**How Big Is A Foot?**

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| During this lesson, students develop an understanding of the importance of measuring with standard units. Students create rulers by taping together twelve 1 inch square tiles and then using them to measure objects around the room. Finally, they create a paper ruler to save and use in the future. |

**Common Core Standards**

**Measure and estimate lengths in standard units.**

**NC.2.MD.1** Measure the length of an object in standard units by selecting and using appropriate tools such as rulers, yardsticks, metersticks, and measuring tapes.

**Standards for Mathematical Practices**

1. Make sense of problems and persevere in solving them.

4. Model with mathematics.

5. Use appropriate tools strategically

6. Attend to precision.

**Student Outcomes:**

* I can create a ruler as a measurement tool.
* I can measure the length of an object using a standard ruler.

**Materials:**

* How Big is a Foot? By Rolf Myller
* one inch color tiles
* masking tape
* one inch grid paper
* scissors
* crayons

**Advance Preparation**:

Material Preparation:

* Have materials ready and have a model of the ruler ready to show the students. This is made by taping 12 one inch color tiles together to form a 12 inch ruler.

Thinking Preparation:

* This lesson is intended to be introduced after students have had opportunities to use non-standard measurement tools to measure objects. This is then the introductory lesson to using standard measurement when students are ready to understand the need for a standard unit.

**Directions:**

1. Read the book to the class as a whole group.
2. Discuss what happened with the bed so that all children understand the importance of standard measurement. Relate this discussion to prior experiences when students have used non-standard measurements.
3. Explain to the students that the King’s foot was 12 inches long and so we will make a copy of the King’s foot to use to measure. We will call it a “ruler” since he was a ruler or it can be referred to as a foot stick.
4. Ask students to tape together the one inch color tiles in an AB pattern to make it easier to count the tiles when we measure. (Share the model you have created or make your ruler with the students so they will see how to tape it together.) When students have their rulers taped together, they can begin to measure items in the room while the teacher helps everyone complete the task.
5. When all rulers are completed, pull the group together and ask them to measure several specific items in the classroom. Ask students, “If you could write on your ruler, where would zero belong?” Make sure students understand that they must start at the beginning of the ruler and count each tile, demonstrate this using your shoe then have students measure their shoe.
6. After students measure several items and compare the measurements have them transfer the color tile ruler to the one inch grid paper. Students will color the squares to match their color tile ruler and write the numbers to represent inches in the squares. Again, question students about the location of zero.
7. Students then measure their shoe with the paper ruler again making sure to begin at the beginning of the ruler. Students measure several objects in the classroom and record in their journals while teacher observes to see if individual students are measuring correctly.
8. These rulers should be kept so that students can compare them to a regular ruler when they are introduced.

**Questions to Pose:**

Before:

When would we measure anything in the real world?

Why is it important to have a standard unit when measuring?

During:

How do you know the measurement of an object?

Can you show me how you measured this object?

After:

What did you learn about using a ruler today?

When will you use this?

Why does “what” we measure help us decide “how” we measure?

**Possible Misconceptions/Suggestions:**

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| **Possible Misconceptions** | **Suggestions** |
| Students will want to start on the second tile rather than the first tile and therefore their measurement will be incorrect. | When modeling be sure to discuss why the first tile must be counted as it is a part of the measuring tool. If necessary, take the tiles apart and have the student align them and count. |

**Special Notes:**

After completing this task, students would create three rulers and tape them together to create a yardstick and use it to measure objects as well. These can be created just as their ruler (the twelfth tile being a different color than colors used previously), so that students can see the three rulers within the yardstick.

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