**Measuring Matter**

How do we measure matter?

**MASS:**

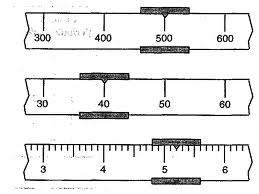
* measured in grams (g) or kilograms (kg)

***Mass is different from WEIGHT***

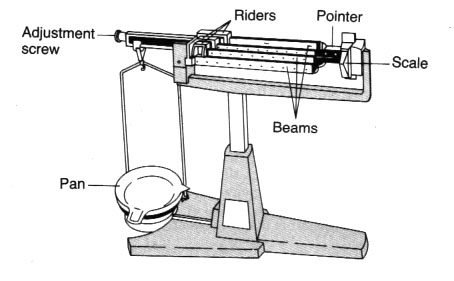
**WEIGHT:** **Force of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_pulling on an object.**

* Measured in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* The weight of objects is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_on the moon since the moon’s gravity is that of the Earth’s.

**MEASURING MASS USING A TRIPLE BEAM BALANCE**

There are various types of laboratory balances. The triple beam balance you use may look somewhat different from the one in the Figure below, however all beam balances have some common features.

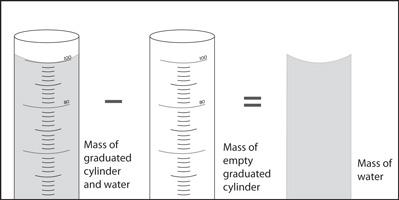
**MASS OF A SOLID:**



**Practice Question:**

What is the mass indicated by the measurement above?

**MASS OF A LIQUID:**

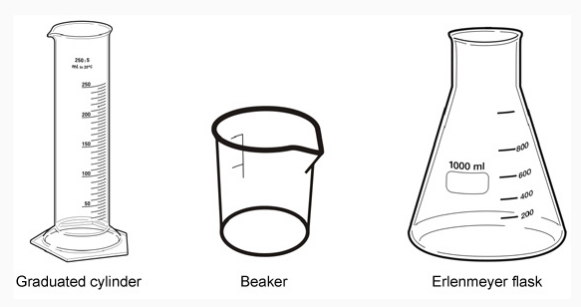


**Practice Question:**

What is the mass of 100mL of water?

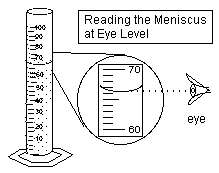
**VOLUME:**

**Volume:**

* Measured in , , ,
* 1 cm3 = 1 mL ; 1m3 = 1000L

**Measuring Volume:**

**A. Volume of LIQUIDS:**

* + use a graduated cylinder or beaker
  + read at **eye level**
  + read from bottom of **meniscus** (curved surface of water)

*Practice Question: What is the volume in this diagram? ---------->*

|  |  |  |
| --- | --- | --- |
|  |  |  |

**B. Volume of RECTANGULAR SOLIDS:**

**Volume = length • width • height**

V = l • w • h

Practice Question:

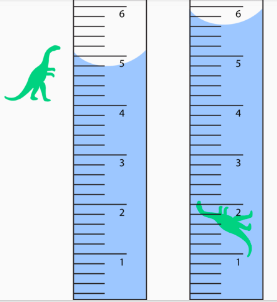
2cm

2cm

1.5cm

V = l • w • h

V=



**Practice Question:** What is the volume of the dinosaur?

**C. Volume of IRREGULARLY SHAPED SOLIDS:**

Use **displacement of water** technique

1. Measure a specific volume of water
2. Measure volume of water with object submerged in it
3. Subtract volumes to find volume of object

**Volume of object = (Volume of object in liquid) - (Volume of liquid alone)**