

I. Purpose: How are SI length measurements made?

CA Standard: (*Investigation & Experimentation 1a*) Select and use appropriate tools and technology to perform tests, collect data, analyze relationships, and display data.

Background: Often measurements are made to learn more about biological problems. The international system of units, or SI system, is a system of measurements you will become more familiar with this year. The measurements you will make in this exercise are SI measurements. In this exercise, you will make length measurements. The basic unit of length is the meter. The meter is divided into one hundred smaller units called centimeters. Smaller measurements are made with millimeters. Ten millimeters equal one centimeter. When measurements are made, you should write them down. Data are observations you record- in this case, the measurements you write down. The data will be written in a table to help you keep them organized.

II. Materials: Metric ruler

III. Procedure:

1. Look at the diagram of the hand on the next page. Count the number of bones present in the thumb, fingers, palm, and wrist. (They are shaded in different ways in the diagram to help you.) Record your counts in the table below.
2. Look at the diagram of the foot on the next page. Count the number of bones present in the big toe, other toes, center of the foot, ankle, and heel. Record your data in the table below.
3. Measure in millimeters the lengths of the bones marked A, B, C, D, and E on the hand diagram. Record your measurements in the table below.
4. Measure in millimeters the lengths of the bones marked A, B, C, D, and E in the foot diagram. Record your measurements in the table below.
5. Measure the length of the thumb and record the number in the table. (HINT: Remember how many bones are in the thumb.)
6. Measure the length of the big toe and record in the table. (HINT: remember how many bones are in the big toe.)
7. Measure the lengths of the smallest finger and toe. Record these data in the table.
8. Change all the millimeter measurements to centimeter measurements in the table. Recall that there are ten millimeters in one centimeter.

IV. Data/Observations

Bone Count

Part	Number of bones	Part	Number of bones
Thumb		Big toe	
Fingers		Other toes	
Palm of hand		Center of foot	
Wrist		Ankle and heel	

Bone	Hand		Foot	
	Millimeters	Centimeters	Millimeters	Centimeters
Bone A				
Bone B				
Bone C				
Bone D				
Bone E				
Thumb			XXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXX
Big toe	XXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXX		
Smallest finger			XXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXX
Smallest toe	XXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXX		

V. Calculations/Results

1. How many millimeters in 1 meter? (show the conversion)
2. How many centimeters in 1 meter? (show the conversion)
3. How many millimeters in 1 centimeter? (show the conversion)

VI. Questions (Re-state the questions and answer in a complete sentence.)

1. How do bones in the hand and the foot compare in total number?
2. How do bones in the palm of the hand and the center of the foot compare in number?
3. How much longer is Bone A in the foot than Bone A in the hand?
4. How much longer is the smallest finger than the smallest toe?
5. How do your measurements of the thumb and big toe compare?
6. How much longer is Bone E in the foot than it is in the hand?
7. Describe the main differences between the lengths of the bones in the hand and the foot.
8. Why are data often kept in tables?
9. How many millimeters are in your ruler?
10. How many centimeters are in your ruler?
11. How many meters are in your ruler?
12. Suppose you were working in a department store. What unit of measurement (meter, centimeter, millimeter) would you use to measure the length and width of shoes and window curtains? Explain.

VII. Conclusion: Answer the purpose. Re-state and answer in a complete sentence.



