the longer object without leaving gaps or overlapping. Work through the examples on the page, and guide students to recognize that if the unit is small, more are needed to measure an object than if the units are large.

Think About It

Students should recognize that gaps between units would not be counted in the measurement and the actual length would be more units.

Common Core Learning Standard

1.MD.2 Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps.

Vocabulary

measure: to find how long something is
unit: something that is used to measure, such as a paper clip

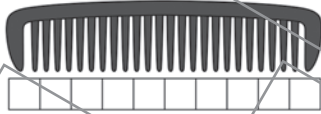
CCLS: 1.MD.2

LESSON 20 Finding Length

1 Introduction

You **measure** to find how long something is. You can find the length of an object using smaller objects of equal length. Line them up end to end.


Ranit measured this comb using squares.
How many squares did she use?



Do not put one square over another square.
Do not leave gaps between squares.

Count the squares under the comb.
There are 10 squares under the comb.
The comb is 10 squares long.

Cliff measured the same comb using paper clips.
How many paper clips long is the comb?



The square is a **unit**.
All the squares are the same. The paper clip is a **unit**.
All the paper clips are the same.

Count the paper clips under the comb.
There are 4 paper clips under the comb.
The comb is 4 paper clips long.

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Think About It

Why is it important to not have gaps between squares or paper clips to find length?

2 Focused Instruction

Use a longer unit to measure longer things. Work with a partner on this problem.

➤ How long is your classroom?

Take off your shoes. Walk the length of the classroom. Walk heel to toe so there are no gaps.

How many footsteps long is your classroom?

Responses will vary.

Measure the classroom with your shoes. Do not leave gaps between the shoes.

How many shoes long is your classroom? *Responses will vary.*

Compare the number of footsteps and shoe lengths.

_____ footsteps *Responses will vary.*

_____ shoe lengths *Responses will vary.*

Use longer objects to measure longer lengths. Use shorter objects to measure shorter lengths.

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2 Focused Instruction Lesson 20

Is the classroom more footsteps or more shoes long?
footsteps

Which unit is shorter, footsteps or shoes?
footsteps

Circle the correct word in the sentence.
 You need [more fewer] of a small unit than a large unit to measure a length.

Suppose you measured the classroom with paper clips. How would that number compare to the number of shoe lengths or footsteps? Tell how you know.
It would be a much bigger number. The paper clip is smaller than my foot. My foot is smaller than my shoe. So, it takes more paper clips that footsteps or shoes to measure the room.

Why should you use longer objects to measure longer lengths?
It is quicker. The numbers are smaller.

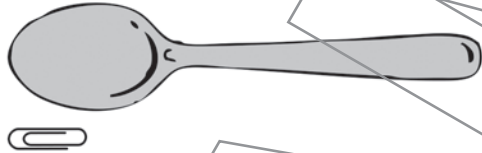
UNIT 5 Measurement and Data 211

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2 Focused Instruction Lesson 20

Use a paper clip to measure.

► What is the length of this spoon in paper clips?



Mark the length of the paper clip on a small piece of paper. Use the piece of paper to mark unit lengths under the spoon. Repeat until you get the end of the spoon.

How many paper clips long is the spoon? 6

Start each measure at the end of the last measure.

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2 Focused Instruction

In the first activity, students work with a partner to measure the length of the classroom using two different units, a footstep and a shoe. The questions guide them to recognize that it takes more of a shorter unit to measure a length than of a longer unit. They conclude that using a larger unit for a long length makes more sense since fewer units are required.

In the second activity, students use a paper clip to measure. They mark the length of a given paper clip on a piece of paper and use that marked unit to measure a given object.

Conclude the Focused Instruction section by having students answer two questions about finding length.


Connections to Standards of Mathematical Practice

- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- Use appropriate tools strategically.
- Attend to precision.

2 Focused Instruction Lesson 20

Use what you know about measuring length to answer these questions.

1 How many pennies long is this toothbrush?



8

2 Kalil and Theo measure the length of their teacher's desk. Kalil counts 8 shoes. Theo counts 11 shoes. What could be a reason that their measures are different?

Kalil's shoes may be longer than Theo's.


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3 Guided Practice Lesson 20


Solve the following problems.

1 Measure the length of the scissors using pennies.



Answer 6 pennies

2 Audrey measured this pencil. She used coins.



Did Audrey measure correctly? Tell how you know.

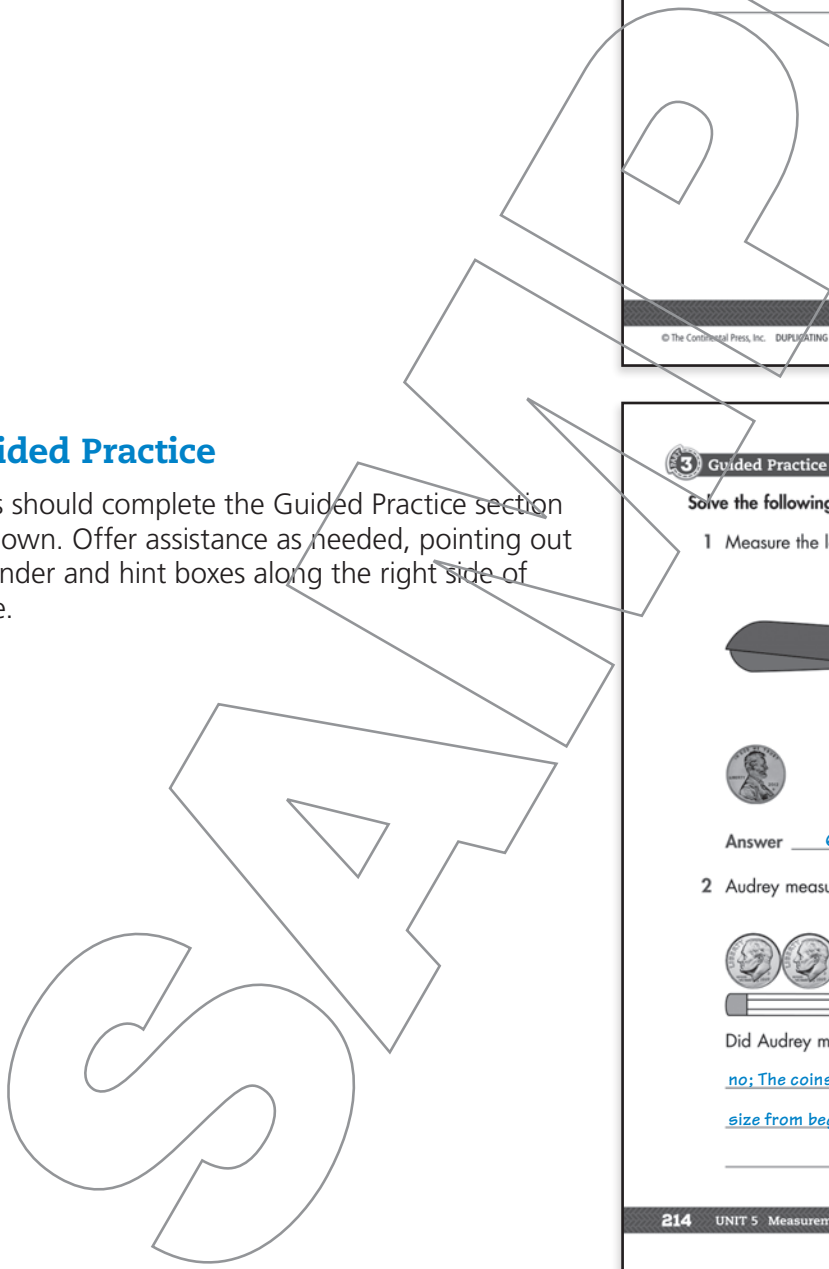
no; The coins are different sizes. The unit has to be the same size from beginning to end.

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3 Guided Practice

Students should complete the Guided Practice section on their own. Offer assistance as needed, pointing out the reminder and hint boxes along the right side of the page.

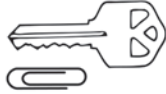


4 Independent Practice

Lesson 20

Solve the following problems.

1 How many paper clips long is this key?



DOK 2
1.MD.2

- A 4
- B 3
- C 2**
- D 1

2 Which ribbon is 3 squares long? Use the square shown.

DOK 2
1.MD.2



- A
- B
- C**
- D

4 Independent Practice Answer Rationales

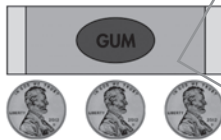
- 1 To determine the length of the key in paper clips, either draw a second paper clip of the same length or mark its length on a piece of paper and measure the key with the paper. The key is 2 paper clips long; choice C is correct and A, B, and D are incorrect.
- 2 To determine the lengths of the ribbons, mark the length of the unit square on a piece of paper and use this paper to measure each ribbon. Choice C is correct. Choice A is incorrect; it is the same length as the unit square. Choice B is incorrect; it is only 2 units long. Choice D is incorrect; it is 4 units long.
- 3 Length is measured by using a repeated unit object placed end to end, without gaps or overlaps. The gaps shown in the art make the total number of units fewer and inaccurate. So Cleo is not correct.

4 Independent Practice

Lesson 20

3 Cleo measures this stick of gum.

DOK 2
1.MD.2



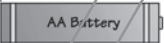
Cleo says the gum is 3 pennies long. Is she correct? Why or why not?

no; There are gaps between the pennies. The gaps add more length. So the gum is more than 3 pennies long.

4 The relative length of each measurement unit in comparison to the battery is easily seen: the clothespin and pen are longer than the battery, and the paper clip and penny are shorter than the battery. Smaller units need to be repeated more times and larger units need to be repeated fewer times to measure any given object. If the desk is 15 batteries long, then it takes fewer than 15 clothespins and pens and more than 15 paper clips and pennies to measure the desk.





4 Independent Practice Lesson 20

4 Nick measures a desk with this battery.



DOK 2
1.MD.2

The desk is 15 batteries long.
How long is the desk in other units? Sort the objects below in the table by the number it takes to measure the desk.

Less than 15 units	15 units	More than 15 units
pen clothespin	battery	penny paper clip

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5 **PART A** The penny shown is life-size, so either actual pennies or a paper marked with its length can be used to measure the straw by marking off the length in this unit. The straw is 8 pennies long.

PART B Because the paper clip is longer than the penny, it will take a smaller number to reach the end of the straw. Xun would only use the same number to measure if the paper clip and the penny were the same length.

4 Independent Practice Lesson 20

5 Xun measured this straw. He used a penny.





DOK 2
1.MD.2

Part A How many pennies long is the straw?

Answer 8 pennies

Part B Xun measured the straw again. He used this paper clip.



He thinks he will use the same number of paper clips as pennies. Is Xun correct? Tell how you know.

no; Xun will use fewer paper clips. The paper clip is longer than the penny, so fewer paper clips are needed to measure length.

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Extension Activity

Assemble a collection of objects that can be used as non-standard measuring units, such as a box of paper clips, counters or markers, clothespins, plastic eating utensils (forks, knives, spoons), play-money coins or bills. Direct each student in a small group to measure the same object using a different unit. Then have the group create a poster to describe the length of the object in the different units. For example, find the length of a student desk in paper clips, clothespins, and plastic spoons.