

# Mathematics!



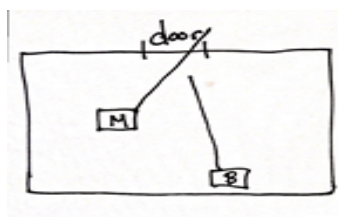
## **A Story of Units Parent Handbook**

**GRADE 1  
MODULE 3**

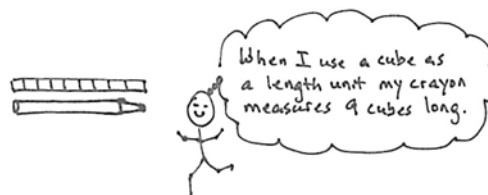
# Ordering and Comparing Length Measurements as Numbers

## OVERVIEW

The module opens in Topic A by extending students' kindergarten experiences with direct length comparison to indirect comparison whereby the length of one object is used to compare the lengths of two other objects. "My string is longer than your book. Your book is longer than my pencil. That means my string is longer than my pencil!" In the topic's third lesson, students use the same transitivity, or indirect comparison, to compare short distances within the classroom in order to see what the shortest path to their classroom door is, which is helpful to know for lining up and emergencies. Students place one endpoint of a length of string at their desks and see if it reaches the door. After using the same piece of string from two students' desks, they make statements such as, "Maya's path is shorter than the string. Bailey's path is longer than the string. That means Bailey's path to the door is longer than Maya's path."



Topic B takes *longer than* and *shorter than* to a new level of precision by introducing the idea of a *length unit*. Centimeter cubes are laid alongside the length of an object as students learn that the total number of cubes laid end to end with no gaps or overlaps represents the length of that object. The progressions document expresses the research indicating the importance of teaching standard units to Grade 1 students *before* non-standard units. Thus, Grade 1 students learn about the centimeter before exploring non-standard units of measurement in this module. Simply lining the cubes up to the ruler allows students to see that they are using units which relate to a tool used around the world. One of the primary ways we recognize standard units is because they are ubiquitous, used on rulers at grandma's house in the Bronx, in school, and in local shops. Students ask and answer the question, "Why would we use a standard unit to measure?" The topic closes with students measuring and comparing sets of three items using centimeter cubes. They return to the statements of Topic A but now with more sophisticated insights, for example, "The pencil measures 10 centimeters. The crayon measures 6 centimeters. The book measures 20 centimeters. These are ordered from shortest to longest: the crayon, the pencil, the book. The book is longer than the pencil, and the pencil is longer than the crayon, so the book is longer than the crayon."



Topic C explores the usefulness of measuring with similar units. Students measure the same objects from Topic B using two different non-standard units together, toothpicks and small paper clips, to measure one object and answer the question, “Why do we measure with same-sized length units?” They realize that using iterations of the *same* unit will yield consistent measurement results. Similarly, students explore what it means to use a different unit of measurement from their classmates. It becomes obvious to students that if we want to have discussions about the lengths of objects together, we *must* measure with the same units. Students answer the question, “If Bailey uses paper clips and Maya uses toothpicks, and they both measure things in our classroom, will they be able to compare their measurements?” With this new understanding of consistent measurement, Topic C closes with students solving *compare with difference unknown* problems. Students answer such questions as, “How much longer is the pencil than the marker?” using standard units.

Topic D closes the module as students represent and interpret data. They collect data about their classmates, and sort that information into three categories. Using same-sized pictures on squares, students represent this sorted data so that they can easily describe and compare the data. Students interpret information presented in the graphs by first determining the number of data points in a given category (e.g., “How many students like carrots the best?”), and then combining categories (e.g., “How many total students like carrots or broccoli the best?”). The module closes with students asking and answering varied questions about data sets, for example, “How many students were polled in all?” (*put together with result unknown*) and, “How many more students preferred broccoli to string beans?” (*compare with difference unknown*). The work with units representing data points are an application of their earlier work with length as they observe that each square can be lightly interpreted as a length unit, which helps them analyze the data.

## Terminology

### New or Recently Introduced Terms

Centimeter (standard length unit within the metric system)

Centimeter cube (pictured right)

Length unit (measuring the length of an object with equal-sized units)



### Familiar Terms and Symbols

Less than

Longer than

More than

## Suggested Tools and Representations

Centimeter cubes

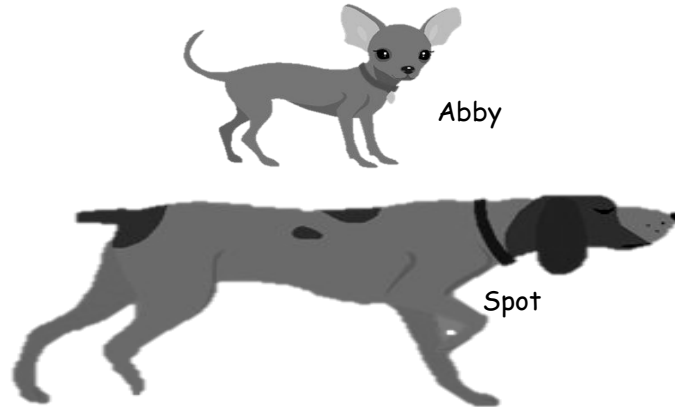
Centimeter rulers (simply for the purpose of naming the centimeter)

String lengths of about 25 centimeters

## Lesson 1

Objective: Compare length directly and consider importance of aligning endpoints.

Write the words **longer than** or **shorter than** to make the sentences true.



Abby is shorter than Spot.

## Lesson 2

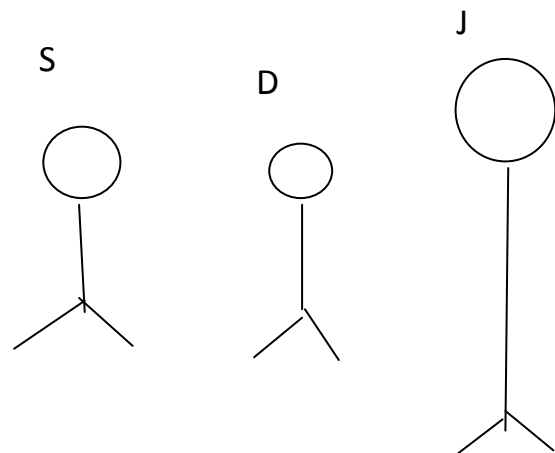
Objective: Compare length using indirect comparison by finding objects *longer than*, *shorter than*, and *equal in length* to that of a string or paper.

Sammy is taller than Dion.

Janell is taller than Sammy.

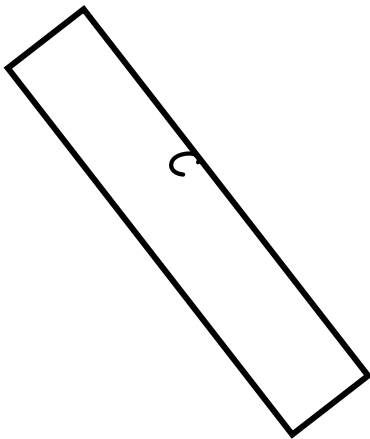
Dion is (**taller than/shorter than**) Janell.

Dion is shorter than Janell.



### Lesson 3

Objective: Order three lengths using indirect comparison.



Which is the shortest rectangle? B

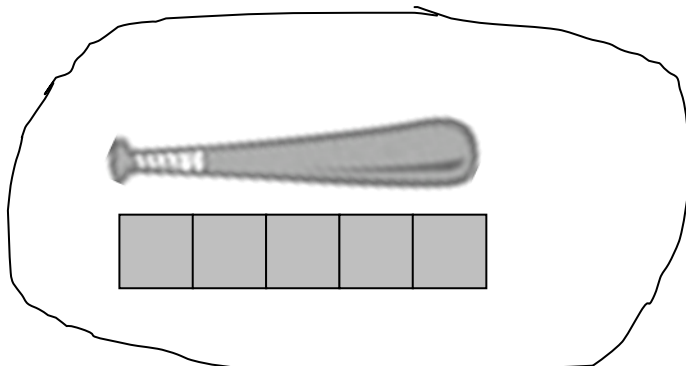
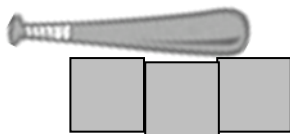
If rectangle A is longer than rectangle C, the longest rectangle is... A

Order the rectangles from shortest to longest...B, C, A

### Lesson 4

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

. Circle the picture that shows the correct way to measure



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

You should line up the end of the bat with the end of the cubes.

## Lesson 5

Objective: Rename and measure with centimeter cubes, using their standard unit name of centimeters.



The hamburger picture is 4 centimeters long.

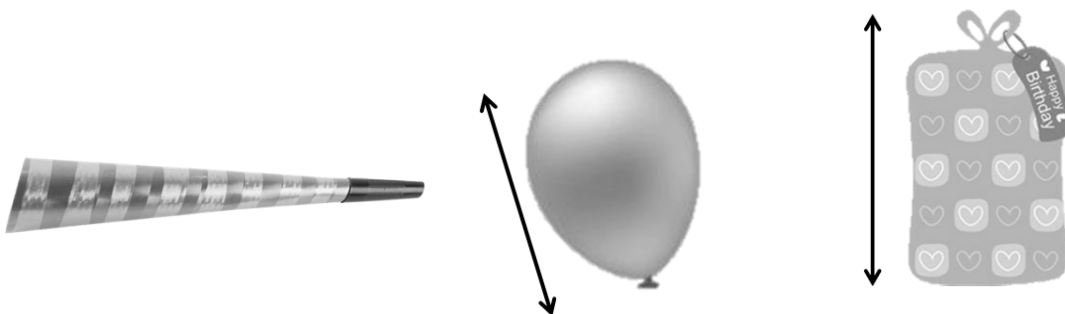
The hotdog picture is 6 centimeters long.

The bread is 5 centimeters long.

Not drawn to scale.

## Lesson 6

Objective: Order, measure, and compare the length of objects before and after measuring with centimeter cubes, solving *compare with difference unknown* word problems.



Order the objects from shortest (1) to longest (3) by writing the number next to the object name.

Noisemaker \_\_\_3\_\_\_

Balloon \_\_\_1\_\_\_

Present \_\_\_2\_\_\_

Not drawn to scale.

## Lesson 7

Objective: Measure the same objects from Topic B with different non-standard units simultaneously to see the need to measure with a consistent unit.

Not drawn  
to scale.



Measure the length of the bottle first with large paper clips and then with small paper clips.

Number of large paper clips   2  

Number of small paper clips   3  

## Lesson 8

Objective: Understand the need to use the same units when comparing measurements with others.

Measure various objects using your choice of measurement.

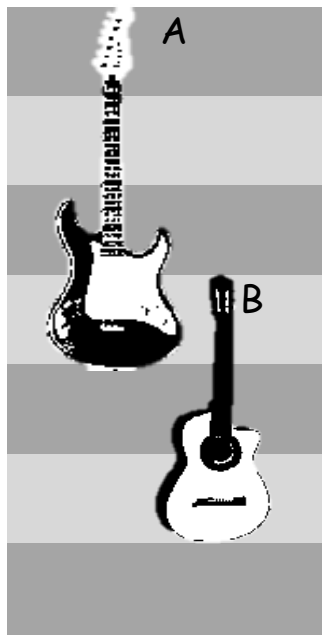
Example: Glue stick measure with centimeter cubes is 8 cm.



## Lesson 9

Objective: Answer *compare with difference unknown* problems about lengths of two different objects measured in centimeters.

How much longer is Guitar A than Guitar B? 1 cm.



## Lesson 10:

Objective: Collect, sort, and organize data, then ask and answer questions about the number of data points.

Organize the data.

red green red blue red blue blue red  
blue blue green red red

Red IIII I

Green II

Blue IIII

Write a number sentence that tells the total number of people interviewed.

$$6 + 2 + 5 = 13$$

## Lesson 11:

Objective: Collect, sort, and organize data, then ask and answer questions about the number of data points.

Toy	Students' Favorite Toy
stuffed animals	15
toy cars	9
blocks	18

How many students chose toy cars? 9

How many more students chose blocks than stuffed animals? 3

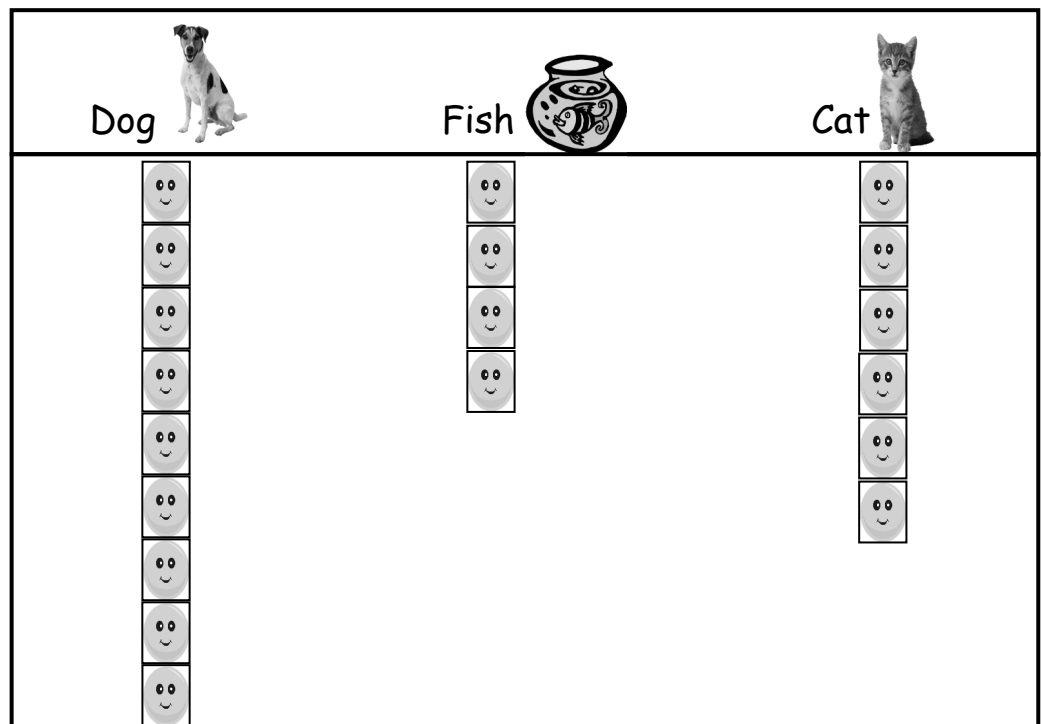
How many students would need to choose toy cars to equal the number of students who chose blocks? 9

## Lesson 12:

Objective: Ask and answer varied word problem types about a data set with three categories.

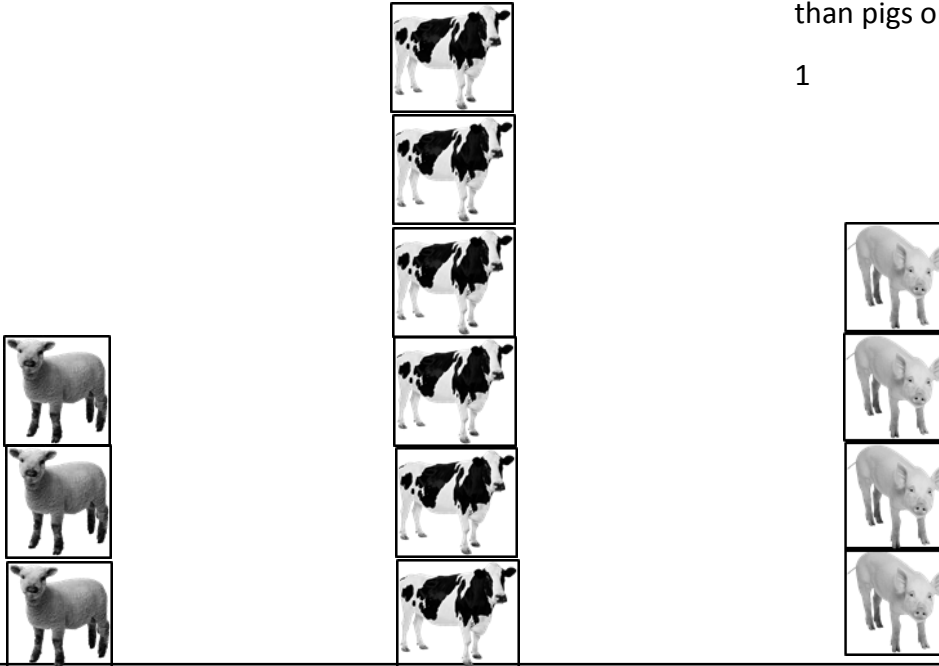
How many students chose dogs or cats as their favorite?

15



## Lesson 13:

Objective: Ask and answer varied word problem types about a data set with three categories. Animals on Lily's Farm



How many fewer sheep are there than pigs on Lily's Farm?

1