

Name: _____

Period: _____

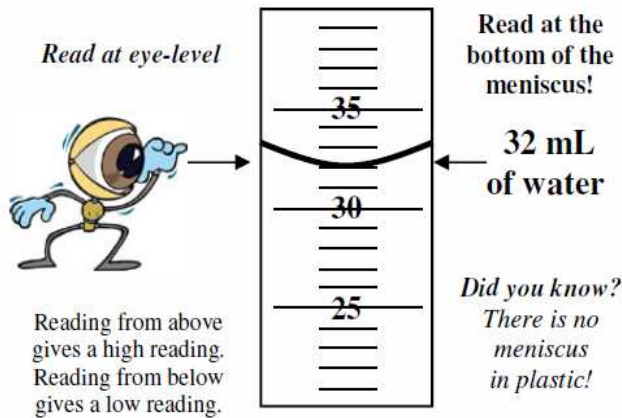
Measuring

Why We Measure

Science gains knowledge that must be verified through experimentation. Good measuring allows us to collect data that can be verified.

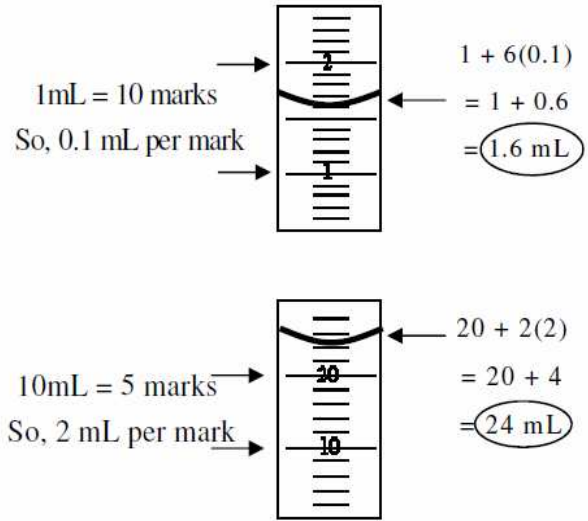
Reading The Meniscus

Water adheres (sticks) to glass and seems to be "climbing the sides". This is called the "meniscus".



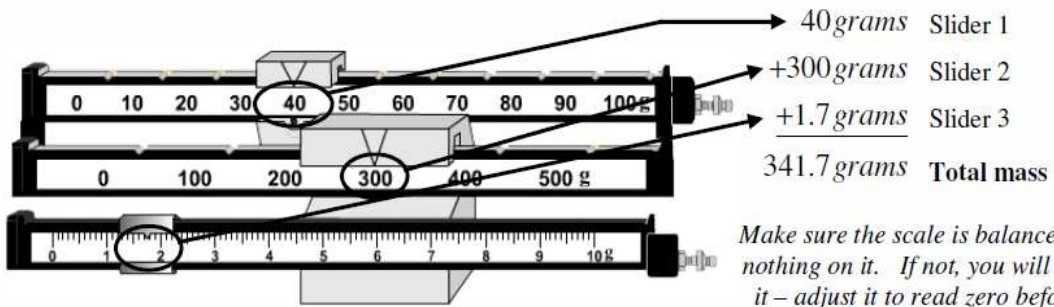
Reading the Scale

Before you measure read the scale to know what each hash mark means.



Balance Scales

Balance scales are used to measure mass. Move the sliders until the scale is "balanced", then add together the amounts for each slider to find the total.

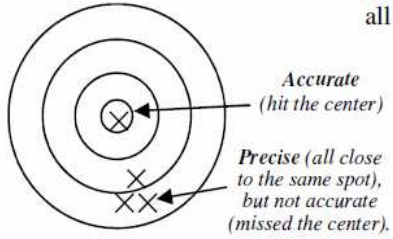


Make sure the scale is balanced when there is nothing on it. If not, you will have to "zero" it - adjust it to read zero before you use it.

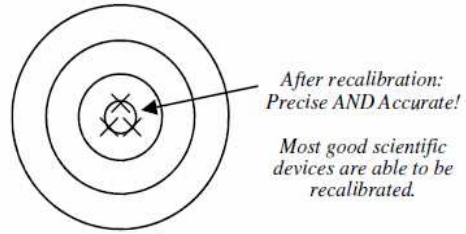
Accuracy vs. Precision

Accuracy: how close a measurement is to the correct number. Ex. If 35.6 grams is the correct mass, then 35.7 g is accurate (very close to the correct number).

Precision: how close measurements are to each other. A precise instrument will give the same number if multiple people measure with it. Ex.: 12.11 cm; 12.12 cm; 12.10 cm are all very close to each other, so they are precise.

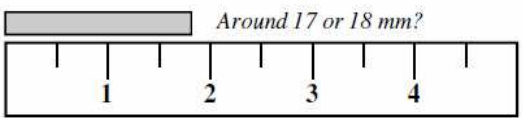


Recalibration:
If an instrument is precise, but not accurate it can be recalibrated with a known quantity. Then it will be both precise and accurate.



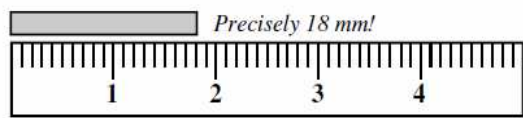
Precision is increased by a finer instrument.

Not precise: only accurate to 0.5 cm; It is hard to tell the exact length of the object.

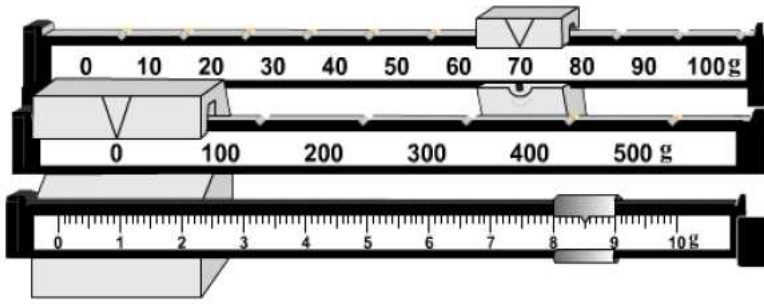


Closer marks = More precise

More Precise: accurate to 0.1 cm; Easy to measure the exact length of the object.



Find the mass from the following two balanced triple-beam balances.

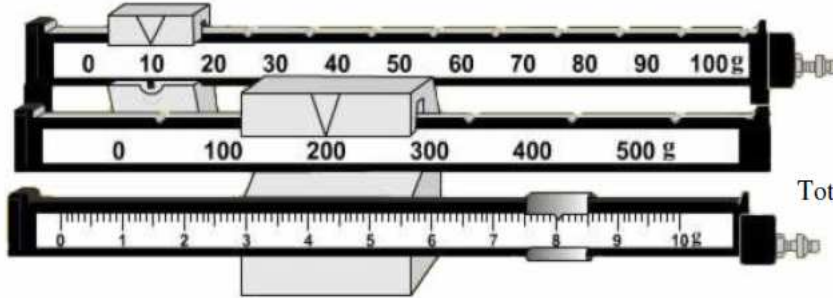


Slider 1 = _____

Slider 2 = _____

Slider 3 = _____

Total Mass = _____



Total Mass = _____

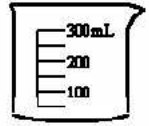


What must you always do before measuring with a balance scale?

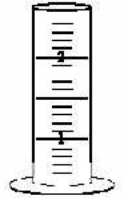


Which is more precise?

A beaker:



or a graduated cylinder?

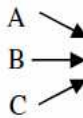


Why?

What do we call the curvature of water in a glass tube?



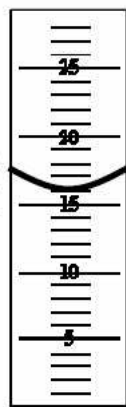
Circle the correct position to read the meniscus.



How much water is in this graduated cylinder?

Why does water "climb up the sides of the glass cylinder?"

Does this occur in plastic?



How many ml between the two arrows?

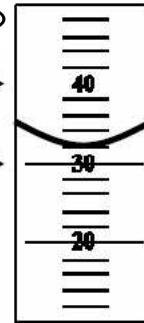


How many marks are there between the arrows?



How many mL is each mark?

How much water is in the graduated cylinder?

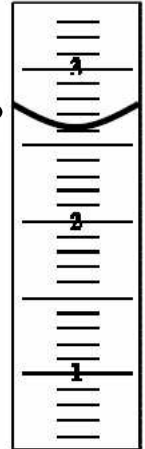


How much water is in the cylinder at the right?



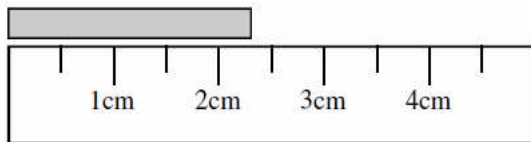
Which cylinder is more precise?

Why?



While hiding the bottom ruler, measure the grey object with the top ruler to the closest millimeter. Ask three other students for their measurements.

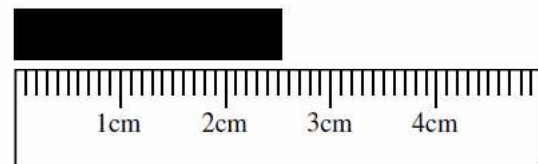
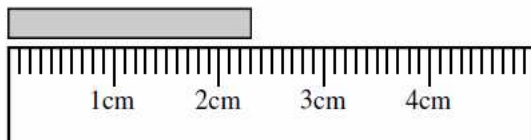
Your length: _____; Others: _____; _____; _____.



Measure the grey object with the bottom ruler. How close were the above measurements?

Which ruler is more precise?

Why?



How long is the black object in centimeters?

How long is the black object in meters?

What is recalibration?

Why is it important that scientific instruments are able to be recalibrated?