

Kenmore-Town of Tonawanda UFSD

We educate, prepare, and inspire all students to achieve their highest potential



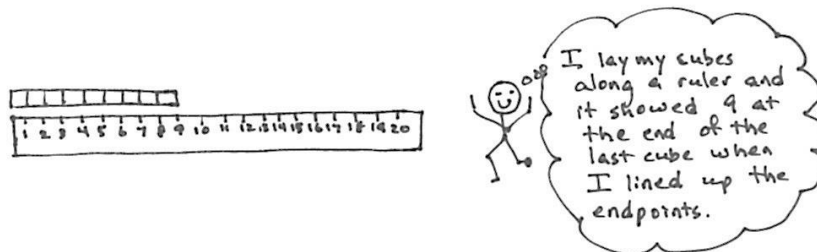
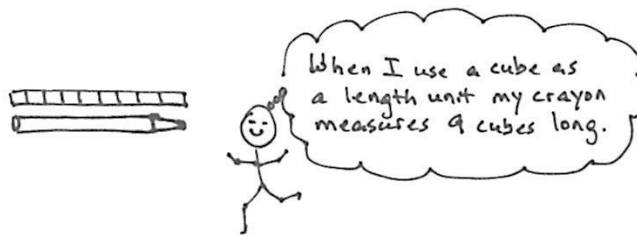
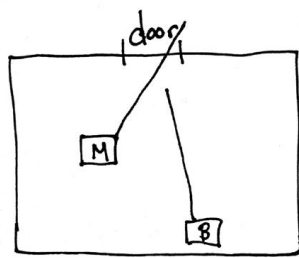
Grade 1 Module 3 Parent Handbook

The materials contained within this packet have been taken from the Great Minds curriculum Eureka Math.

Ordering and Comparing Length Measurements as Numbers

OVERVIEW

Grade 1 Module 3 opens in Topic A by extending students' Kindergarten experiences with direct length comparison to the new learning of indirect comparison whereby the length of one object is used to compare the lengths of two other objects (1.MD.1). "My string is longer than your book. Your book is longer than my pencil. That means my string is longer than my pencil!" Students use the same transitivity, or indirect comparison, to compare short distances within the classroom in order to find the shortest path to their classroom door, which is helpful to know for lining up and for emergencies. Students place one endpoint of a length of string at their desks and then extend the string toward the door to see if it will reach. 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 (1.MD.2). The Geometric Measurement 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 reasons why 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, such as “The pencil measures 10 centimeters. The crayon measures 6 centimeters. The book measures 20 centimeters. I can put them in order 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” (1.MD.1).

Topic C explores the usefulness of measuring with similar units. Students measure the same objects from Topic B using two different non-standard units, toothpicks and small paper clips, simultaneously to measure one object and answer the question, “Why do we measure with same-sized length units?” (1.MD.2). 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, 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 use standard units to answer such questions as, “How much longer is the pencil than the marker?” (1.OA.1).

Topic D closes the module as students represent and interpret data (1.MD.4). 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 it can be easily compared and described. Students interpret information presented in the graphs by first determining the number of data points in a given category, for example, “How many students like carrots the best?” Then, students combine categories, for example, “How many total students like carrots or broccoli the best?” The module closes with students asking and answering varied questions about data sets, such as “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) (1.OA.1). Their work with units representing data points is an application of students’ 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 to the below, also used as a length unit in this module)



- Centimeter ruler (measurement tool using length units of centimeters)
- Data (collected information)
- Endpoint (the end of an object, referenced when aligning for measurement purposes)
- Height (measurement of vertical distance of an object)
- Length unit (measuring the length of an object with equal-sized units)
- Poll (survey)
- Table or graph (organized charts visually representing data)

Familiar Terms and Symbols

- Less than
- Longer than/taller than
- More than
- Shorter than
- Tally marks

Suggested Tools and Representations

- Centimeter cubes
- Centimeter rulers (simply for the purpose of naming the centimeter)
- Non-standard units (toothpicks, small and large paper clips)
- String lengths of about 25 centimeters
- Tally marks

Grade 1 Module 3 Topic A

Indirect Comparison in Length Measurement

Focus Standard:

1.MD.1 Order three objects by length; compare the lengths of two objects indirectly by using a third object.

Instructional Days Recommended: 3

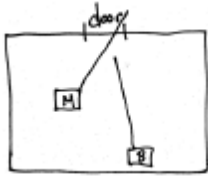
The module opens in Topic A by extending students' Kindergarten experiences with direct length measurement to indirect measurement whereby the length of one object is used to compare that of two other objects (1.MD.1).

Students explore direct comparison in Lesson 1, comparing the length of two objects by paying close attention to the endpoints of each to ensure accurate comparisons. Students draw on their Kindergarten experiences as they use longer than and shorter than as they compare.

In Lesson 2, students begin to use indirect comparison (or transitivity) as they compare each item to one consistent item, such as a piece of string or a strip of construction paper of a specific length. Items are then compared to each other through indirect comparison. For instance, if the crayon is shorter than the paper strip, and the pencil is longer than the paper strip, we can say that the crayon is also shorter than the pencil. As a way to prove their conclusions from indirect comparisons, students use direct comparison to verify their claims.

Lesson 3 extends the use of indirect comparison to compare distances between objects that cannot be moved next to each other for direct comparison. Students use the same transitive process to compare short distances within the classroom in order to find the shortest path to their classroom door, which is helpful to know for lining up and for emergencies. After measuring each path from their desks to the door with the same piece of string, students are able to 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.” Using grid lines on classroom floor tiles and on provided maps of city blocks, students compare distances of various paths.



**The sample homework responses contained in this manual are intended to provide insight into the skills expected of students and instructional strategies used in Eureka Math.*

Lesson 1

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

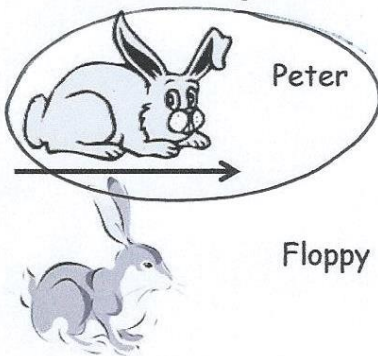
Homework Key

- | | |
|---------------------------------|---------------------|
| 1. Peter circled; Peter; Floppy | 5. Longer than |
| 2. A circled; A; B | 6. Shorter than |
| 3. Shorter than | 7. True |
| 4. Longer than | 8. Answers may vary |

Homework Samples

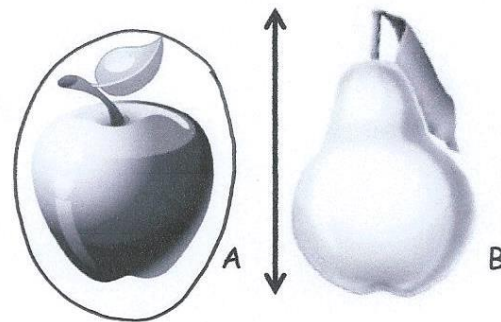
Follow the directions. Complete the sentences.

1. Circle the **longer** rabbit.



Peter is longer than Floppy.

2. Circle the **shorter** fruit.



The ^(A)apple is shorter than the pear^(B).

Lesson 2

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

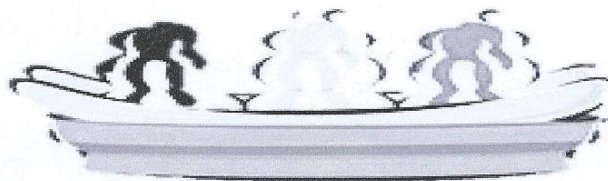
Homework Key

1. The same length as; shorter than; shorter than
2. Shorter than
3. Longer than
4. Shorter
5. Shorter
6. Longer
7. Spoon, cake, paper strip
8. Picture drawn; shorter
9. Picture drawn; taller

Homework Samples

Use the paper strip provided by your teacher to measure each picture. Circle the words you need to make the sentence true. Then, fill in the blank.

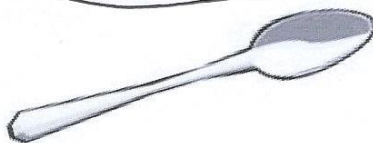
1.



The sundae is

longer than
shorter than
the same length as

 the paper strip.



The spoon is

longer than
shorter than
the same length as

 the paper strip.

The spoon is shorter than the sundae.

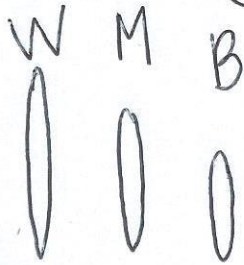
Lesson 2 (continued)

Draw a picture to help you complete the measurement statements. Circle the word that makes each statement true.

8. Marni's hair is shorter than Wesley's hair.

Marni's hair is longer than Bitia's hair.

Bitia's hair is (~~longer~~/shorter) than Wesley's hair



Lesson 3

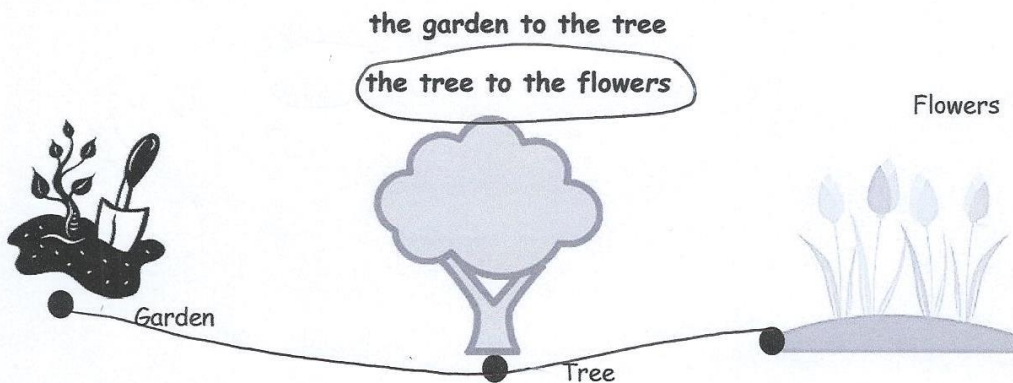
Objective: Order three lengths using indirect comparison.

Homework Key

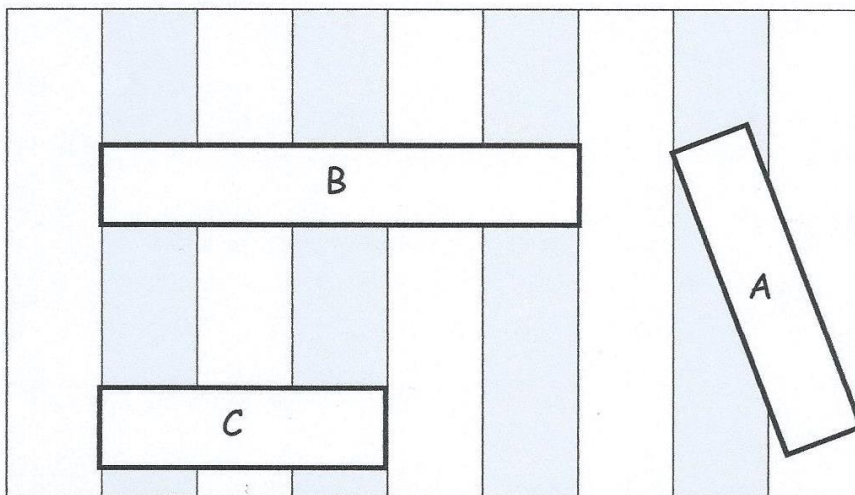
- 1. Path between the tree to the flowers
- 2. B
- 3. C
- 4. C, A, B
- 5. 12
- 6. 14
- 7. Line drawn on picture showing 8, 9, 10, or 11 blocks
- 8. Longer
- 9. Sal
- 10. Sal, Jon, Cam

Homework Samples

1. The string that measures the path from the garden to the tree is longer than the path between the tree and the flowers. Circle the shorter path.



Use the picture to answer the questions about the rectangles.



2. Which is the longest rectangle? B
3. If Rectangle A is longer than Rectangle C, the shortest rectangle is C.

Grade 1 Module 3 Topic B

Standard Length Units

Focus Standards:

- 1.MD.1 Order three objects by length; compare the lengths of two objects indirectly by using a third object.
- 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. Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.

Instructional Days Recommended: 3

Topic B adds a new level of precision to measurement by introducing the idea of a length unit. In Lesson 4, centimeter cubes are laid alongside the length of objects as students learn that the total number of cubes laid end to end with no gaps or overlaps is the length measure of that object. The objects being measured by students include many of the same objects measured in Topic A so that students can add greater precision to their measurements as they specify the number of units equal to the length of the objects being compared. For example, the length of the crayon can now be described not only as shorter than the paper strip, but more precisely as 9 centimeter cubes (1.MD.2).

In Lesson 5, students lay those same centimeter cubes alongside a ruler, recognizing the meaning of the numbers on the ruler as describing the number of centimeter length units up to that number. The centimeter then connects students to their world as they come to realize that the centimeter unit is used by first-grade students in Brazil, by the restaurant owner across the street, and even by their families. Students explore the question, “Why would we use a standard unit to measure?” As the use of rulers to measure is a Grade 2 standard, students in Grade 1 simply rename their centimeter cube as a centimeter as they continue to use the cubes to measure objects. The Geometric Measurement Progressions Document suggests that students engage in standard unit measurement in order

to develop a solid understanding of why and how to measure, rather than measuring using a plethora of nonstandard measurement units.

The topic closes with Lesson 6 where students measure and compare sets of three items using centimeter cubes, returning to the transitive statements of Topic A, but with more sophisticated insights (1.MD.1): “The pencil measures 10 centimeters. The crayon measures 6 centimeters. The book measures 20 centimeters. The order from shortest to longest is the crayon, the pencil, and 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.” Students finally solve compare with difference unknown word problems, determining how much longer a given object is than another.

**The sample homework responses contained in this manual are intended to provide insight into the skills expected of students and instructional strategies used in Eureka Math.*

Lesson 4

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

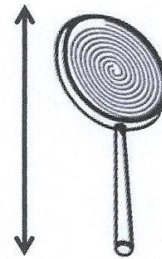
Homework Key

- | | |
|------|---------------------------|
| 1. 4 | 6. 5 |
| 2. 5 | 7. 3 |
| 3. 5 | 8. 5 |
| 4. 7 | 9. 4 |
| 5. 3 | 10. Picture D is circled. |
| | 11. Answers may vary. |

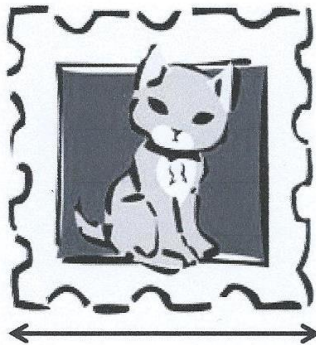
Homework Samples

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

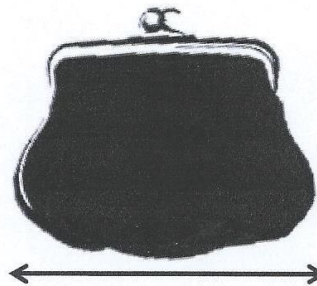
1. The lollipop is 4 centimeter cubes long.



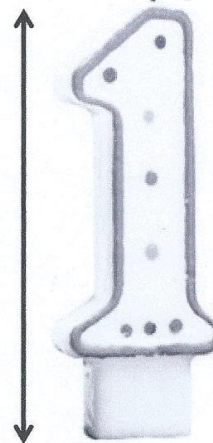
2. The stamp is 5 centimeter cubes long.



3. The purse is 5 centimeter cubes long.

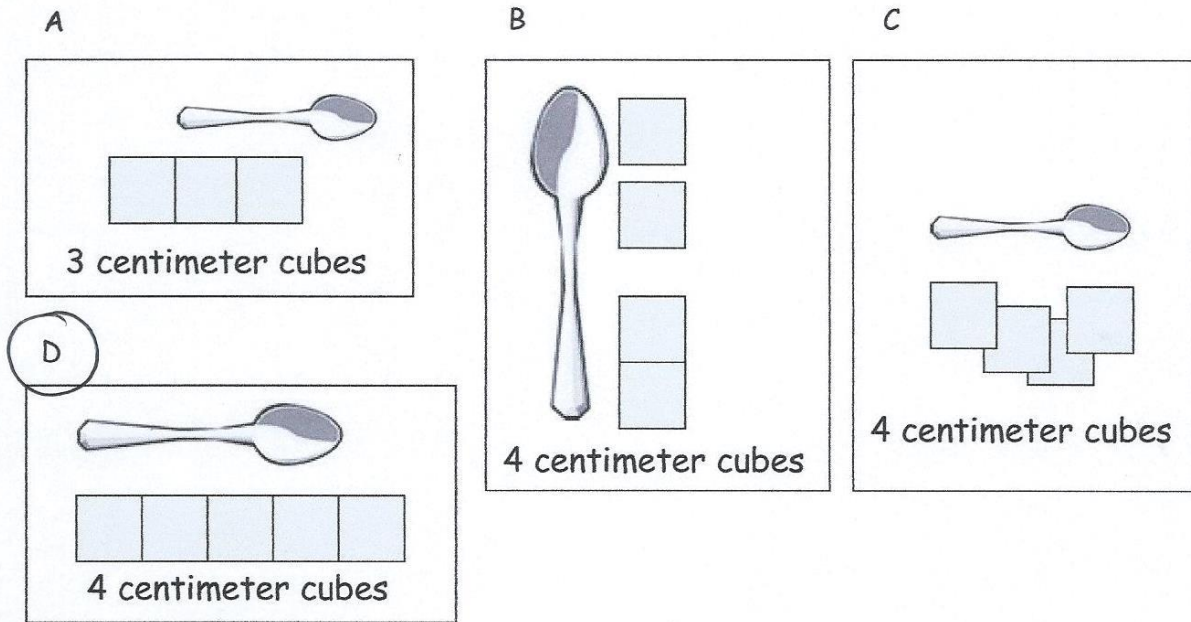


4. The candle is 7 centimeter cubes long.



Lesson 4 (continued)

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



11. Explain what is wrong with the measurements for the pictures you did NOT circle.

You have to make sure the endpoints line
up. The spoon & cubes weren't lined up
in A. In B & C, the cubes need to be
next to each other & touching without any
spaces or overlaps.

Lesson 5

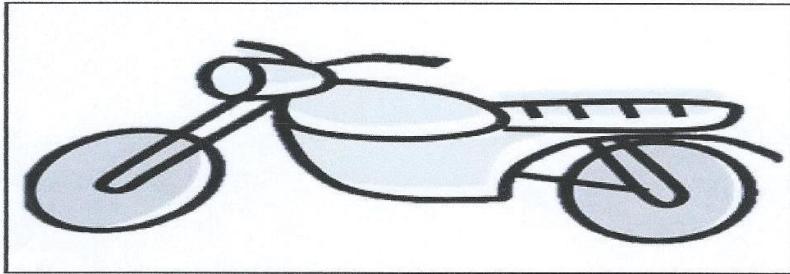
Objective: Rename and measure with centimeter cubes, using their standard unit name of centimeters.

Homework Key

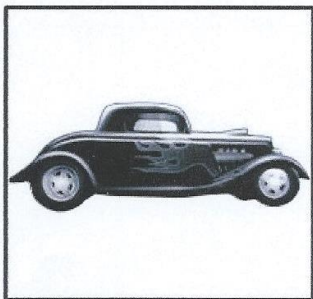
- 13
 - 5
 - 15
 - 8
 - 10
- Fire truck, airplane, rowboat
- Rowboat or car
 - Car; motorcycle, fire truck, or airplane
 - Fire truck; car, rowboat, or airplane
 - Car

Homework Sample

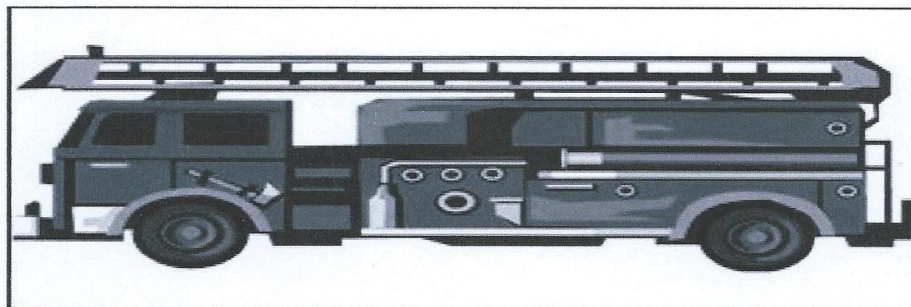
- Justin collects stickers. Use centimeter cubes to measure Justin's stickers. Complete the sentences about Justin's stickers.



- The motorcycle sticker is 13 centimeters long.

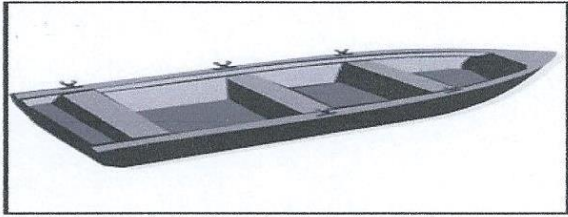


- The car sticker is 5 centimeters long.

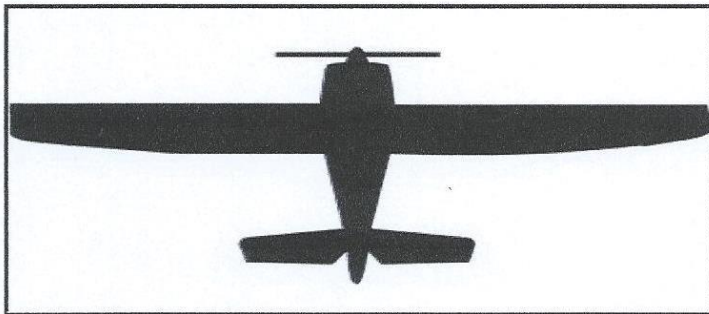


- The fire truck sticker is 15 centimeters long.

Lesson 5 (continued)



d. The rowboat sticker is 8 centimeters long.



e. The airplane sticker is 10 centimeters long.

Lesson 6

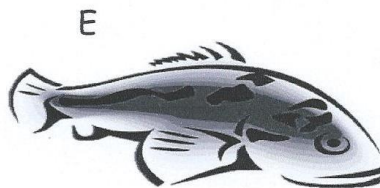
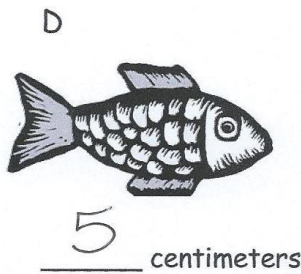
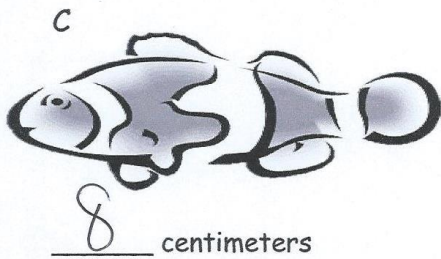
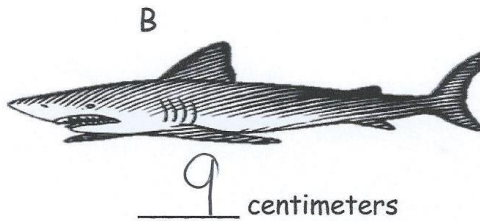
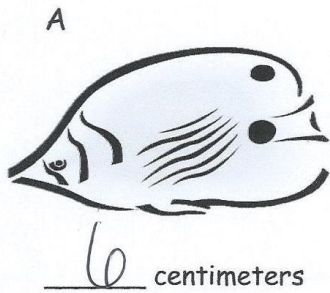
Objective: Order, measure, and compare the length of objects before and after measuring with centimeter cubes, solving *compare with difference unknown* word problems.

Homework Key

- 1. a. 6
- b. 9
- c. 8
- d. 5
- e. 7
- 2. B, C, A
- 3. a. D; answers may vary (B, C, or E).
- b. B; answers may vary (A, D, or E).
- c. D
- d. B, C, and E
- 4. 10 cm
- 5. 6 cm

Homework Samples

1. Natasha's teacher wants her to put the fish in order from longest to shortest. Measure each fish with the centimeter cubes that your teacher gave you.



2. Order fish A, B, and C from longest to shortest. 7 centimeters

B
(9cm) C
(8cm) A
(6cm)

Grade 1 Module 3 Topic C

Non-Standard and Standard Length Units

Focus Standards:

- 1.OA.1 Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.
- 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. Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.

Instructional Days Recommended: 3

Topic C gives students a chance to explore the usefulness of measuring with similar units. The topic opens with Lesson 7 where students measure the same objects from Topic B using two different non-standard length units simultaneously, such as toothpicks and small paper clips (1.MD.2). They then use small paper clips and large paper clips, two non-standard units that happen to be the same object but different lengths. Each time they measure one object using both units, they receive inconsistent measurement results. Students then begin to ask the question, “Why do we measure with same-sized length units?” As they explore why it is so important to use the same-sized length unit, they realize that doing so yields consistent measurement results.

In Lesson 8, students explore what happens when they use a different unit of measurement from that of their classmates. As students measure the same objects with different non-standard length units, they realize that in order to have discussions about the lengths of objects, they 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, Lesson 9 closes the topic with students solving compare with difference unknown problems using centimeter cubes. Students explore and solve problems such as, “How much longer is the pencil than the marker?” (1.OA.1). Revisiting the centimeter helps students recognize the value of having a consistent way to communicate about various measurements.

**The sample homework responses contained in this manual are intended to provide insight into the skills expected of students and instructional strategies used in Eureka Math.*



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.

Homework Key

- a. 4; 6
b. 3; 4 or 5
c. 1; 1 or 2
d. 2; 3
e. 3; 4 or 5
- Answers will vary

Homework Sample



Name of Object	Length in Large Paper Clips	Length in Small Paper Clips
a. paintbrush	4	6
b. scissors	3	5
c. eraser	1	2
d. crayon	2	3
e. glue	3	5

Lesson 8

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

Homework Key

1. a. Answers will vary.
- b. Answers will vary.
- c. Answers will vary.
- d. Answers will vary.
- e. Answers will vary.
- f. Answers will vary.
- g. Answers will vary.
2. a. Answers will vary.
- b. Answers will vary.
- c. Answers will vary.

Homework Sample

Circle the length unit you will use to measure. Use the same length unit for all objects.

Small Paper Clips



Large Paper Clips



Toothpicks



Centimeter Cubes



1. Measure each object listed on the chart, and record the measurement. Add the names of other objects in your house, and record their measurements.

Home Object	Measurement
a. fork	3 toothpicks
b. picture frame	6 toothpicks
c. pan	4 toothpicks
d. shoe	4 toothpicks

Lesson 9

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

Homework Key

- 1. 1
- 2. 7 cm; 8 cm
- 3. 1
- 4. Model drawn; $11 + 4 = 15$ or $15 - 11 = 4$; 4 cm
- 5. Model drawn; $6 + 7 = 13$ or $13 - 6 = 7$; 7 cm
- 6. Model drawn; $8 + 4 = 12$ or $12 - 8 = 4$; 4 cm
- 7. Model drawn; $9 + 5 = 14$ or $14 - 9 = 5$; 5 cm

Homework Samples

1. Look at the picture below. How much **shorter** is Trophy A than Trophy B?

3 units

A

B

4 units

Trophy A is 1 units shorter than Trophy B.

4 units - 3 units = 1 unit

2. Measure each object with centimeter cubes.

red

The red shovel is 7 centimeters.

green

The green shovel is 8 centimeters.

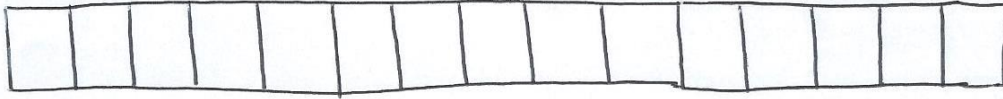
3. How much **longer** is the green shovel than the red shovel?
The green shovel is 1 centimeters longer than the red shovel.

Lesson 9 (continued)

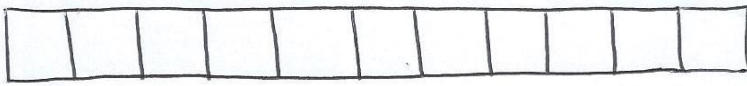
Use your centimeter cubes to model each problem. Then, solve by drawing a picture of your model and writing a number sentence and a statement.

4. Susan grew 15 centimeters, and Tyler grew 11 centimeters. How much **more** did Susan grow than Tyler?

Susan



Tyler



$$15 - 11 = 4 \text{ cm}$$

Susan grew 4 more cm than Tyler.

5. Bob's straw is 13 centimeters long. If Tom's straw is 6 centimeters long, how much **shorter** is Tom's straw than Bob's straw?

Grade 1 Module 3 Topic D

Data Interpretation

Focus Standards:

- 1.OA.1 Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.
- 1.MD.4 Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.

Instructional Days Recommended: 4

Topic D closes the module as students organize, represent, and interpret personally relevant data in Lesson 10 (1.MD.4). As students work as a class to collect, sort, and organize data into a graph, they find great purpose and excitement. They begin to answer, and then ask questions about, the number of data points in a given category and in two categories.

Lesson 11 allows students to take a more independent role in the collecting, sorting, organizing, and representing phases involved in graphing. They work on their own to ask and answer questions about the data set. This work prepares them for the comparison work of the last two lessons.

In Lesson 12, students interpret information presented in graphs by exploring compare with difference unknown problems. They begin with visualizing these problems in their easily accessible “equalizing” contexts by answering questions such as, “How many more students would Category A need in order to have the same amount as Category B?” Students use their understanding of comparing lengths from Topics A, B, and C to now compare the responses in three categories.

Lesson 13 continues this exploration with students again interpreting data sets to ask and answer varied word problems including “How many students were polled in all?” and “How many more students are in Category C than in Category A?” (1.OA.1). Throughout Topic D, students also apply their learning from earlier in the module as they begin to notice the connection between length units and data points on a graph.

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Lesson 10 - 11

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

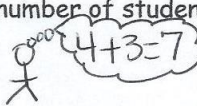
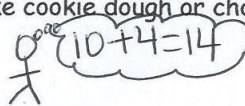
Homework Key (Lesson 10)

- 4; 3; 10
- 10
- 7
- Strawberry
- 14
- Chocolate, strawberry
- $4 + 3 + 10 = 17$
- 6
- Comic book
- 1
- 11
- Comic books, magazines
- $4 + 6 + 5 = 15$

Homework Samples (Lesson 10)

Students were asked about their favorite ice cream flavor. Use the data below to answer the questions.

Ice Cream Flavor	Tally Marks	Votes
Chocolate		4
Strawberry		3
Cookie Dough	 	10

- Fill in the blanks in the table by writing the number of students who voted for each flavor.
- How many students chose cookie dough as the flavor they like **best**?
10 students
- What is the total number of students who like chocolate or strawberry the **best**?
7 students 
- Which flavor received the **least** amount of votes? Strawberry
- What is the total number of students who like cookie dough or chocolate the **best**?
14 students 
- Which two flavors were liked by a **total** of 7 students?
Chocolate and Strawberry
- Write an addition sentence that shows how many students voted for their favorite ice cream flavor.
 $4 + 3 + 10 = 17$ students

Lesson 11

Homework Key

1. Answers will vary.
2. Answers will vary.
3. Answers will vary.
4. Answers will vary.
5. 8
6. 14
7. Yes, explanations will vary.

Homework Samples

Collect information about things you own. Use tally marks or numbers to organize the data in the chart below.

How many pets do you have?	How many toothbrushes are in your home?	How many pillows are in your home?	How many jars of tomato sauce are in your home?	How many picture frames are in your home?
0		 		

- Complete the question sentence frames to ask questions about your data.
- Answer your own questions.

1. How many picture frames do you have? (Pick the item you have the **most** of.)

2. How many pets do you have? (Pick the item you have the **least** of.)

3. **Together**, how many picture frames and pillows do you have? $12 + 8 = 20$

4. Write and answer two more questions using the data you collected.

- a. How many toothbrushes and pets altogether? $4 + 0 = 4$
- b. How many more picture frames than toothbrushes?
 $12 - 4 = 8$

Lesson 12 - 13

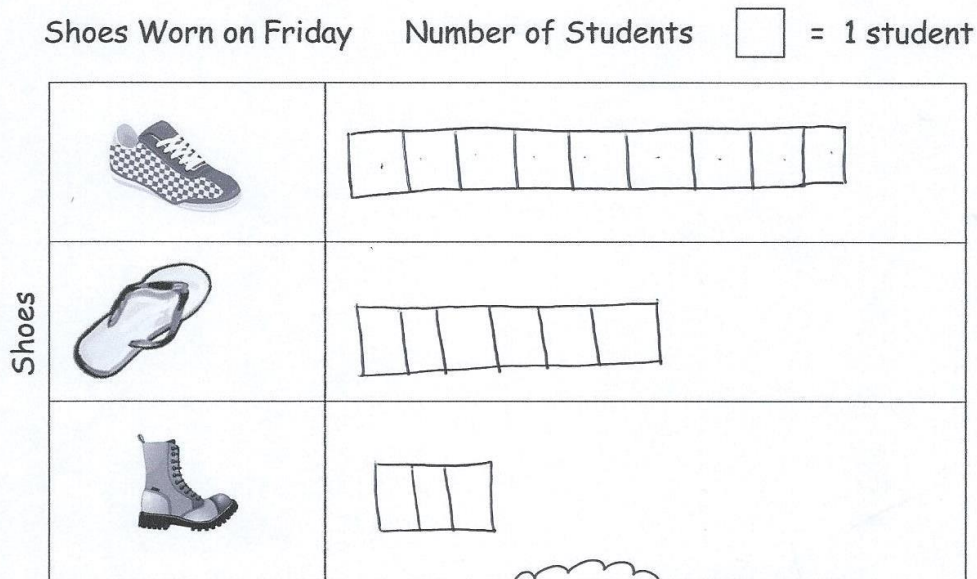
Objective: Ask and answer varied word problem types about a data set with three categories.

Homework Key (Lesson 12)

1. 3
2. $9 + 6 + 3 = 18$
3. $9 - 3 = 6$
4. 14
5. Carrots
6. 1
7. 3

Homework Samples (Lesson 12)

The class has 18 students. On Friday, 9 students wore sneakers, 6 students wore sandals, and 3 students wore boots. Use squares with no gaps or overlaps to organize the data. Line up your squares carefully.



1. How many more students wore sneakers than sandals? 3 students
2. Write a number sentence to tell how many students were asked about their shoes on Friday.
 $18 = 9 + 6 + 3$
3. Write a number sentence to show how many fewer students wore boots than sneakers.
 $9 - 3 = 6$

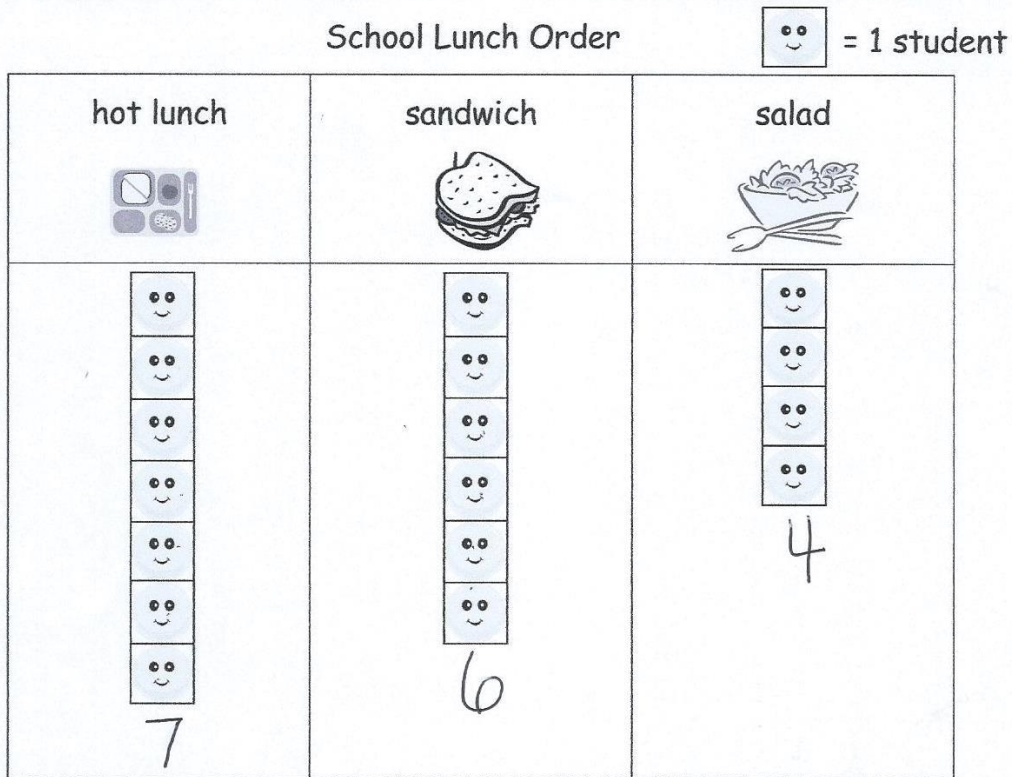
Lesson 13

Homework Key

- | | |
|---------------------|-----------------------|
| 1. 1; $7 - 6 = 1$ | 5. 7; $15 - 8 = 7$ |
| 2. 3; $7 - 4 = 3$ | 6. 19; $11 + 8 = 19$ |
| 3. 12; $7 + 5 = 12$ | 7. 3; $11 - 8 = 3$ |
| 4. 3; $11 - 8 = 3$ | 8. Yes; $11 + 5 = 16$ |

Homework Samples

Use the graph to answer the questions. Fill in the blank, and write a number sentence.



1. How many more hot lunch orders were there than sandwich orders?

There were 1 more hot lunch orders.

$$7 - 6 = 1$$

2. How many fewer salad orders were there than hot lunch orders?

There were 3 fewer salad orders.

$$7 - 4 = 3$$

3. If 5 more students order hot lunch, how many hot lunch orders will there be?

There will be 12 hot lunch orders.

$$7 + 5 = 12$$