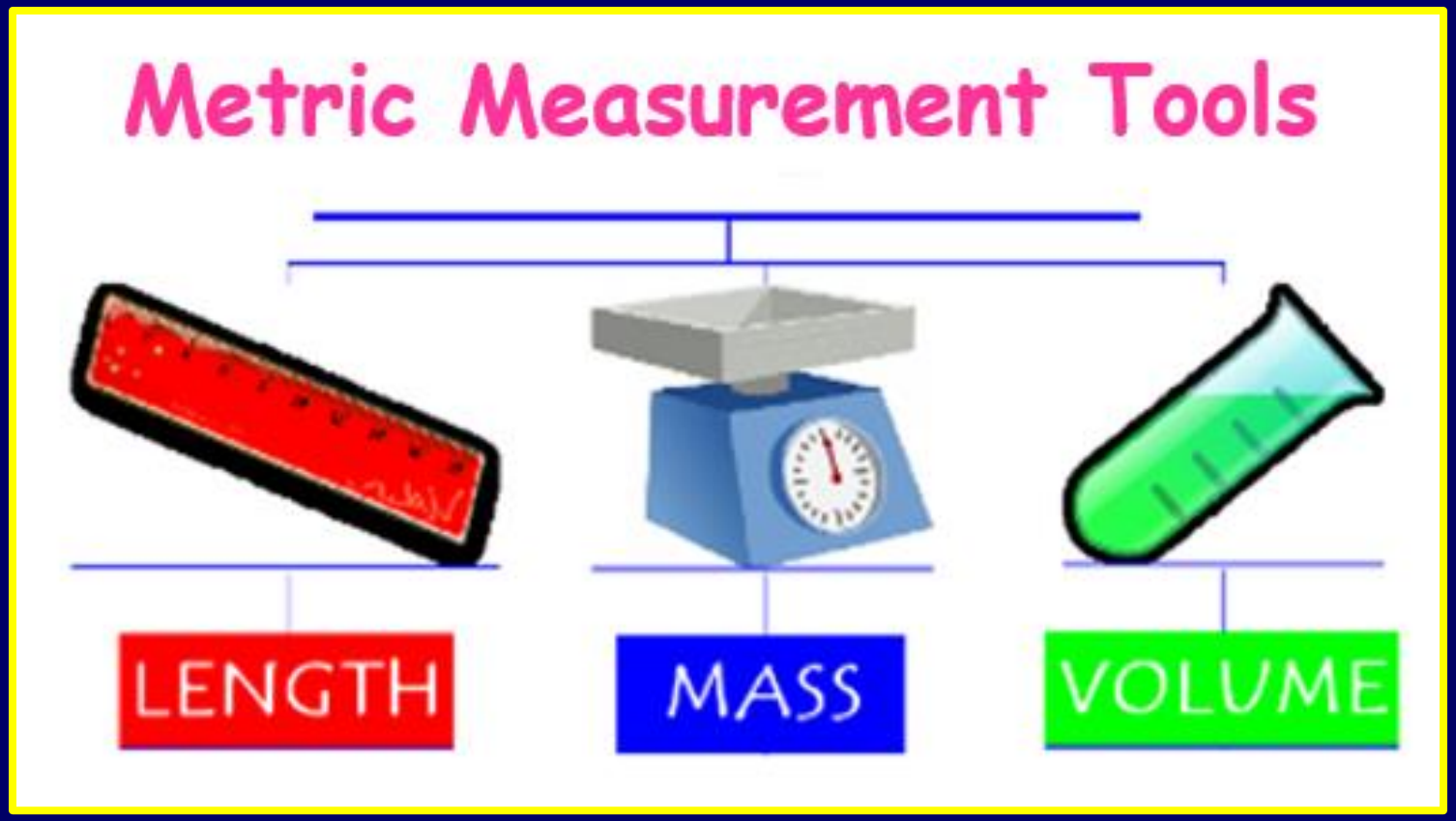
Metric Measurements



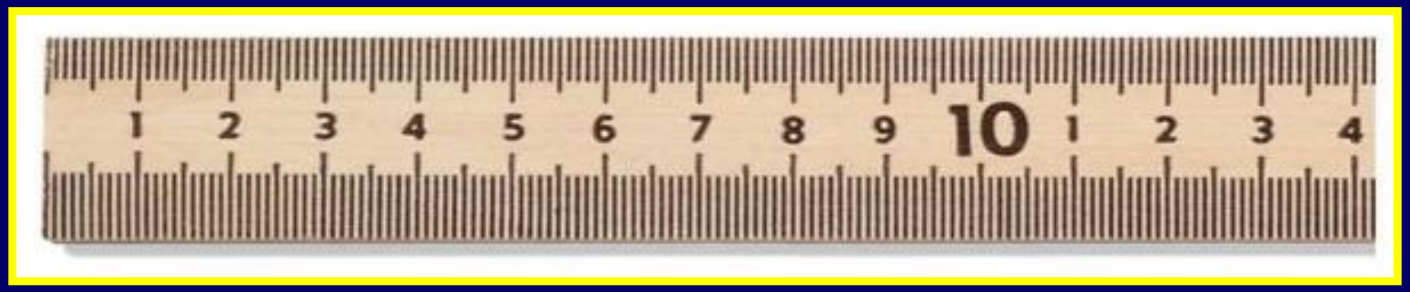
I Can Statements

At the end of this lesson, you should be able to say, with confidence:

- I can use a meter stick to measure length
- I can use a graduated cylinder to measure the volume of a liquid
- I can use the water displacement method to measure the volume of an irregularly shaped object
- I can use a triple beam balance to measure mass

Measuring Length

Meter sticks are common tools for measuring length using the metric system.

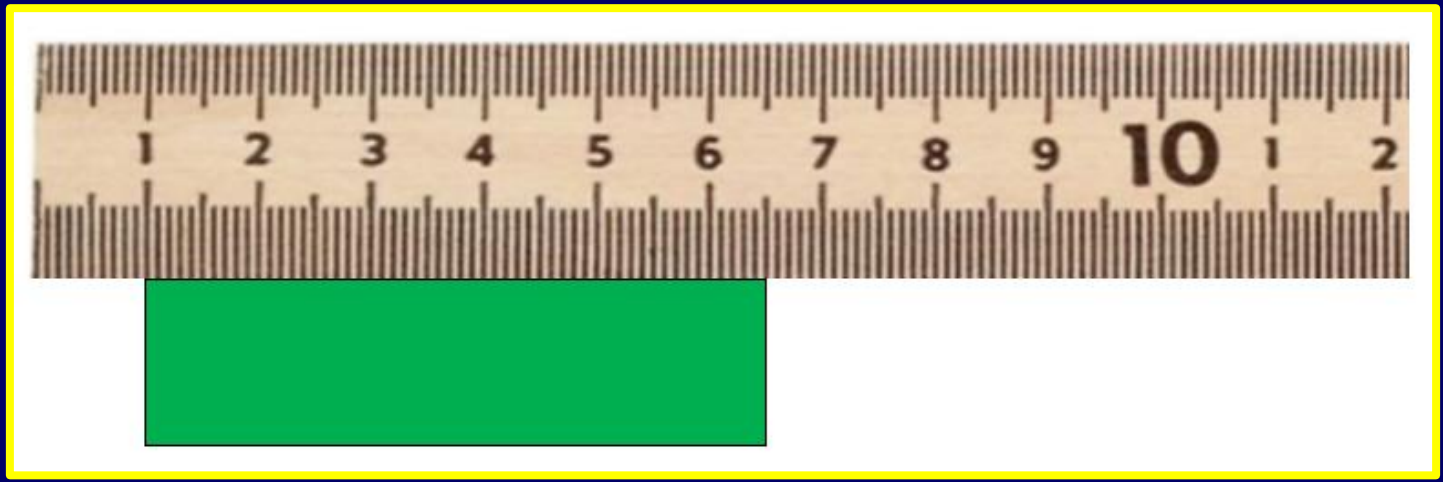


Decimeters are notated as 10, 20,…. 90.

Centimeters are notated as 1,2, …….. 9.

Millimeters are indicated by the small, unmarked lines.

Measuring Length



6.5 cm – 1 cm = 5.5 cm

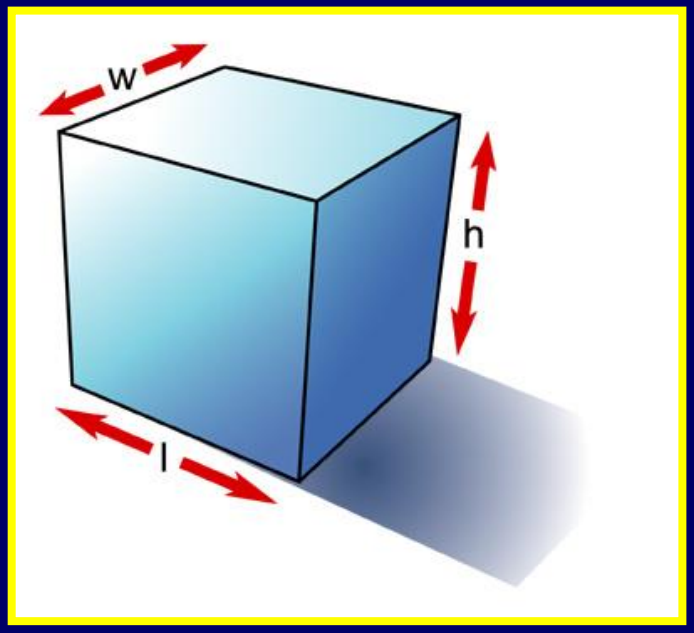
65 mm – 10 mm = 55 mm

0.65 dm – 0.1 dm = 0.55 dm

Measuring Volume

Length X Width X Height

Because there are three measurements, that are then multiplied, the final unit must be cubed.



2cm X 2cm X 2cm

$8cm^3$

Measuring Volume

Liquids are measured with graduated cylinders.

The markings on graduated cylinders will vary, depending upon the size of the cylinder.

Measuring Volume

Most graduated cylinders, beakers, and flasks are named by the amount of milliliters they hold.

500 ml Beaker

25 ml Graduated Cylinder

50 ml Erlenmeyer flask

Measuring Volume

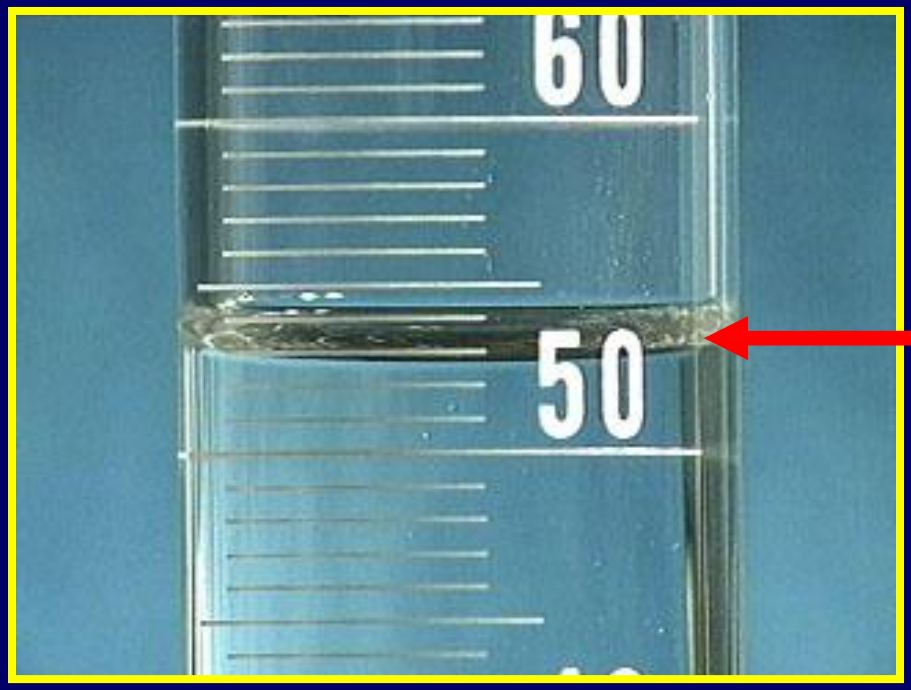
The plastic things on glass graduated cylinders are called bumpers.

Bumpers are used to help prevent breakage if the cylinder falls over.

They are not meant to be used as markers.

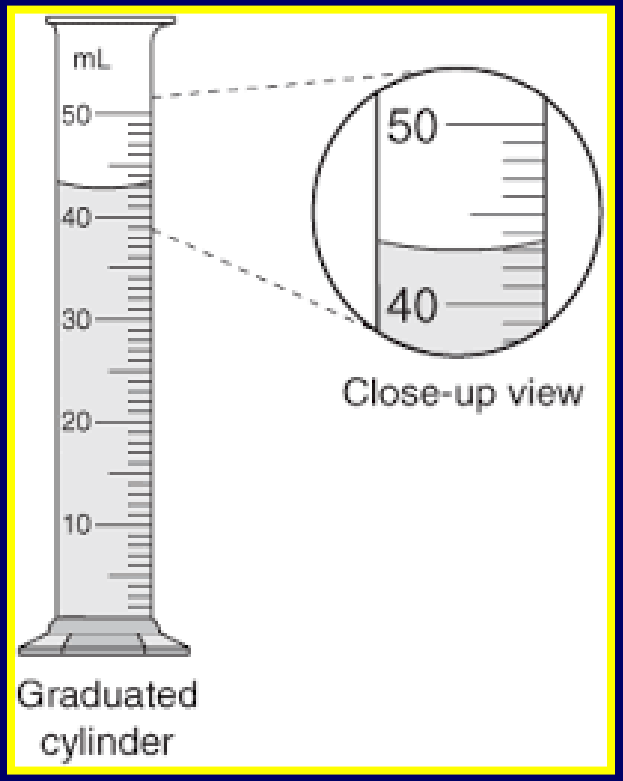
Measuring Volume

Due to water's chemical nature, the top water level will form a U-shape that is called the meniscus.



Measuring Volume

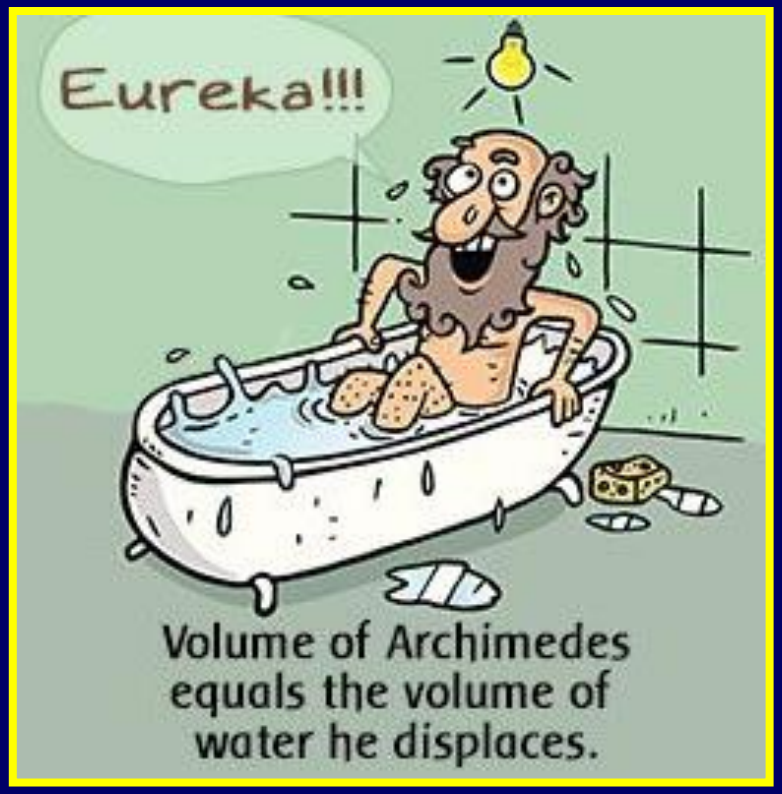
To read the volume, hold the cylinder up to eye level and read the measurement that aligns with the bottom of the meniscus.



43 mL

Measuring Volume

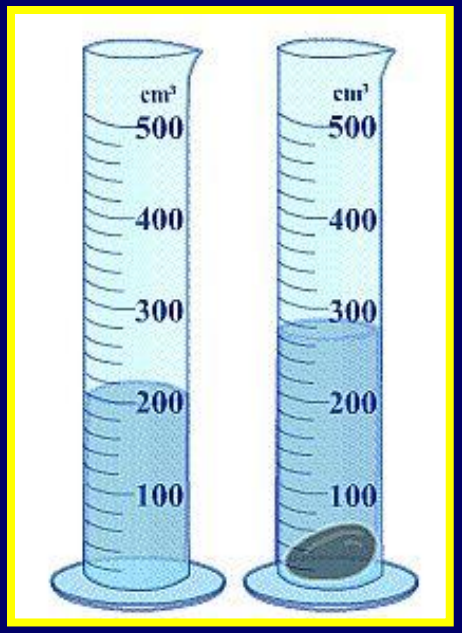
The volume of irregular shaped solids can be measured in graduated cylinders using the water displacement method.



This method was discovered by a Greek scientist named Archimedes.

Measuring Volume

1. Determine initial volume
2. Add the Object
3. Determine final volume



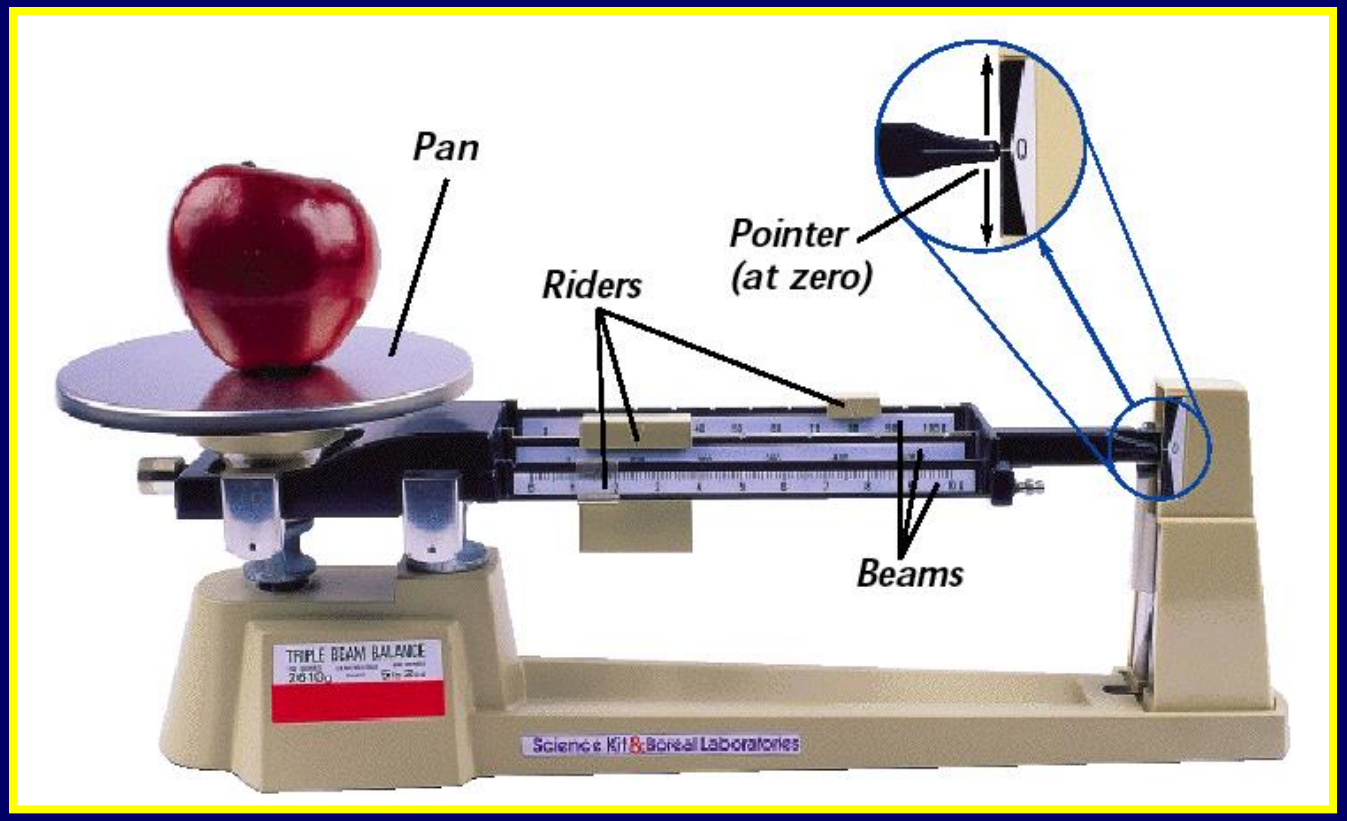
4. Volume = final volume – initial volume

Initial volume = 200 mL
Final volume = 260 mL

Volume = 260 mL – 200 mL = 60 mL

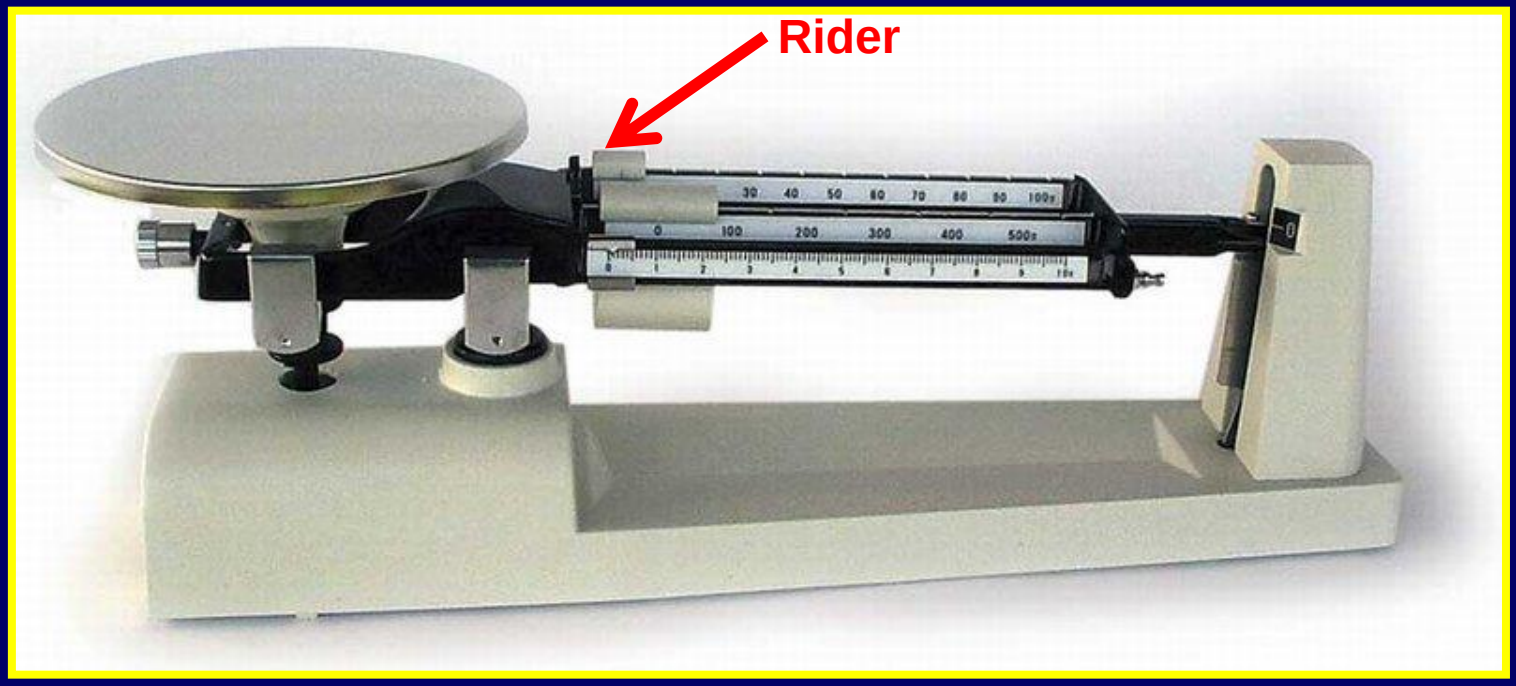
Measuring Mass

To measure mass, in the metric system, triple beam balances are used.



Measuring Mass

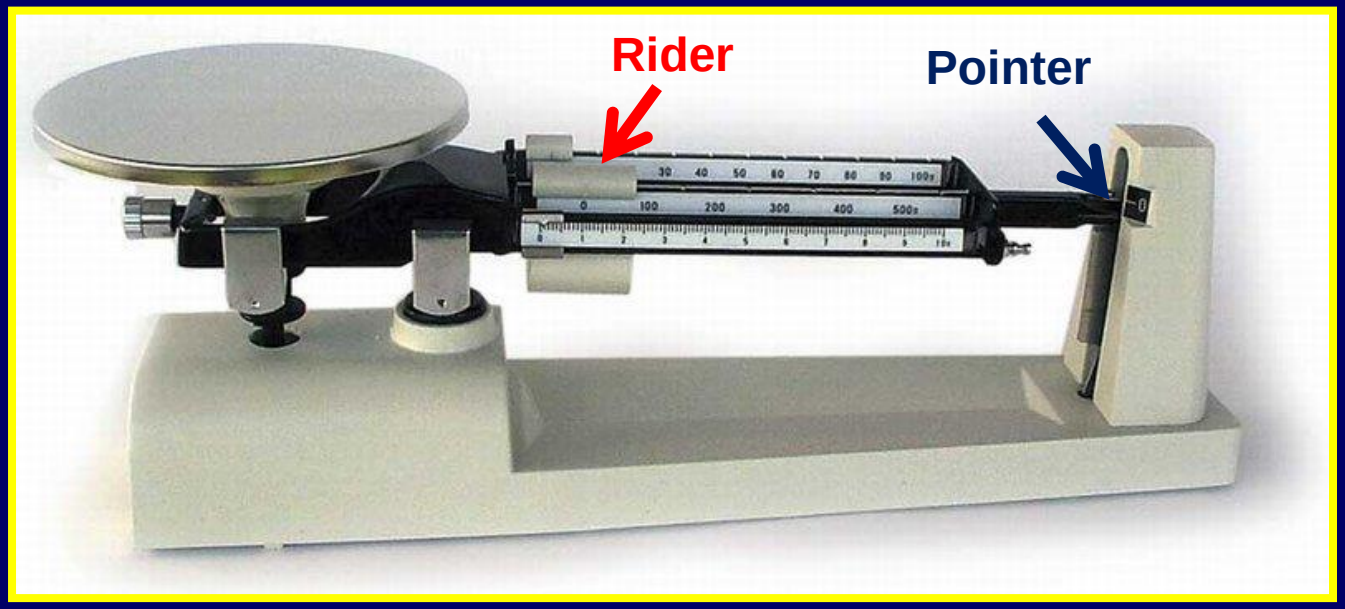
To use a triple beam balance, always begin with the riders on zero.



Always make sure the riders are clicked into the notches.

Measuring Mass

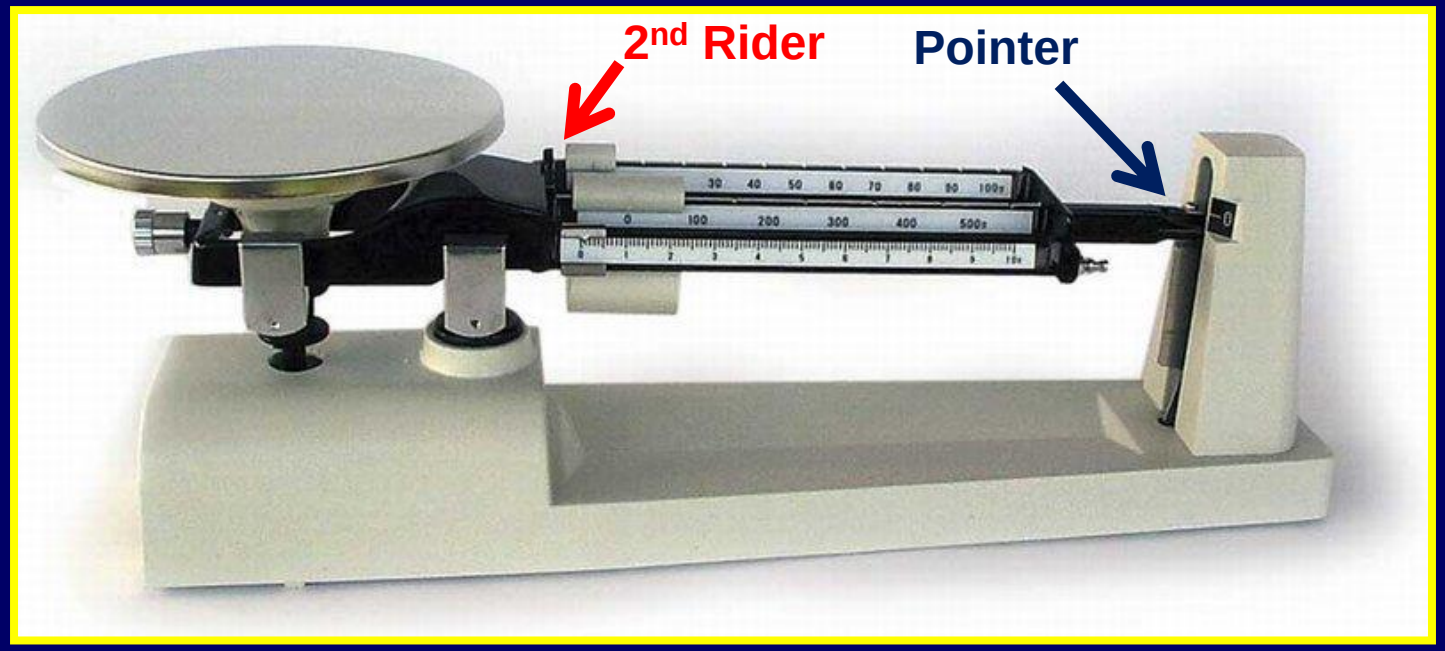
Begin with the largest rider, by moving it into each notch until the pointer sits at the bottom on the bottom.



Then, move the rider back one notch, so the pointer floats again, and leave it.

Measuring Mass

Next, move the second largest rider into each notch until the pointer again rests on the bottom.

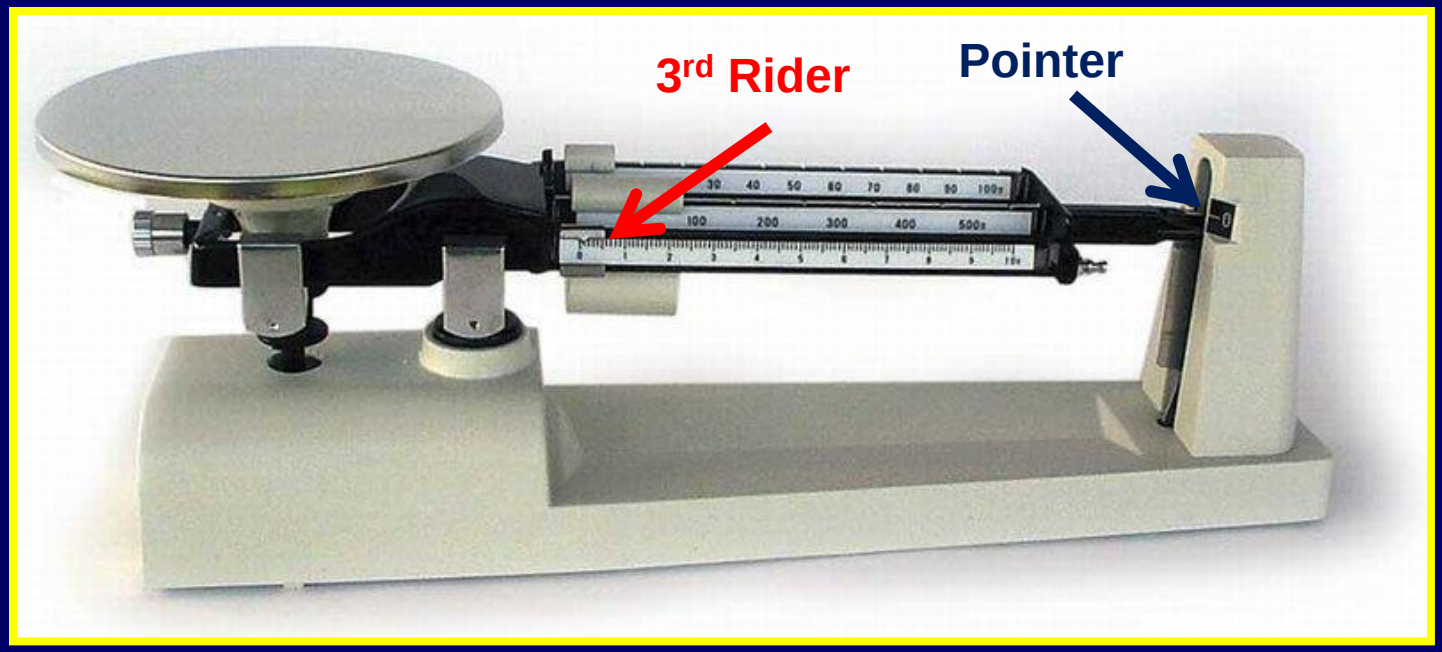


Then, move that rider back one notch, so that the pointer floats again, and leave it.

Measuring Mass

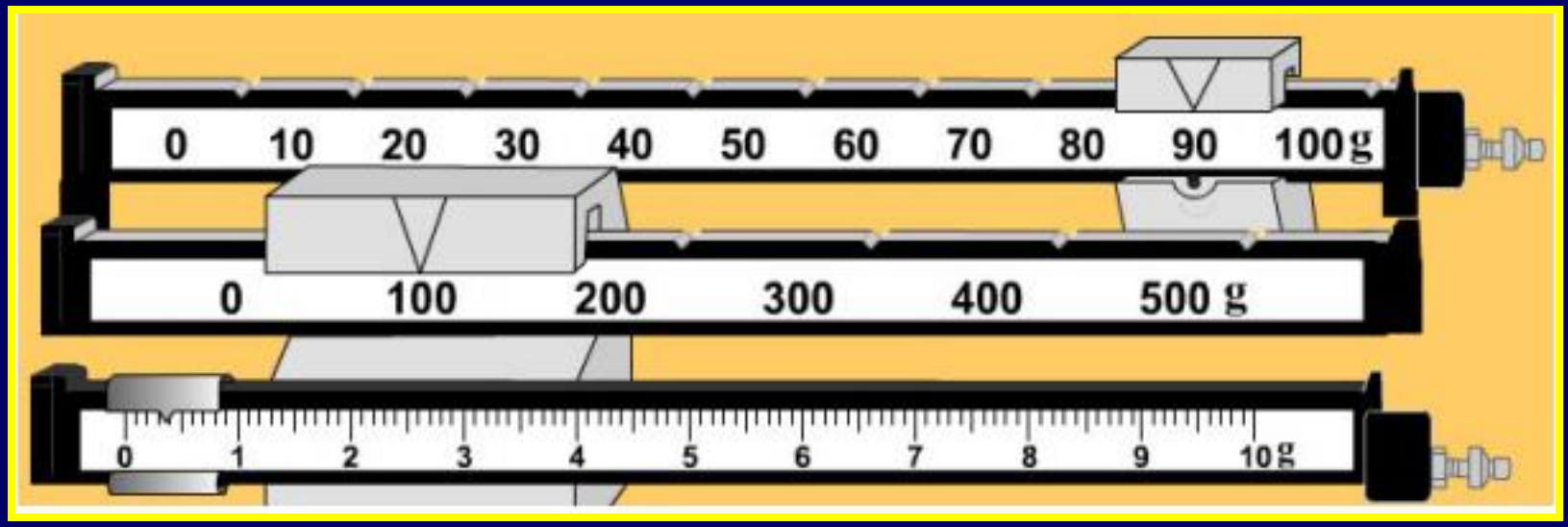
Finally, move the smallest rider over until the pointer lines up with the zero mark.

You are now ready to read the mass.



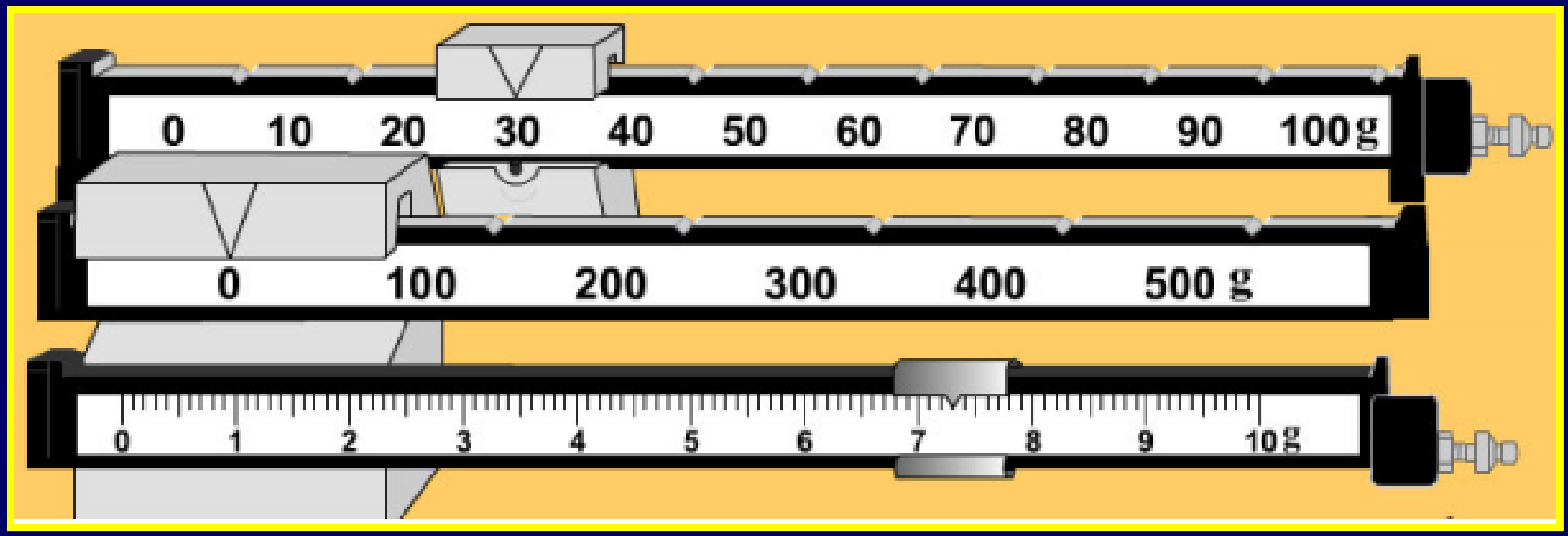
Measuring Mass

The numbers on a Triple beam balance represent grams. The small lines on the smallest rider are in decigrams and are denoted <u>after</u> a decimal point.



190.4 grams

Measuring Mass



37.3 grams

The End