Name _____

Date _____ Period _____

Measuring to the Correct Number of Places

PROBLEM

What is the correct number of decimal places for a measurement?

INTRODUCTION

Measuring to the correct number of decimal places is as easy as pi. Pi, you will recall, is the ratio between the circumference of a circle and its radius. It is an irrational number. You may know it as 3.14. Some may say pi is 3.14159. Still others may claim it is 3.141592653589793. These values are all correct, but the last is the most accurate of the three. It is desirable to use the most accurate values that you can, but adding extra decimal places to a value only improves the accuracy if they are correct. You can only be reasonably certain that your values are accurate if you estimate no more and no less than one decimal place beyond what your instruments can measure. In this investigation, you will explore this concept.

MATERIALS (per group)

3 × 5 index cards

PROCEDURE

1. Measure the number of decimeters in the length and width of a 3 × 5 index card using the ruler below. If the edges of the index card are not both exactly on a line, you will need to estimate. If they do appear to be exactly on the line, you can still estimate one additional place to be zero. Record your result in the data table on the next page.
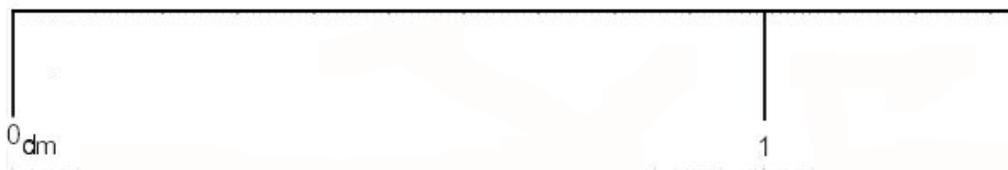
2. Measure the number of centimeters in the length and width of a 3 × 5 index card using the ruler below. Estimate one additional place beyond what you can measure. Record your result in the data table on the next page.
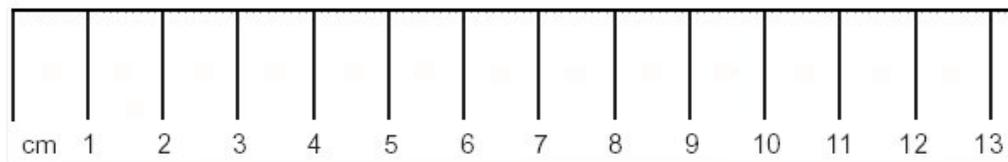
3. Measure the number of millimeters in the length and width of a 3 × 5 index card using the ruler below. Estimate one additional place beyond what you can measure. Record your result in the data table on the next page.
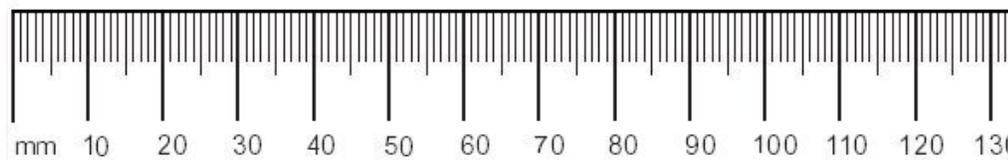
4. Convert your first two sets of measurements to millimeters. Record the results in the data table below.

Original Measurement	Length (5")	Width (3")	In Millimeters	
			Length (5")	Width (3")
Decimeters				
Centimeters				
Millimeters				

CONCLUSIONS

1. Compare the three sets of measurements in millimeters.

   a. How are they similar? _____

   _____

   b. How are they different? _____

   _____

2. Why do the similarities and differences you observed exist? _____

   _____

   _____

3. Which of your measurements is most accurate? Why? _____

   _____

   _____

4. Why weren't all your measurements equally accurate? _____

   _____

   _____

5. How do you determine the correct number of decimal places for a measurement? _____

   _____

   _____

   _____

6. How many significant figures do each of your measurements have? How is the number of

   significant figures effected by converting results into millimeters? _____

   _____

   _____

   _____

   _____