

# Take & Teach

A large, semi-transparent silhouette of a human head is the central focus, filled with various mathematical concepts. The background is a teal-tinted landscape with mountains and a hot air balloon. Overlaid on the head silhouette are:

- A sine wave graph with a shaded area under the curve.
- A line graph with axes labeled 'x' and 'y', and a point labeled 'a' on the y-axis.
- A pie chart with one section shaded with diagonal lines.
- A compass and a ruler.
- Several mathematical equations and formulas in white and yellow text, including:
  - $N^2 \times H^3 = a \times c$
  - $\frac{d}{91m} = \frac{b}{91m}$
  - $x^2 + y^3 + z^2 + xyz = 2$
  - $c^2 = 2c$
  - $a^2 = b$
  - $\frac{a}{5nd} =$
  - $y = \frac{2}{\sqrt{3+1}}$
  - $xyz = 2$
  - $9 + x_7 = (\frac{2}{3} \times 2x)$
  - $x_7 = (\frac{2}{3} \times 2x)$
  - $(cdx) = 26 + c^2 (\frac{2}{3} \times 2x)$
  - $\epsilon = c005$
  - $bc$
  - $2x)$
  - $2$



# What's Inside This Sample Lesson?

- A fully guided **Explore activity** written to meet rigorous state and national standards
- **Teacher Edition** pages, **Student Workbook** pages, and **other helpful resources** to fully experience a STEMscopes Math Explore activity

## Table of Contents

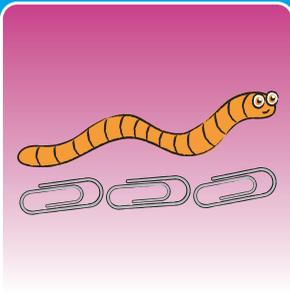
Grade 1, Length - Explore 2

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**Go Online!**

Explore the digital resources for this lesson.





GRADE 1 MEASUREMENT AND DATA

# LENGTH

## FOCUS STANDARDS

Measure lengths indirectly and by iterating length units.

- Order three objects by length; compare the lengths of two objects indirectly by using a third object.
- 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. Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.

## ENGAGE ACTIVITIES

### ACCESSING PRIOR KNOWLEDGE

In this activity, students engage in hands-on learning to directly compare the lengths of common classroom objects.

- Students select two items from the classroom and compare their lengths to determine which is longer or shorter.
- They work with partners to compare different pairs of items, discussing and rotating through various combinations.
- A class discussion follows, where students share their findings and reasoning, allowing for assessment of understanding and addressing any misconceptions.
- The activity concludes with students demonstrating their comparisons to the class and returning the items to their original places.

### HOOK - BUILDING-BLOCK TOWER CONTEST

Students explore nonstandard measurement by determining the height of a building-block tower using various tools.

- Students receive building blocks and a set of nonstandard measurement tools, including paper clips, linking cubes, and markers.
- They build a tower and use the provided tools to measure its height, recording their findings on a Student Handout.
- The activity encourages discussion on measurement accuracy and tool selection, prompting students to compare results using different tools.
- As an extension, students build a longer structure and measure it with each tool, sharing and comparing their results with peers.

## USING STEMSCOPES MATH

### DAILY NUMERACY

Boost number sense and spark mathematical discourse!

Designed to help students go beyond procedures, Daily Numeracy builds a deep understanding of numbers through purposeful, engaging activities. Empower students to reason with numbers in ways that are accurate, efficient, and flexible—just like real mathematicians do! Each activity is carefully crafted to strengthen number sense, encourage math discourse, and help students see the relationships and connections that make math meaningful.

## EXPLORE ACTIVITIES

### EXPLORE 1 - LENGTH CONCEPT

Students explore the concept of length by comparing objects in the classroom using strings of various lengths.

- Students work in pairs to find objects that are shorter and longer than each of the five colored strings provided.
- They record their findings in a Student Journal by drawing and labeling the objects.
- Students order the strings from shortest to longest and vice versa, enhancing their understanding of measurement.
- The activity concludes with a Math Chat, where students share strategies and observations, reinforcing their learning.

### EXPLORE 2 - MEASURING OBJECTS

Students engage in hands-on measurement exercises using nonstandard tools to explore the concept of length.

- Students work in groups to measure various classroom objects using tools like straws, linking cubes, and paper clips.
- They estimate the number of units needed before measuring and compare their estimations to actual measurements.
- The activity includes rotating through stations, each with different objects and tools, to practice and refine measurement skills.
- Students participate in discussions to share strategies and insights, enhancing their understanding of measurement concepts.

### EXPLORE 3 - MEASURING THE SAME THING WITH DIFFERENT UNITS

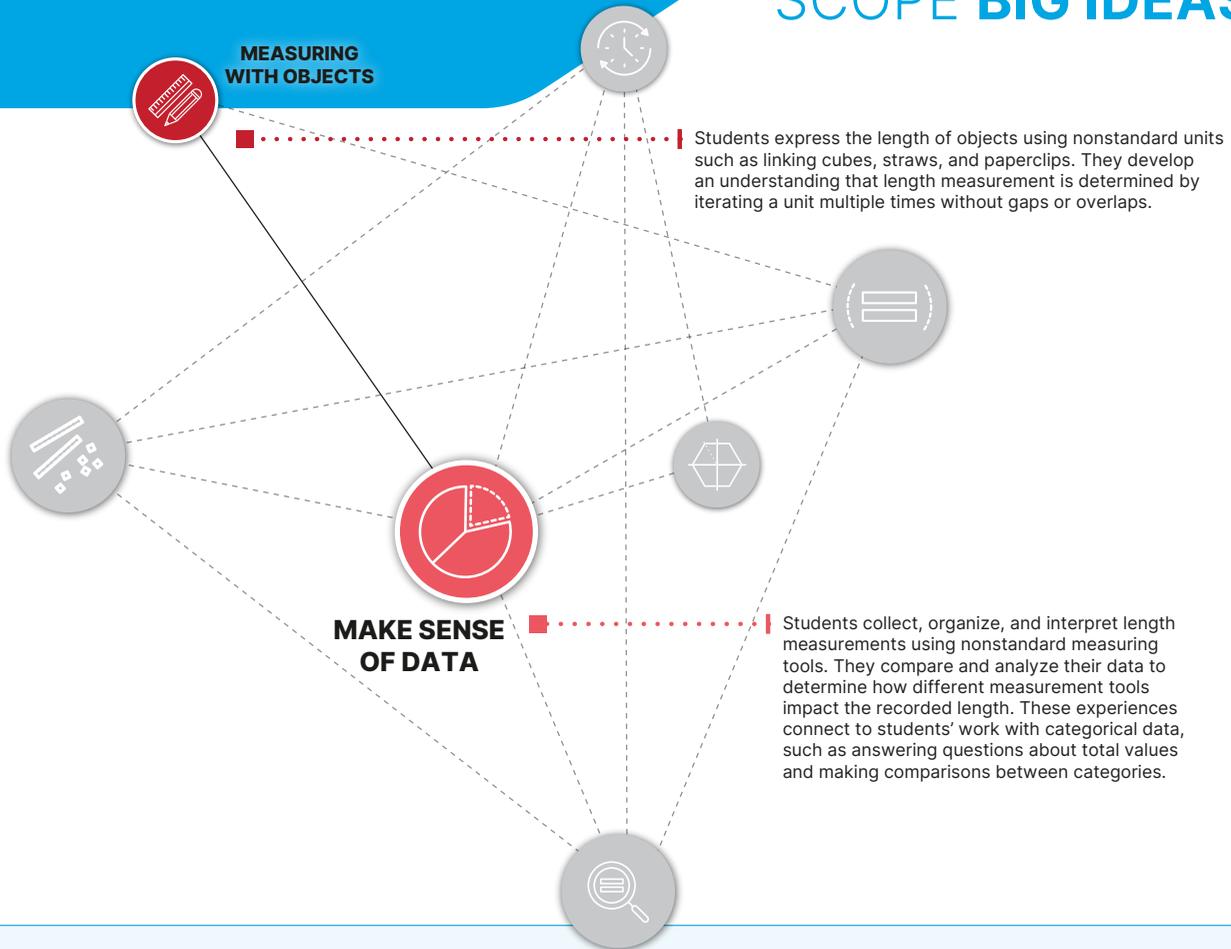
Students explore measurement by using different units to measure the length of an earthworm.

- Students work in groups to measure a chenille stem (representing an earthworm) using various units such as paper clips, cubes, and coins.
- They estimate and then measure the length of the earthworm with two different units at each station, recording their findings in a Student Journal.
- Students discuss and compare their results, noting how the size of the measurement unit affects the number needed to measure the same object.
- The activity concludes with a Math Chat, where students share observations and strategies, reinforcing their understanding of measurement concepts.

JUMP IN HERE



# SCOPE BIG IDEAS



## KEY CONCEPTS

- I can 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.
- I can understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. (Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.)
- I can order three objects by length.
- I can compare the lengths of two objects indirectly by using a third object.

## FUNDAMENTAL QUESTIONS

- Explain how to 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.
- How can you demonstrate an understanding that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps?
- Why is it important to measure by lining objects with no gaps or overlaps?
- How can shorter objects be used to measure longer objects?
- How can you order three objects?
- How can the lengths of two objects be compared indirectly using the third object?

SCAN HERE  
for the  
Teacher  
Prep Video



LENGTH GRADE 1

EXPLORE &gt; EXPLORE 2



INSTRUCTIONAL LESSON

## EXPLORE 2 - MEASURING OBJECTS

Prior to completing this Explore, have students complete **Skill Basics - The Rules of Measurement** so they can apply the skill to this concept.

**Standard(s)**

**Measure lengths indirectly and by iterating length units.** 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. Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.

Big Ideas	Standards for Mathematical Practice	Content Connections	Drivers of Investigation
Make Sense of Data	<b>MP.2</b> Reason abstractly and quantitatively.	<b>CC1</b> Reasoning with Data	<b>D12</b> Predict What Could Happen (Predict)
Measuring with Objects	<b>MP.5</b> Use appropriate tools strategically. <b>MP.8</b> Look for and express regularity in repeated reasoning.	<b>CC2</b> Exploring Changing Quantities	

**DESCRIPTION**

Students use nonstandard measuring tools to measure the lengths of various objects in the classroom.

**MATERIALS****PRINTED**

- 1 Student Journal (per student)
- 1 Exit Ticket (per student)

**REUSABLE**

- 120 Straws (per teacher)
- 1 Teacher's desk, for students to measure (per teacher)
- 1 Bookshelf, for students to measure (per teacher)
- 40 Linking cubes (per teacher)
- 40 Large paper clips (per teacher)
- 6 Large resealable bags (per teacher)
- 2 Unsharpened pencils (per teacher)
- 2 Glue bottles (per teacher)
- 2 Books (per teacher)
- 2 Folders (per teacher)
- 2 Student desks (per teacher)
- 2 Staplers (per teacher)
- 12 Linking cubes (per student)
- 1 Sheet of paper (per student)
- 1 Marker (per student)
- 1 Glue stick (per student)

**PREPARATION**

- Plan to have students work in 6 groups to complete this activity. There are 3 stations, and 2 groups work at 1 station at a time.
- Prepare the following materials for the following stations:
  - Station 1: 2 pencils, 2 glue bottles, 2 books, and 2 sets of 20 linking cubes in their own resealable bag
  - Station 2: 2 sets of 60 straws in their own resealable bag  
The teacher's desk and a bookshelf should be available to measure. If these pieces of furniture are not available, other classroom furniture can be substituted.
  - Station 3: 2 folders, 2 staplers, and 2 sets of 20 large paper clips in their own resealable bag. A student desk should be available to measure. If a student desk is not available, a different piece of classroom furniture can be substituted.
- Provide each student with at least 12 linking cubes, 1 sheet of paper, 1 marker, and 1 glue stick to complete the Exit Ticket.
- Print the Student Journal and an Exit Ticket for each student.



GRADE 1 LENGTH

EXPLORE > EXPLORE 2

PROCEDURE AND FACILITATION POINTS

1. Help students access the task by using the following guiding questions:
  - a. What do you already know about measuring length?
  - b. Have you ever packed a box of items to move or get rid of?
  - c. What kinds of things did you pack?
  - d. How did you fit the items into the box?
2. Read the following scenario to the class: This summer, our school is getting brand-new carpet, which means everything in our classroom needs to be packed up and stored away. But before that can happen, the maintenance team needs to measure each item to make sure everything will fit in the storage room. Can you help by measuring the classroom items and gathering the information they need?
3. Give each student the Student Journal.
4. Divide the class into 6 groups. Assign groups to their starting stations. Two groups work at one station at a time.

5. Instruct students to use the assigned measurement tool at their station to measure the three objects listed on the table in the Student Journal. Before using the tools to measure, students estimate how many of that tool is needed to measure the length of the object. Once they have made their estimations, they can use the tools to measure the actual length of the object. If needed, point out that length is the longer side of the object, and width is the shorter side of the object.
6. When students are done, have them rotate to the next station.
7. Monitor and talk with students as needed to check for understanding by using the following guiding questions:
  - a. **DOK-3** What do you notice about measuring accurately? *Answers will vary. I notice that we have to make sure we don't leave any gaps or overlaps. We have to line up the measuring tools in a straight line.*
  - b. **DOK-3** Why do we have to make sure the measuring tools are lined up end to end? *Answers will vary. If there are gaps, then the measurement will be too short. If they overlap, then the measurement will be too long.*
  - c. **DOK-2** What do you notice about the different tools used for measuring length? *Answers will vary. The tools are different sizes. A smaller tool takes more units to measure the object, while a larger tool takes fewer units.*
  - d. **DOK-3** Was your estimation close to your actual answer? Was it greater than or less than the actual length of the object? *Answers will vary. My estimation was close to the actual length, but the actual length was a little bit less than my estimation.*
  - e. **DOK-3** How does estimation help us when measuring? *Answers will vary. It helps us make a reasonable guess before measuring, and it helps us check if our answer makes sense.*
8. Once students have completed all stations and the Student Journal, bring the class together as a whole group.
9. Ask students to share their strategies, and encourage them to ask each other questions and make connections. Encourage students to notice the similarities and differences between the strategies used to measure length with nonstandard measuring tools.
10. After the Explore, invite the class to a Math Chat to share their observations and learning.

Explore

Length  
Explore 2

Name: \_\_\_\_\_ Date: \_\_\_\_\_

### Measuring Objects

Estimate how long you think each object is, and write your estimation in the table. Use the measuring tool at your station to find the actual length of each object.

Answers for estimations and actual lengths will vary.

**Station 1: Measuring with Linking Cubes**

Object	My Estimation	Actual Length
Pencil		
Glue bottle		
Book		

**Station 2: Measuring with Straws**

Object	My Estimation	Actual Length
Teacher's desk		
Your height		
Bookshelf		

**Station 3: Measuring with Large Paper Clips**

Object	My Estimation	Actual Length
Folder		
Student's desk		
Teacher's stapler		

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STUDENT JOURNAL  
ANSWER KEY



MATH CHAT

- **DOK-2** How can we measure the length of an object? *We can use different tools like rulers, paperclips, or string to measure, making sure to line them up carefully with no gaps or overlaps.*
- **DOK-3** Why is it important to make sure we don't leave gaps or overlaps when measuring length? *If the measuring tools overlap, the measurement will be too long. If there are gaps, the measurement will be too short, making it inaccurate.*
- **DOK-3** Would straws be a reasonable tool for measuring the length of a glue bottle? Why or why not? *No, because straws are usually much longer than a glue bottle, which would make it difficult to measure precisely. A smaller tool would be better.*
- **Choose a Structured Conversation routine to facilitate the following question:**
  - **DOK-2** How do we determine the correct tool to use when measuring an object? *We think about the size of the object first. If it's small, we use something like paperclips or linking cubes, but if it's large, we could use a larger unit like straws or shoes.*
- **DOK-3:** How might measuring length be useful outside of school? *Measuring length helps when buying furniture to make sure it fits in a space, or cutting ribbon the right length for a craft project*

POST-EXPLORE

1. Have students complete the Exit Ticket to formatively assess their understanding of the concept.
2. Complete the Anchor Chart as a class.
3. Have each student complete their Interactive Notebook.

INSTRUCTIONAL SUPPORTS

1. Before introducing the scenario, display the word estimate and come up with a classroom definition of this term. Discuss real-life situations when it is appropriate and helpful to estimate and situations when measurements need to be exact.
2. To encourage multiple methods and multiple ways of seeing and thinking, pose open-ended questions that have more than one possible response.
3. It is important to model the use of measuring tools, emphasizing the importance of lining up the end of the tool with the object being measured. Students should observe and experience firsthand the errors that can occur when a measuring tool is not used properly or when the tools are lined up with gaps or overlaps.
4. Consider cutting each station apart on the Student Journal and stapling them together to form a booklet.
5. Model which side of the object to measure. Remind students that length is a measure of how long something is and to measure the longest side of the object.
6. As students measure, provide short, explicit feedback before misconceptions are developed.
7. As an extension, ask students to list the items from each station in order from shortest to longest and longest to shortest.

Explore
Length Explore 2

Name: \_\_\_\_\_ Date: \_\_\_\_\_

### Measuring Objects Exit Ticket

Estimate how many linking cubes long each object is, and write your estimation in the table. Use the linking cubes to find the actual length of each object. Answers may vary.

Object	My Estimation	Actual Length
Sheet of paper		About 10 cubes
Marker		About 7 cubes
Glue stick		About 5 cubes

Which object is the longest?  
The sheet of paper was the longest.

Which object is the shortest?  
The glue stick was the shortest.

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EXIT TICKET  
ANSWER KEY



GRADE 1 LENGTH

EXPLORE > EXPLORE 2

**LANGUAGE SUPPORTS**

Support students with examples of the concept of estimation and actual length with a visual word wall.

For Spanish-speaking students relate the English word estimate to the Spanish word estimar.

Preteach nonacademic vocabulary, such as the names of the measuring tools and objects being measured, to aid in the understanding of academic content and support students in communicating about their work.

Demonstrate a think-aloud strategy using precise academic vocabulary to explain how to measure the length of an object with different measuring tools, especially when the length does not align exactly with a unit. Allow extra wait time to give students the opportunity to process and understand the information.

Facilitate a structured conversation between pairs of students. Use the sentence structures below to support students in asking and answering questions. Allow students to take turns being partner A and partner B.

- Partner A: How did you measure the book with linking cubes?
- Partner B: I measured the book with linking cubes by ....
- Partner A: How did you measure your height with straws?
- Partner B: I measured my height with straws by ....
- Partner A: I heard you say .... Is that right?

Show What You Know

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Length  
Part 2

### Length

**Part 2: Measuring Objects**  
Estimate how many linking cubes long each object is, and write your estimation in the box. Use linking cubes to find the actual length of each object.

Object	My Estimation	Actual Length
Crayon		About 4 cubes
Folder		About 15 cubes
Pencil box		About 10 cubes

Which object is the longest?  
Folder

Which object is the shortest?  
Crayon

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SHOW WHAT YOU KNOW - PART 2  
ANSWER KEY



Explore

Length  
Explore 2

Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Measuring Objects

Estimate how long you think each object is, and write your estimation in the table. Use the measuring tool at your station to find the actual length of each object.

### Station 1: Measuring with Linking Cubes

Object	My Estimation	Actual Length
Pencil		
Glue bottle		
Book		

### Station 2: Measuring with Straws

Object	My Estimation	Actual Length
Teacher's desk		
Your height		
Bookshelf		

### Station 3: Measuring with Large Paper Clips

Object	My Estimation	Actual Length
Folder		
Student's desk		
Teacher's stapler		



Explore

Length  
Explore 2

Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Measuring Objects Exit Ticket

Estimate how many linking cubes long each object is, and write your estimation in the table. Use the linking cubes to find the actual length of each object.

Object	My Estimation	Actual Length
Sheet of paper		
Marker		
Glue stick		

Which object is the longest?

\_\_\_\_\_

Which object is the shortest?

\_\_\_\_\_



Math Chat

Math Chat
How can we measure the length of an object?
Why is it important to make sure we don't leave gaps or overlaps when measuring length?
Would straws be a reasonable tool for measuring the length of a glue bottle? Why or why not?
How do we determine the correct tool to use when measuring an object?
How might measuring length be useful outside of school?



Show What You Know

Name: \_\_\_\_\_ Date: \_\_\_\_\_

# Length

## Part 2: Measuring Objects

Estimate how many linking cubes long each object is, and write your estimation in the box. Use linking cubes to find the actual length of each object.

Object	My Estimation	Actual Length
Crayon		
Folder		
Pencil box		

Which object is the longest?

\_\_\_\_\_

Which object is the shortest?

\_\_\_\_\_







# Ready to see the full program?

Scan here!



## Exploring this lesson with your students?

We'd love to see it in action! Snap a pic, share your classroom experience, and tag us with @AccelerateLearningInc on Facebook.

By sharing, you'll join a community of math educators who are making math meaningful. You might even get featured!

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