

## How Big is a Foot?

Find 3 objects to measure in the classroom with your pair of shoes. Choose a pair of shoes from your teacher's family to measure the same object. What observations and comparisons can you make about the length of the objects that you measured?

## How Big is a Foot?

### Suggested Grade Span

Pre-K-2

### Task

Find 3 objects to measure in the classroom with your pair of shoes. Choose a pair of shoes from your teacher's family to measure the same object. What observations and comparisons can you make about the length of the objects that you measured?

### Alternate Versions of Task

#### More Accessible Version:

Find 3 objects in the classroom that are the same length as your shoes. Now find 3 objects in the classroom that are the same length as a pair of shoes from my family. What is the difference between objects measured with your shoe and those measured with shoes from my family?

#### More Challenging Version:

Measure the length of the hallway outside of your classroom with your shoes. Choose a pair of shoes from my family and measure the same hallway. What is the difference between the 2 measurements? Why does this difference exist?

### Context

Measurement is one of the skills to be introduced in our first grade curriculum. Before I give the children rulers to investigate inches, I provide many measurement activities that the children can experience in non-standard units. This particular task has the children investigating with a pair of their shoes, which are familiar and easy to manipulate in their environment.

### What This Task Accomplishes

This task has the children actively involved while using a pair of their shoes in measuring length and width in non-standard units. They practiced this skill in the classroom and had activities at home to complete with their parents to investigate their environment further.

### What the Student Will Do

The children eagerly took their shoes off and they were asked to choose any three items in the

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classroom to measure the length and width. The children have been doing many measurement activities with partners and in cooperative groups, but they were asked to do this task independently. They were asked to use tally marks and the numerical representation with a sketch of the object included. I brought in many pairs of shoes from my family which were all larger sizes for the children to make observations and comparisons while they measured the same three objects in the classroom. We did take time before the measurement activity began to figure out which shoes belonged to each of my three daughters, which were mine and which belonged to my husband so that they could label that during the activity.

## Time Required for Task

1-2 hours

We spent an hour in the morning and used another half-hour to finish the measuring and to record observations. During that time, I was circulating to help those writers that would need assistance through dictation and asking questions as the children were making comparisons.

## Interdisciplinary Links

This task was one of many to incorporate a measurement theme for the next month, which began with hand spans. We have also been investigating measurement through our multi-cultural theme on Africa for the past six weeks. In many cultures the measurement is found in their environment by using hands, feet, sticks, beads and lengths in string. As I had mentioned before, each measuring activity was also practiced at home for family math each week. We have used hand spans before using our feet and then shoes. A delightful book to start your measurement unit is, *How Big Is A Foot?*, by Rolf Myller. One of the activities that we did in partners was to design a bed for each other by using their feet to measure around each other's body. Another literature resource to use as you get closer to the inch is Eric Carle's book, *Inch By Inch*. Yarn may be cut into inch segments to represent the inchworm so students can practice in the classroom and at home.

## Teaching Tips

It is very meaningful for young children to investigate the measurement using their hands, arms, feet, paper clips, yarn or Unifix cubes before being asked to accurately measure with rulers. We also had drawing games by just learning how to hold the ruler straight and how to stop and start on the ruler. Have children trace each other's foot and cut out a pair to decorate. You can incorporate graphing activities with this. Finding the area of their foot or hand using inch paper or centimeter paper is also an extension that may be investigated. Some children wanted to investigate the length of the rug and the room which could lead to cooperative groups walking parts of the school building or checking the number of footsteps home.

Talk about why it is important for everyone to use the same length of measurement. Ask the children to think of jobs in which workers need to make measurements of any kind (shoe salespeople, cooks, postal workers, pharmacist, etc.).

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## Suggested Materials

- Shoes
- String
- Paper
- Pencil
- Manipulatives
- Other materials for measuring

## Possible Solutions

The children at the Practitioner and Expert levels should be making accurate comparisons of how their shoe measurements contrast to the larger shoe measurements. They should realize that if they use a larger shoe that it would take more of their own smaller shoe and less of the larger shoe for the same objects. They should also be able to estimate (given a variety of shoes) what would happen when they compare measurements. The children would become aware of the patterns of measuring similar size objects with the same shoes.

### More Accessible Version Solution:

The student should be able to accurately find objects the same length as her/his shoe and the shoe of someone in my family. If the shoes of someone in my family are larger than the student's, then the student should conclude that the objects are larger as well.

### More Challenging Version Solution:

You can use the chosen shoes to check the accuracy of the student's solution. The student should then conclude that it took more of his/her shoes than shoes from my family to go the length of the hallway, since his/her shoes are smaller (if this is indeed the case). You could also measure the hallway and divide it by the length of the shoe to check for accuracy.

## Task Specific Assessment Notes

### Novice

This student was having some difficulty measuring with the pairs of shoes and was not consistent with the procedure. The student began to make some observations with the largest shoes, but did not understand the problem to be solved as indicated by several of his comments.

### Apprentice

The student started an appropriate strategy, but should have checked the measurements of the larger shoe. There should have been more of a difference using the larger shoe. The student was organized and completed the task using some correct math terminology and numerical representation. The student has a correct observation, but not a full solution and needs to revisit the procedure.

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## **Practitioner**

This student has a broader understanding of the problem and used accurate strategies to solve the task. This student wanted to know more about using half, which we have not done a lot with yet. When I asked the student to explain in more detail what their observations were, it was very clear and detailed.

## **Expert**

This student went beyond the task and investigated much larger measurements. The student has a clear understanding of the problem, used a consistent strategy, utilized accurate mathematical representation to communicate the solution and was able to see the pattern in the relationship in different lengths.