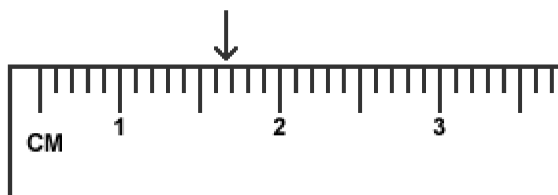


Measurement and Significant Figures

To measure with significant figures, you count ALL digits. Each one is considered significant. For example, a ruler that reads 1.36 cm has 3 significant figures. A beaker with 12.52 mL of liquid has 4 significant figures. Scientific equipment has markings that let you read its measurement to a certain number of significant figures. The last value in your reading will ALWAYS be an estimate between the markings. This is why no two people will necessarily have the same exact number, although they should be close.

Example 1: Measuring Length



The ruler markings are every 0.1-centimeter. The correct reading is approximately **1.67 cm**. The first 2 digits **1.67** are known exactly. The last digit **1.67** is uncertain. You may have instead estimated it as 1.68 or 1.66 cm.

Example 2: Measuring the Volume of a Liquid



When measuring liquid volumes, the graduated scale must be read from the lowest point of the curved surface of the liquid – the liquid **meniscus**.

The graduated cylinder markings are every 1-milliliter. The correct reading is **30.0 mL**. The first 2 digits **30.0** are known exactly. The last digit **30.0** is uncertain. Even though it is a zero, it is significant and *must be recorded*.

Measurement Activity

Station 1: Measuring Mass

Measure **approximately** 5 g of sugar on 2 different balances. Underline the uncertain digit.

Balance 1:	Balance 2:
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Convert your measurement from balance 1 to mg. Convert your measurement from balance 2 to kg.

mg	kg
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What is the difference between **accuracy** and **precision**? Give examples.

Station 2: Measuring Length

Measure the length of a pencil in cm. How many significant figures are included? Underline the uncertain digit.

Convert your measurement to mm, m and km. Express your answers in scientific notation.

mm	m	km	
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Station 3: Measuring Volume

Use 3 different pieces of glassware to measure approximately 25 mL of water. Have a partner read each volume and compare your estimated volumes. Find the mass of water in each container. Which piece of glassware is most precise? When would you use each piece of glassware?

Piece of glassware	Your Volume	Partner's	Mass	Common Use

Station 4: Calculations

Measure the area of a piece of paper in m^2 . Show all your work. Remember significant figures.

Station 5: Calculations

Determine the density of the block. Show all your work. Remember significant figures.

Station 6: Calculations

How long can you hold your breath....in years? Remember significant figures.