

# Stick-Figure Measurements

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**Reporting Category** Measurement

**Topics** Estimating and measuring length

**Primary SOL** 4.7 The student will

- a) estimate and measure length and describe the results in both metric and U.S. Customary units; and
- b) identify equivalent measurements between units within the U.S. Customary system (inches and feet; feet and yards; inches and yards; yards and miles) and between units within the metric system (millimeters and centimeters; centimeters and meters; and millimeters and meters).

## Materials

- Inch ruler
- Centimeter ruler
- Meter stick
- Yard stick
- Tape measure
- Stick-Figure Recording Sheet (attached)
- Stick-Figure Model (attached)
- Bulletin board paper
- Measurement Relationship Chart (attached)
- Measurement Relationship Cards (attached)

## Vocabulary

*U.S. Customary system, metric system, length, inches, feet, yards, miles, millimeters, centimeters, and meters, benchmarks, estimate, measure, unit of measure, equivalent measures*

## Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

1. At this point, students have had opportunities to measure a variety of objects with a variety of measurement tools. As a review, ask students to estimate the length of the teacher's arm, leg, hand, foot, and height from head to toe. Estimates should be made in U.S. Customary and metric units. Once reasonable estimates have been made, allow students to use a variety of tools to practice measuring accurately.
2. Group students into pairs or small groups, and explain that they are going to be measuring parts of their bodies and then creating a life-size stick figure. Distribute copies of the Stick-Figure Recording Sheet and the Stick-Figure Model to each student. Have groups take turns measuring each other's arms, legs, hands, and feet, and heights from head to toe, using a variety of measurement tools. Instruct students to measure one side of the body in U.S. Customary units and the other side in metric units. As one student is measuring, the student being measured should be recording his/her measurements on the recording

sheet. Students should use the most appropriate measurement tool and unit for each part of the body. Make sure students are making reasonably accurate measurements. Encourage students to be detailed with their measurements, using the extra blocks on the recording sheet for three additional measurements on each side (e.g., fingers, toes, forearms). Encourage their creativity.

3. Once all measurements have been recorded on the recording sheets, have each student transfer his/her own measurements from the recording sheet to the Stick-Figure Model, drawing in any measured parts that are missing (e.g., fingers, toes).
4. Give each group bulletin board paper, and direct each group to use the measurements listed on one of the group member's Stick-Figure Model sheets to create a life-size stick figure in accordance with the student's measurements. Again, make sure students are measuring one side of the figure in U.S. Customary units and the other side in Metric units, as well as labeling the measurement of each part. Encourage students to measure the student's eyes, eyelashes, nose, mouth, ears, and other parts to be as unique as possible. Have them add these items to the stick figure, marking the measurement of each. Emphasize that the stick figures' measurements should be as close as possible to the actual measurements of the students they reflect.

### **Assessment**

- **Questions**
  - What tool would be best for measuring the length of your arm? Why?
  - Did you use millimeters to measure the length of your hand? Why, or why not?
  - How are the left and right sides of the stick figure similar?
  - How are the left and right sides of the stick figure different?
- **Journal/Writing Prompts**
  - Explain which measurement tool you used to measure your arm, including the reason you chose that tool and the reason you did *not* choose other tools.
  - Complete the attached Measurement Relationship Chart, using a variety of measurement tools to investigate these equivalent measurements between units within each system.
- **Other**
  - Set up stations around the room for students to measure various items in customary and metric units. Have students first estimate and then record their measurements.
  - Have students go on a scavenger hunt as part of a measurement project they can do both at home and at school. Assess students for reasonableness of the items and/or distances they choose to measure.

### **Extensions and Connections (for all students)**

- Have students decorate and color the stick figures.
- Have students use red, white, and blue for the U.S. Customary side and another country's colors for the metric side. If there are students from other countries in your class, this would be a nice way to acknowledge their heritage.
- Discuss symmetry with students, and ask whether their stick figures are symmetrical.

- Have students use the attached Measurement Relationship Cards as a memory game to find equivalent measures within each system. You are encouraged to create and add more cards.

**Strategies for Differentiation**

- Extend this activity to a multiday activity, having students measure only in U.S. Customary units on one day and in metric units on the other day.
- Label measuring tools as either U.S. Customary or metric.
- Provide a list of metric units of measure and a list of U.S. Customary units of measure.
- Use measurement tools for U.S. Customary units that display increments only in  $\frac{1}{8}$  of an inch, not in  $\frac{1}{16}$  of an inch.



# Stick-Figure Model Recording Sheet

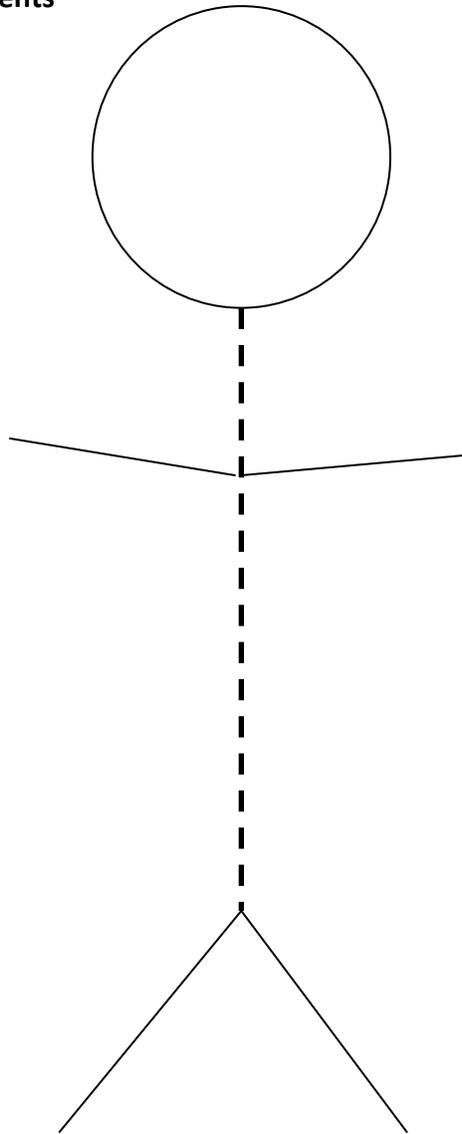
Part of Body	U.S. Customary Measurement	Part of Body	Metric Measurement
Height from head to toe		Height from head to toe	
Length of left arm		Length of right arm	
Length of left hand		Length of right hand	
Length of left leg		Length of right leg	
Length of left foot		Length of right foot	
_____ of left _____		_____ of right _____	
_____ of left _____		_____ of right _____	
_____ of left _____		_____ of right _____	



# Stick-Figure Model

U.S. Customary Measurements

Metric Measurements



# Measurement Relationship Chart

U.S. Customary Measurements	
How do you know?	<b>_____ inches = _____ feet</b>
How do you know?	<b>_____ feet = _____ yards</b>
How do you know?	<b>_____ inches = _____ yards</b>
How do you know?	<b>_____ yards = _____ miles</b>

Metric Measurements	
How do you know?	<b>_____ millimeters = _____ centimeters</b>
How do you know?	<b>_____ centimeters = _____ meters</b>
How do you know?	<b>_____ millimeters = _____ meters</b>

# Measurement Relationship Cards

## U.S. Customary System

12 in.	1 ft.	3 ft.	1 yd.
36 in.	1 yd.	1,760 yd.	1 mile
48 in.	4 ft.	15 ft.	5 yd.
72 in.	2 yd.	84 in.	7 ft.

## Metric System

10 mm	1 cm	100 cm	1 m
1,000 mm	1 m	500 cm	5 m
320 mm	32 cm	10 m	1,000 cm