

CONSTRUCTING TASK: How Big is a Foot?

Approximately 2 days



STANDARDS FOR MATHEMATICAL CONTENT

MCC1.MD.1 Order three objects by length; compare the lengths of two objects indirectly by using a third object.

MCC.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.*

MCC.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.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

Students should be familiar with using measuring tools. They should be able to measuring an object correctly by placing the non-standard tool at the base or end of an object. When using multiple nonstandard objects, each object should be placed end to end without overlapping or gaps. There should be a common understanding that while students may each use a common unit, for example their own foot, they may find that their results differ.

ESSENTIAL QUESTIONS

- How can we measure the length of an object?
- How can we tell which of two objects is longer than the other?
- How can we order a group of objects by their length?

MATERIALS

- Paper for tracing feet
- *How Big Is a Foot?* by Rolf Myller or similar book
- “How Big is Foot” Student Task Sheet (copied twice, back to back, per student)
- Sentence strips or strips of tag board

GROUPING

Whole group/Individual

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

Part I

Read the book, *How Big Is a Foot?*, by Rolf Myller (or similar book.) Have students trace around their shoe and cut use their cut-outs to measure how many of their personal "feet" it takes to get from one place to another. Making several copies allows students to see why it is important to use the measurement tool back to back and not leave big gaps when measuring. You can also have students practice walking the rug, or the length of tables by walking heel to toe, heel to toe, to help them see this.

Allow students time to measure several distances with their “feet”, then, as a class, use a cut-out of the teacher’s foot (that has already been cut out and reproduced) to measure the same distances. Students may also graph their results on chart paper. Talk about why there is a difference between the number of feet used to measure distances using different students’ feet and using the teacher’s foot.

Part II

Next, students should choose 5 items from the classroom to measure. They must estimate the number of “feet” first; measure the item next, and then record the actual measurement on the recording sheet. Also, have the students place the items they measured in order from longest to shortest or vice-versa. This could be recorded on their student task sheet. While students are measuring, ask the following questions about their findings:

- *Which of the two objects is longer than the other?*
- *Show me how to put these in order.*
- *Why do other students have different measurements than you for the same item?*
- *What will you do for objects longer than your feet?*
- *Is it important to put the “feet” end to end? Why?*

After all groups have completed their recording sheet, take time to share results with the entire class. Be sure to ask each group of students if they measured using the length or the width of their foot. Encourage them to give reasons to support one way over the other but do not discourage them from choosing a particular way. However, make sure to discuss how this might affect their results.

Part III

Review the previous lesson, *How Many Hands?*, with the students. Ask them to share what they remember about using a measurement tool versus only one unit of measure (a single handprint). Ask, “*What are the drawbacks to using only one unit of measure to determine the length of an object?*”, “*How might using only one unit affect your findings?*” Ultimately, you want students to discover through the previous activity and the current task that using only one single unit is not efficient. Have them create a measurement tool using their “feet” by tracing their feet again to create a measurement tool of “5 feet”. Students could glue their footprints to sentences strips or tape each footprint, toe-to-heel, in groups of five to create a non-standard measurement tool. Once each student has created a tool, have them re-measure the same objects and record their findings on the second recording sheet.

Once students have completed the task with their measurement tool, have them answer the following question in their math journals:

- *What is an efficient method of measuring an object? Why?*

FORMATIVE ASSESSMENT QUESTIONS

- What will/did you do when the item was longer or further than the number of “feet” you had, what did you do to figure out an answer?
- Which do you prefer to use to measure, a single footprint or your measurement tool of “5 feet”? Why?
- How are you able to determine which the objects you have measured are longer than the other?

DIFFERENTIATION

Extension

- In pairs have students talk about how they could standardize their feet so that all measurements are the same. For instance, perhaps the classroom bookshelf measured 4 of Aly’s feet but 3 of Zak’s feet. Ask the students, “How can we make it so Aly and Zak got the same measurement instead of a different ones?” “Why would this be an important thing to do?”

Intervention

- Have students dictate to you their math thinking for their journal entry.
- For students who have fine motor difficulties, give students precut footprints to use so that all of them are the same size, rather than requiring them to cut out the footprints.

Georgia Department of Education
 Common Core Georgia Performance Standards Framework
First Grade Mathematics • Unit 4

Name _____

Date: _____



How Big Is a Foot?



Object to be Measured	My Foot Estimate	My Foot Measurement	Was my estimate close? Put an x in the box	
			Yes	No