Aim: How are mass and weight measured?

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Vocabulary

- Weight and mass
- balance and spring scale
- riders, pointer, pan, base, adjustment knob, arm

AIM:How are mass and weight measured?

Objectives

- Ability to distinguish between mass and weight
- Ability to use the appropriate apparatus

AIM:How are mass and weight measured?

DEFINITION

What is gravity?

AIM: How are mass and weight measured?

DEFINITION

Gravity is the attraction of an object to the surface of the Earth

AIM:How are mass and weight measured?

Gravity and Weight:

Weight is

The measurement of the force of gravity on an object …

AIM:How are mass and weight measured?

AIM:How are mass and weight measured?

Think about it…

If the object is on the moon

AIM:How are mass and weight measured?

then gravity is the attraction of that object to the surface of the moon.

AIM: How are mass and weight measured?

QUESTION ?

Where is gravity greater,

on Earth or the Moon?

So where would you weigh more,

On Earth or the Moon?

FURTHER QUESTION

So, since I weigh more on Earth then on the Moon,

Just because I am on the moon,

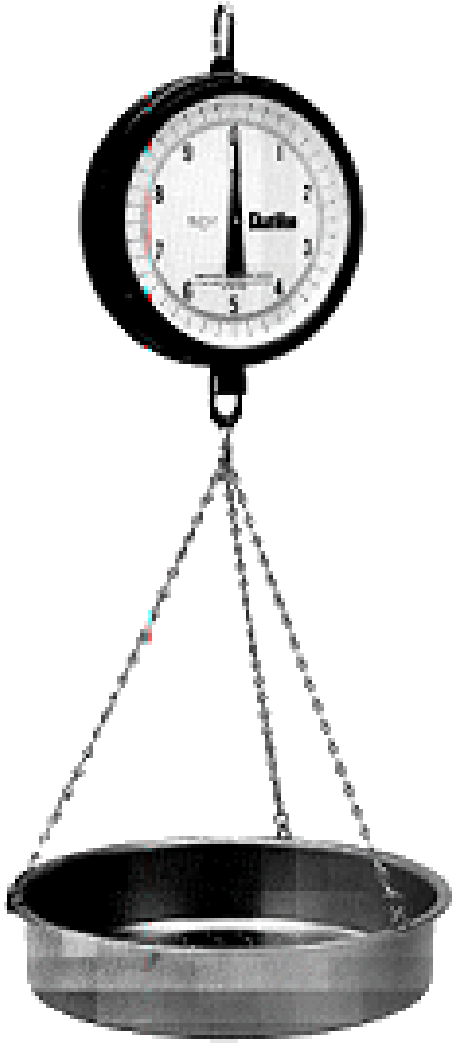
"am I any different?"

NO - my mass stays the same!

AIM:How are mass and weight measured?

Question

What do the following three pictures have in common?



AIM:How are mass and weight measured?

Question

What do the following three pictures have in common?

Have you ever…

- Stepped on a weight scale at home and held onto something to push yourself harder on the scale so that your weight is more?
- That is increasing the force of your body, creating something like as if we were to increase the gravitational pull of the Earth. (But we didn't.)

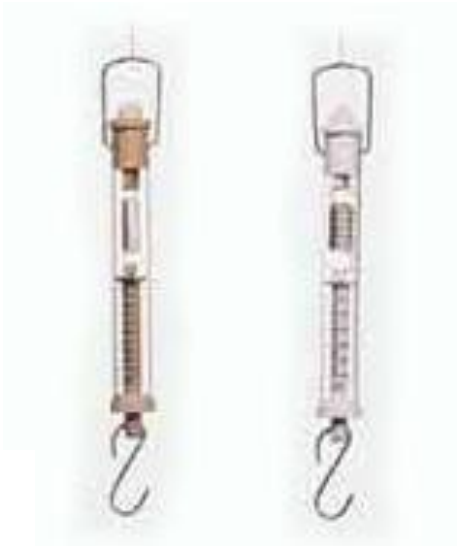
AIM: How are mass and weight measured?

They are all spring scales.

They measure weight.

(the force of gravity)

The ---- it is Newtons



STOP

AIM:How are mass and weight measured?

MASS

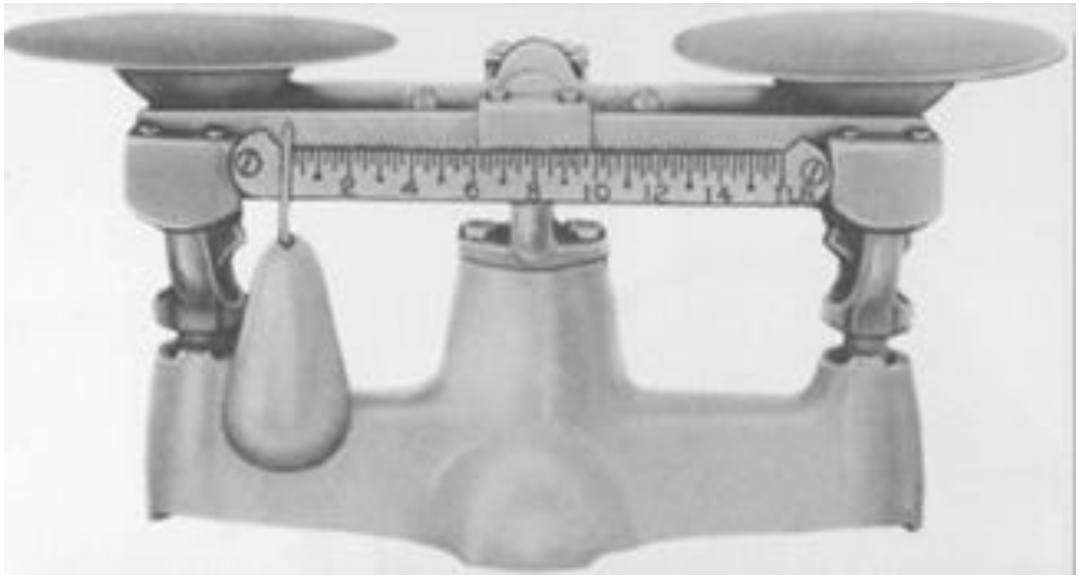
is the measurement of

…the amount of matter an object has …

AIM:How are mass and weight measured?

Question

What do the following three pictures have in common?



AIM:How are mass and weight measured?

Question

What do the following three pictures have in common?

AIM: How are mass and weight measured?

Question

What do the following three pictures have in common?

AIM: How are mass and weight measured?

They are all balances.

They measure mass.

(the amount of matter)

The unit is grams

AIM:How are mass and weight measured?

Let Organize Our Thoughts

Measurement	Definition	Unit
length	Distance from 1 point to another	meter
Liquid volume	Amount of space something takes up	Liter
weight	The gravitational pull on an object	Newtons
mass	The amount of matter in an object	grams

AIM: How are mass and weight measured?

The balance measures in kilograms and grams.

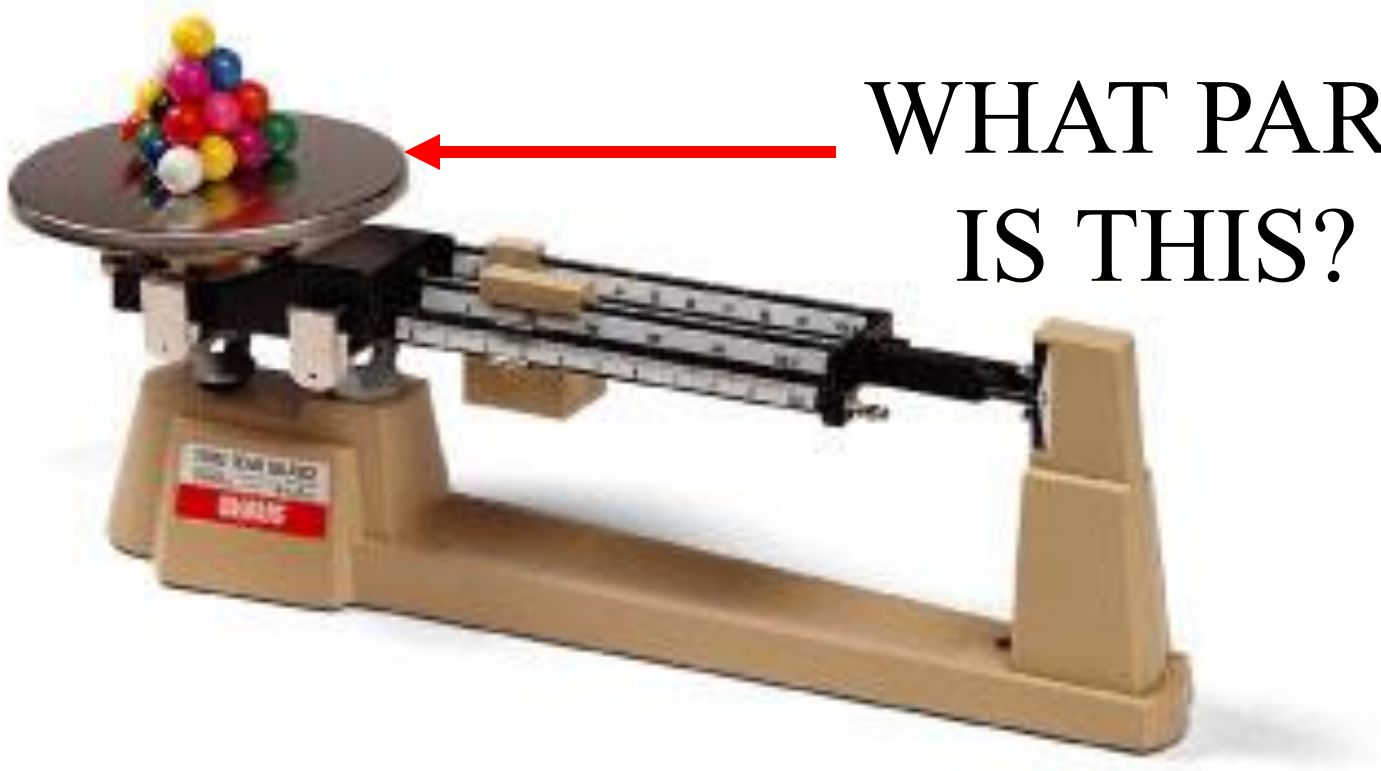
AIM:How are mass and weight measured?

There are 1000 g in 1 kg

AIM:How are mass and weight measured?

What are the parts of a balance?

AIM: How are mass and weight measured?



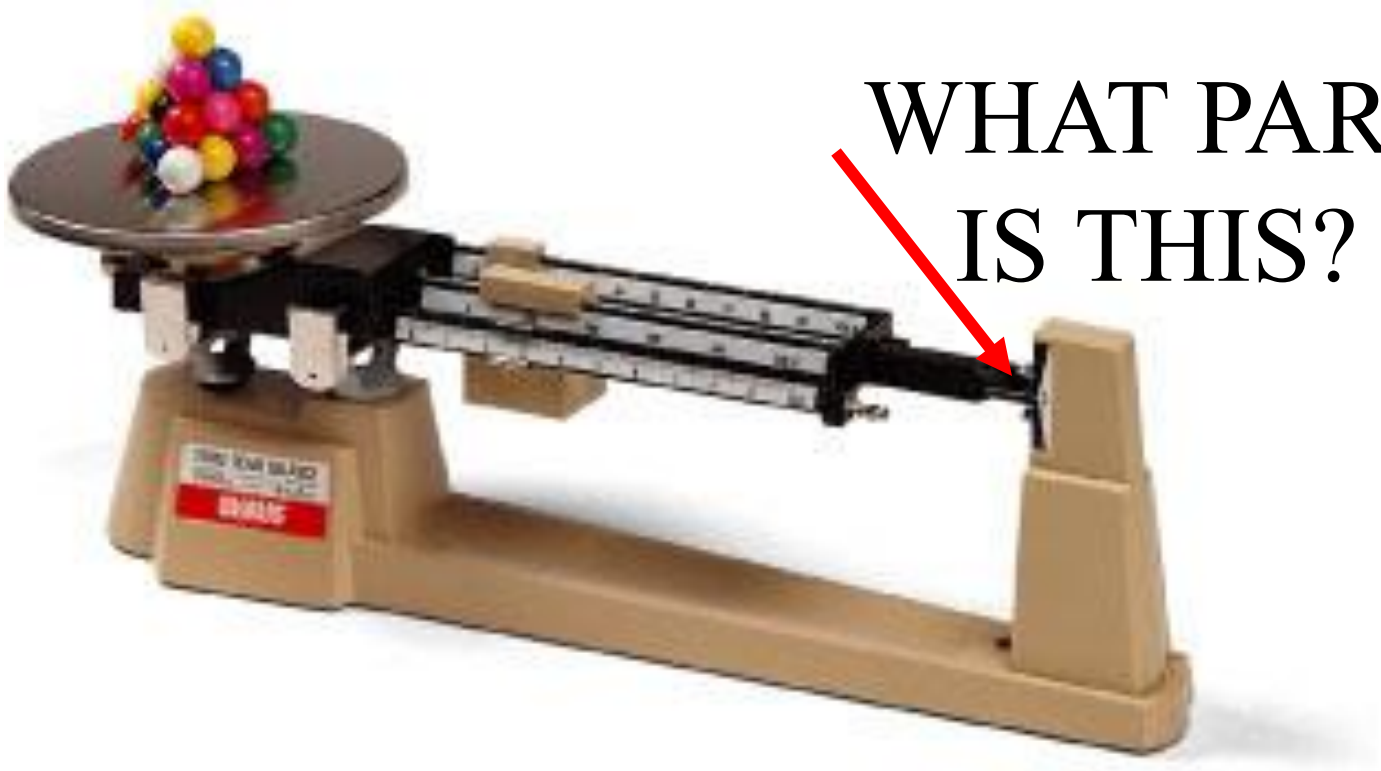
WHAT PART IS THIS?

AIM: How are mass and weight measured?

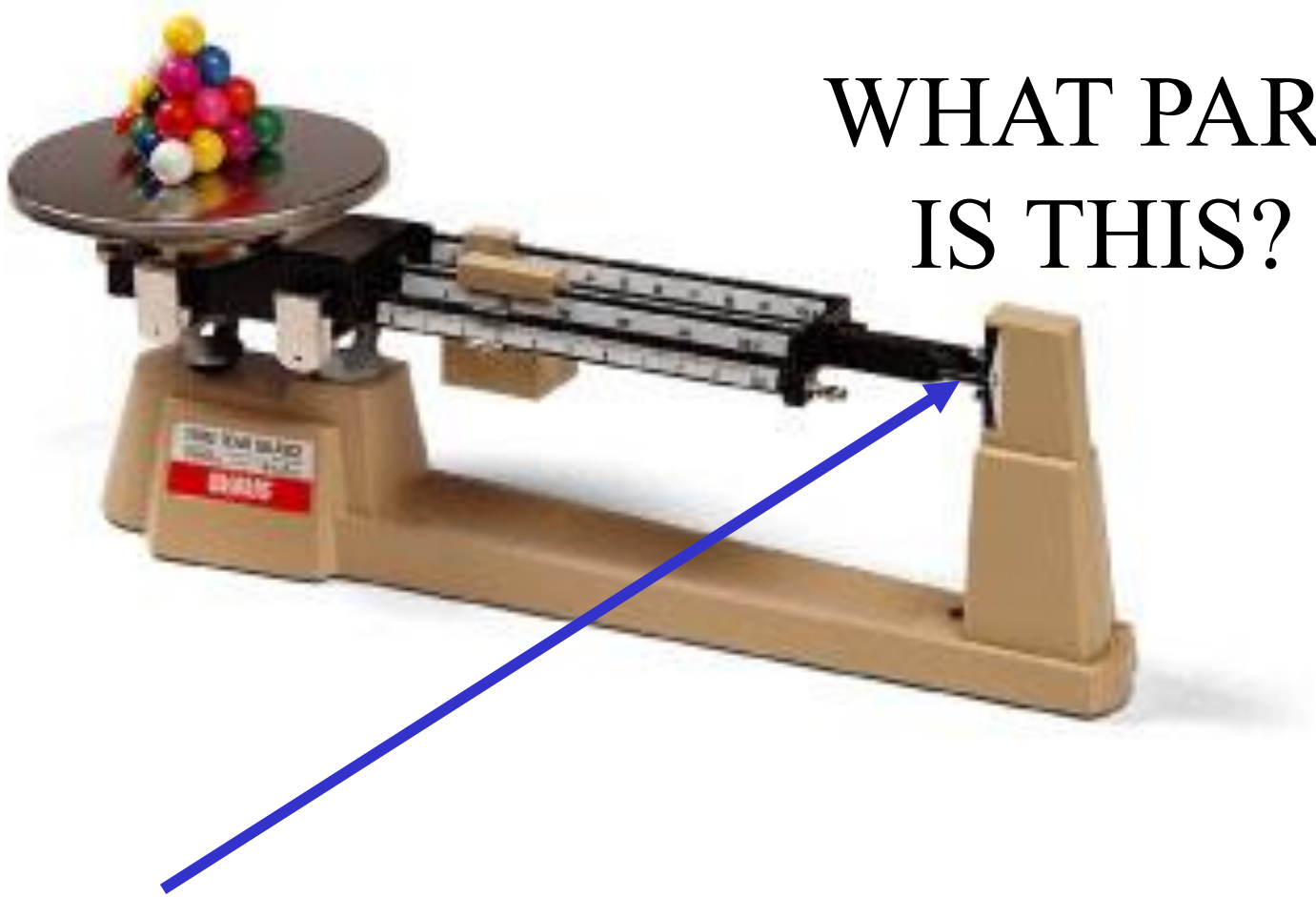
WHAT PART IS THIS?

This is the pan: Objects to be massed are placed on the pan

AIM: How are mass and weight measured?



AIM: How are mass and weight measured?



WHAT PART IS THIS?

This is the pointer: It points to ZERO when the balance is correct.

AIM: How are mass and weight measured?

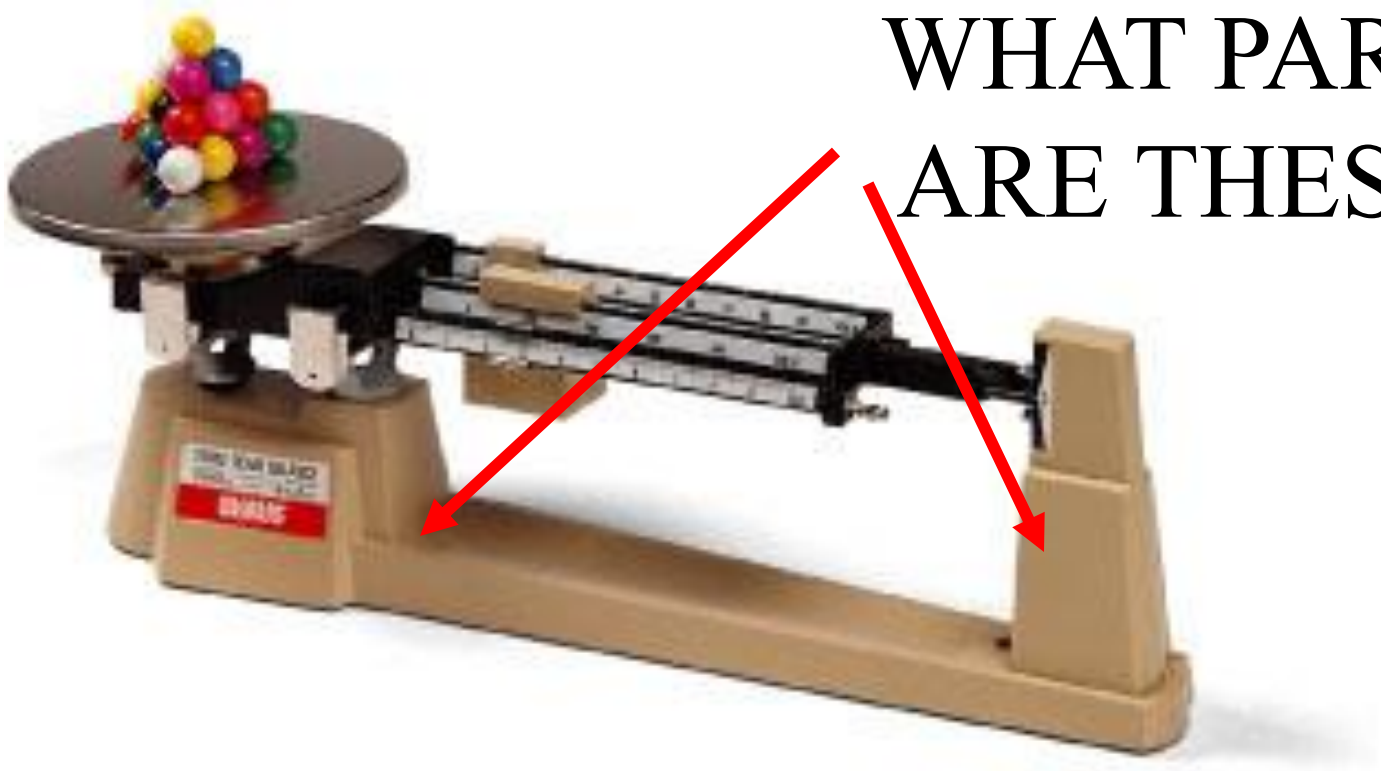
WHAT PART
IS THIS?

AIM: How are mass and weight measured?

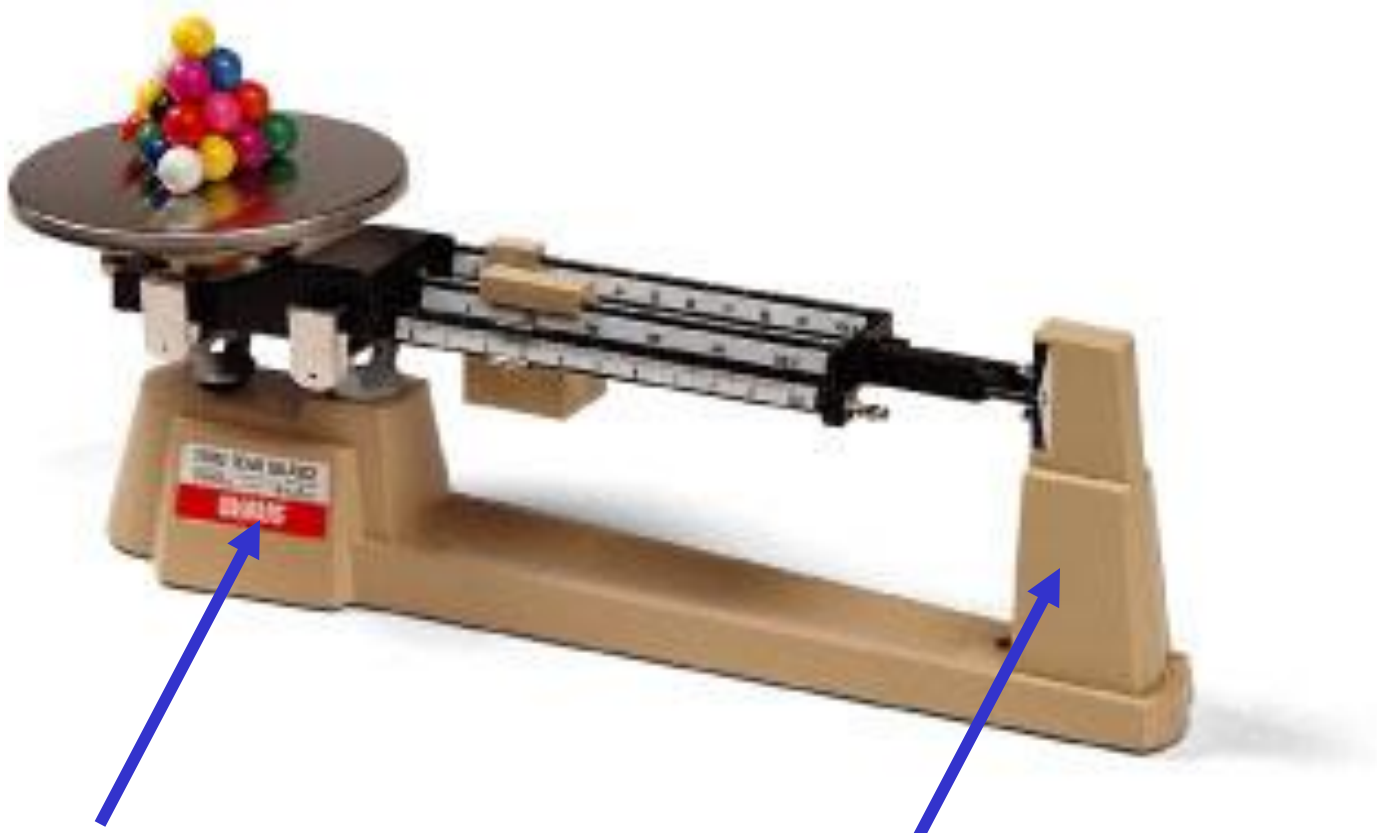
This is the *Adjustment Knob*:

It's used to "zero the balance" and to make sure the scale is at zero.

AIM:How are mass and weight measured?



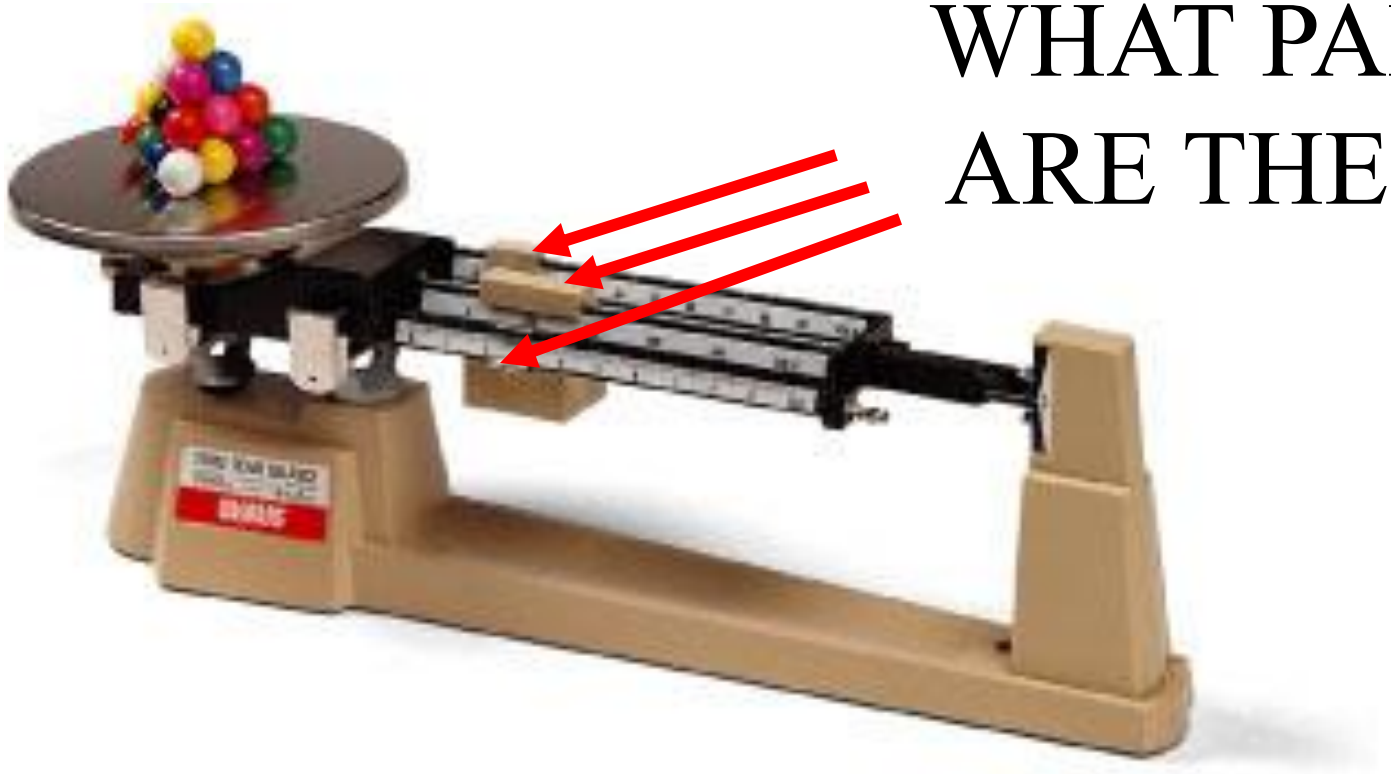
AIM: How are mass and weight measured?



This is the base: This is the arm.

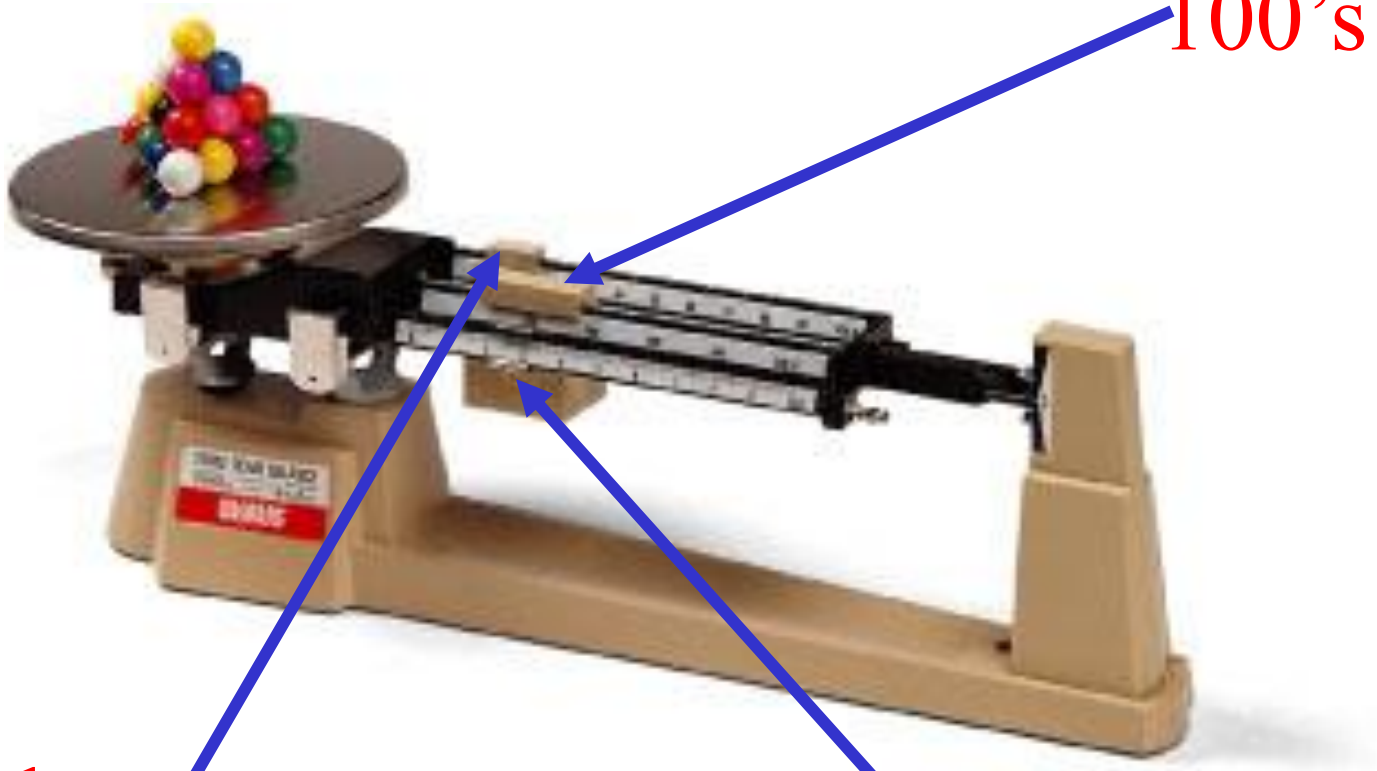
When transporting the balance, you hold it by the base and arm.

AIM:How are mass and weight measured?



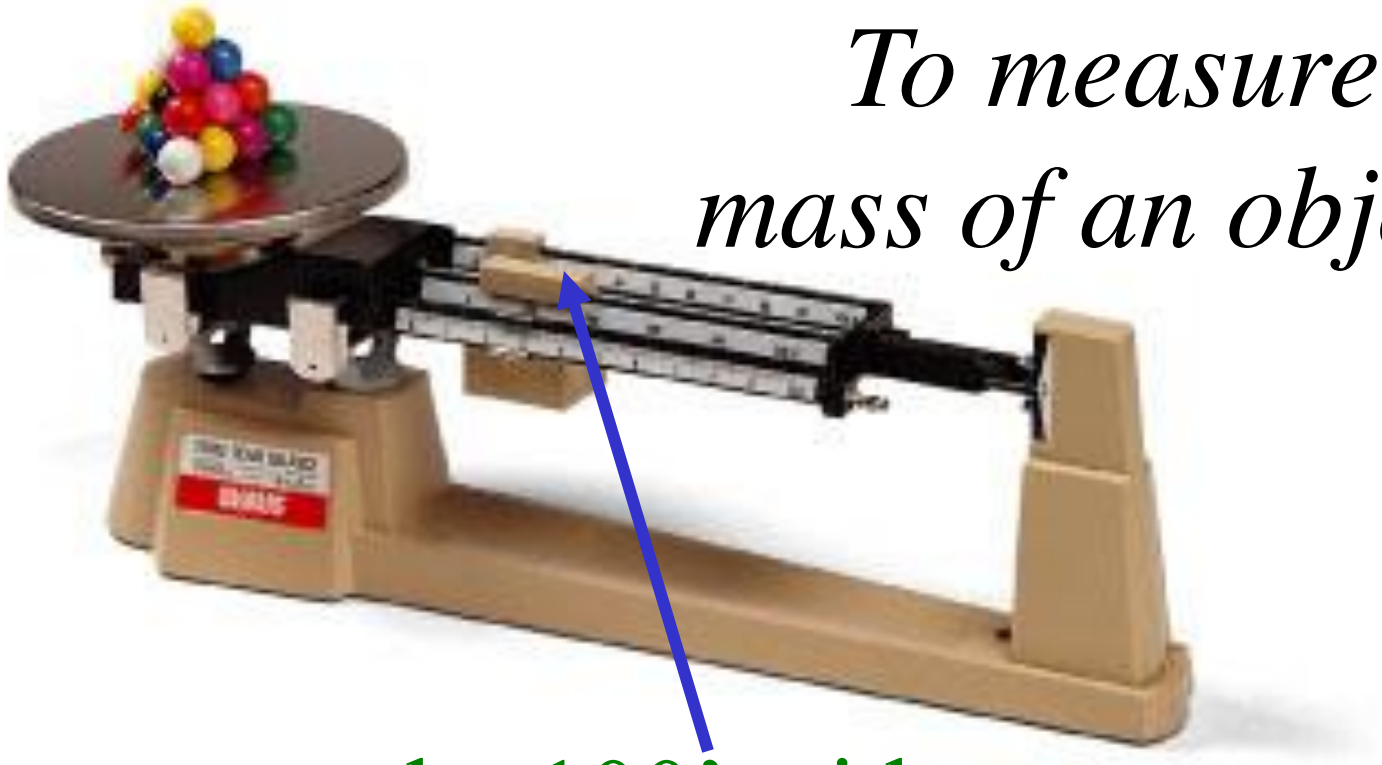
WHAT PARTS ARE THESE?

AIM: How are mass and weight measured?



These are the riders. You move the riders to balance the pan.

AIM: How are mass and weight measured?



To measure the mass of an object:

First you move the 100's rider.

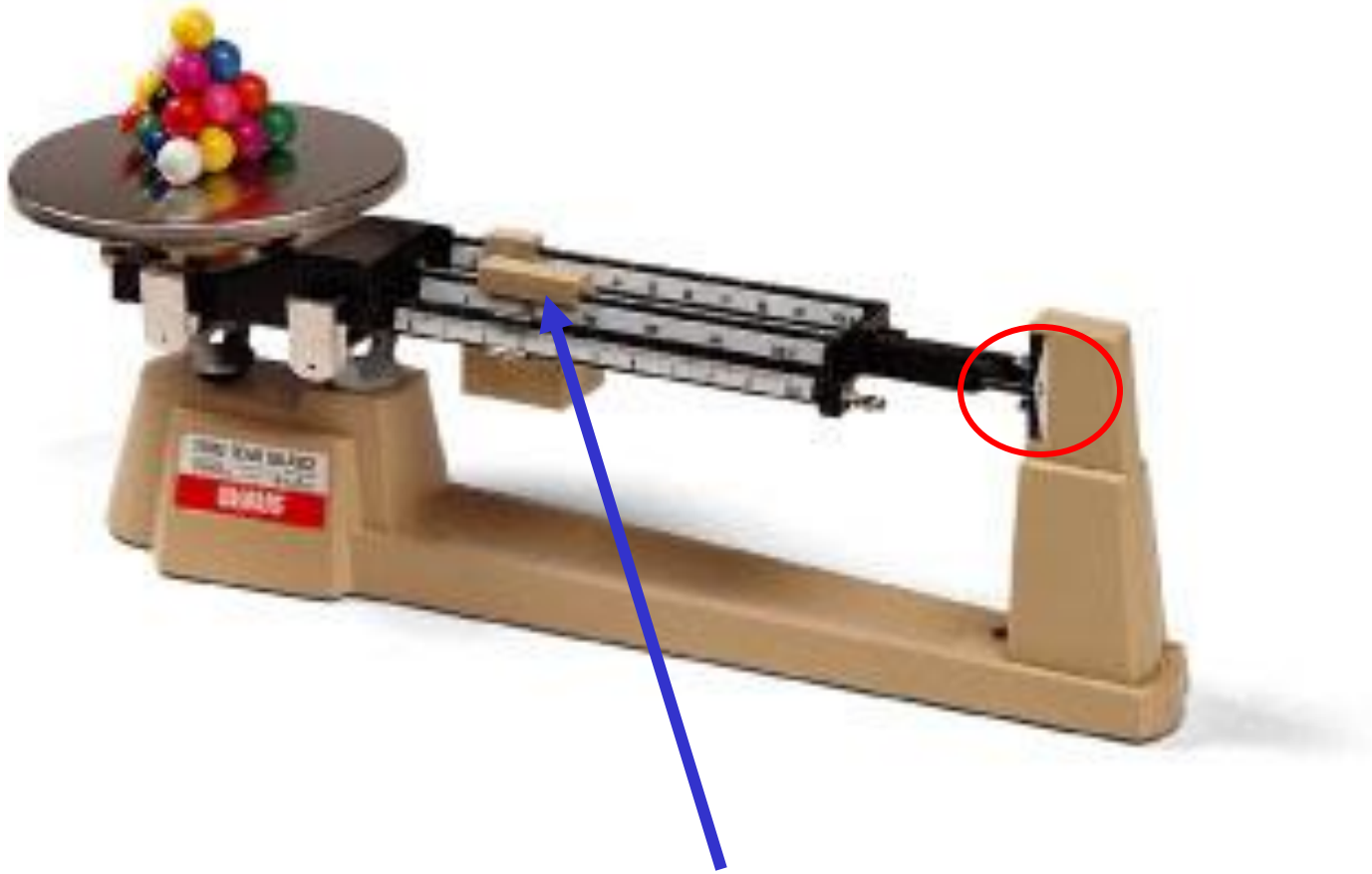
AIM: How are mass and weight measured?

If the pointer is above ZERO, the object on the pan is more then 100 grams.

Keep moving the 100's rider up to 200, then 300, then 400 etc...

STOP

AIM:How are mass and weight measured?



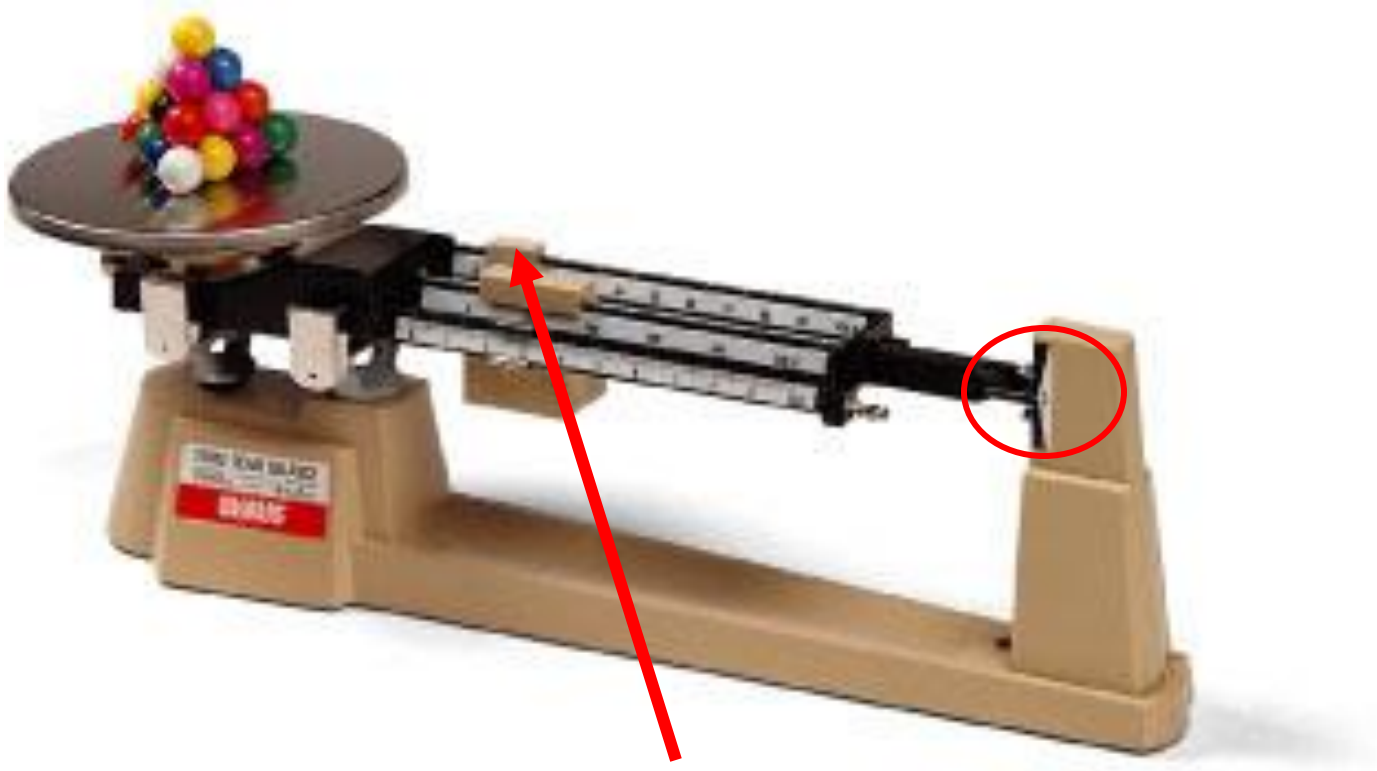
Once the the pointer is below zero -- you know you moved the rider to far. Move it back one ... And then ....

AIM: How are mass and weight measured?

Begin to move the 10's rider.

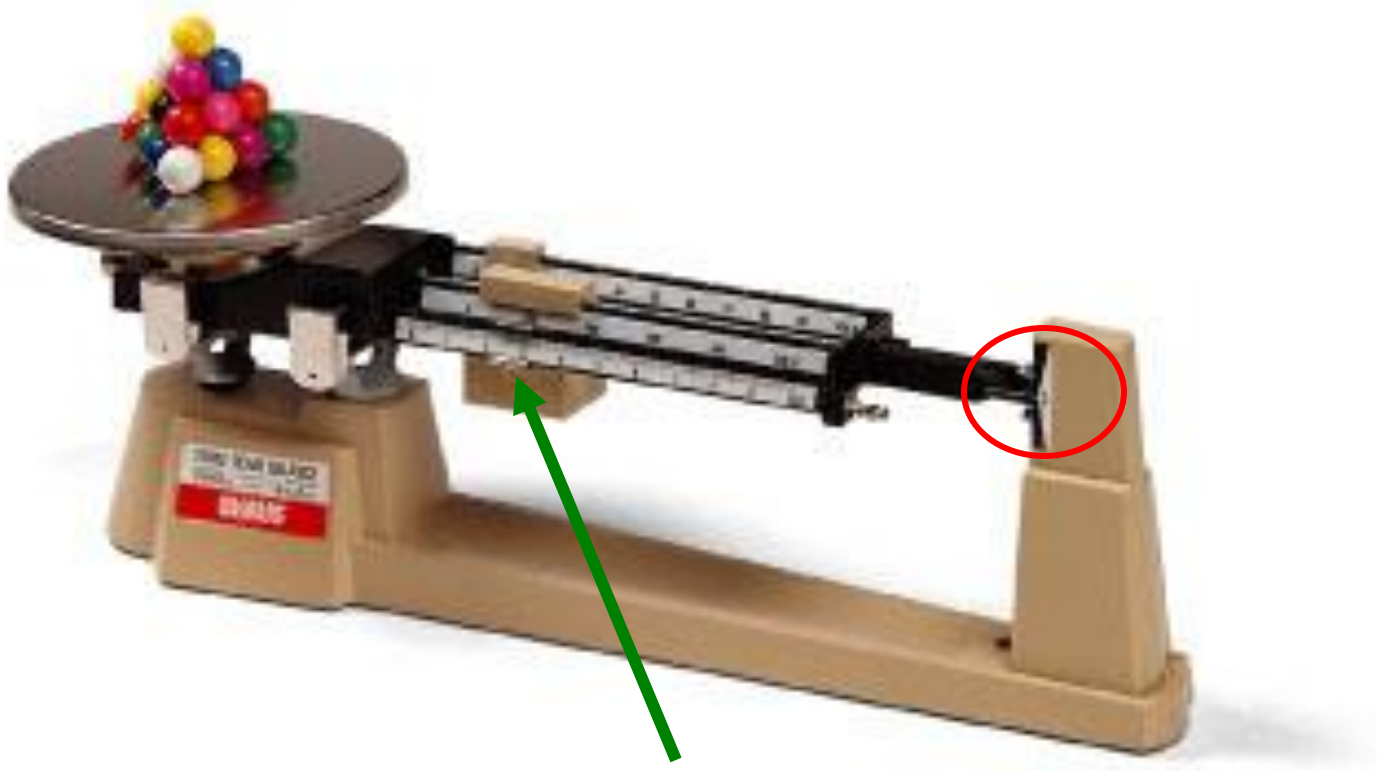
If the pointer is still above zero, continue to move the 10's rider one unit at a time.

AIM:How are mass and weight measured?



Once the the pointer is below zero -- you know you moved the 10's rider to far. Move it back one ... And then ....

AIM:How are mass and weight measured?



Begin to move the 1's rider.

Continue to move the 1's rider until the pointer is pointing to ZERO.

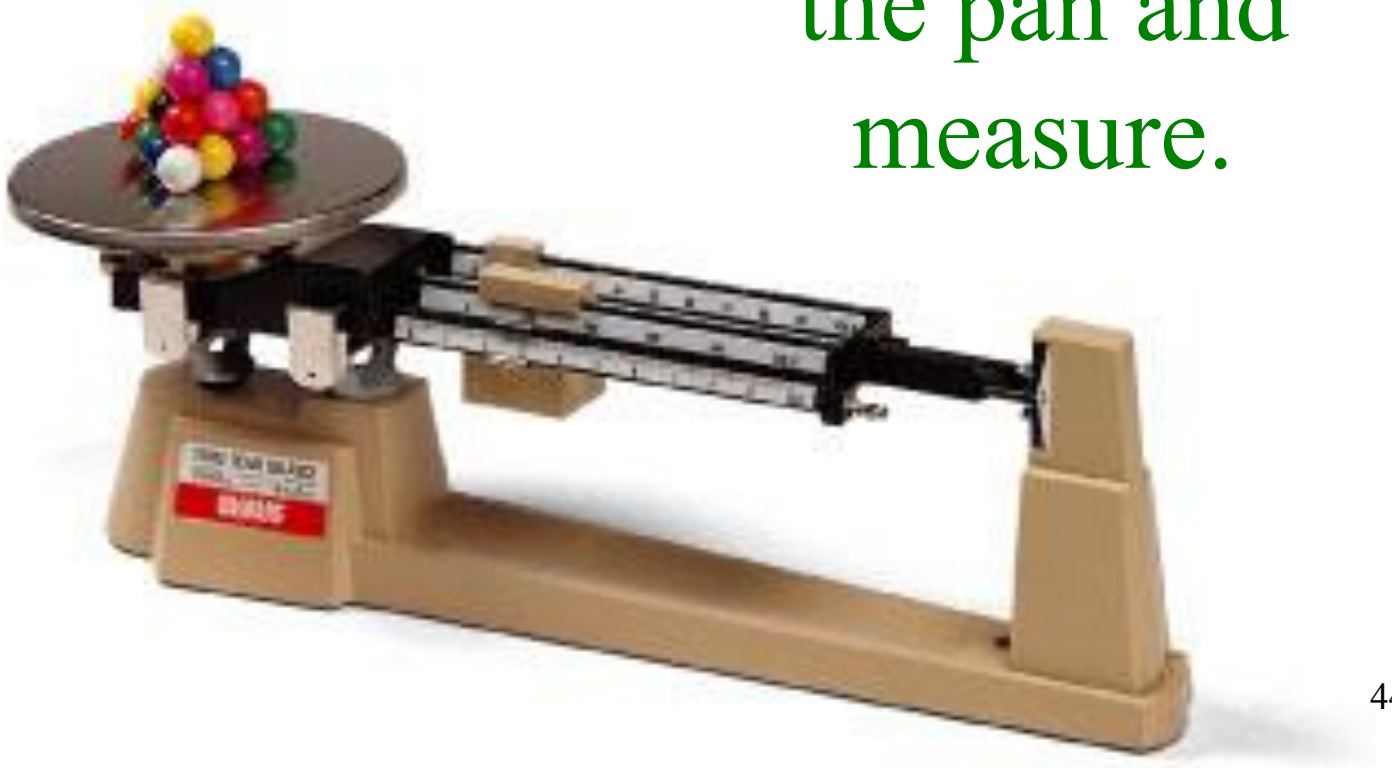
AIM:How are mass and weight measured?

Three Methods of Determining Mass

AIM: How are mass and weight measured?

Method 1:

1. Place the solid object directly on the pan and measure.



AIM: How are mass and weight measured?

Method 2:

1. When measuring the **mass of liquid**, you have to measure the mass of a empty container first

AIM:How are mass and weight measured?

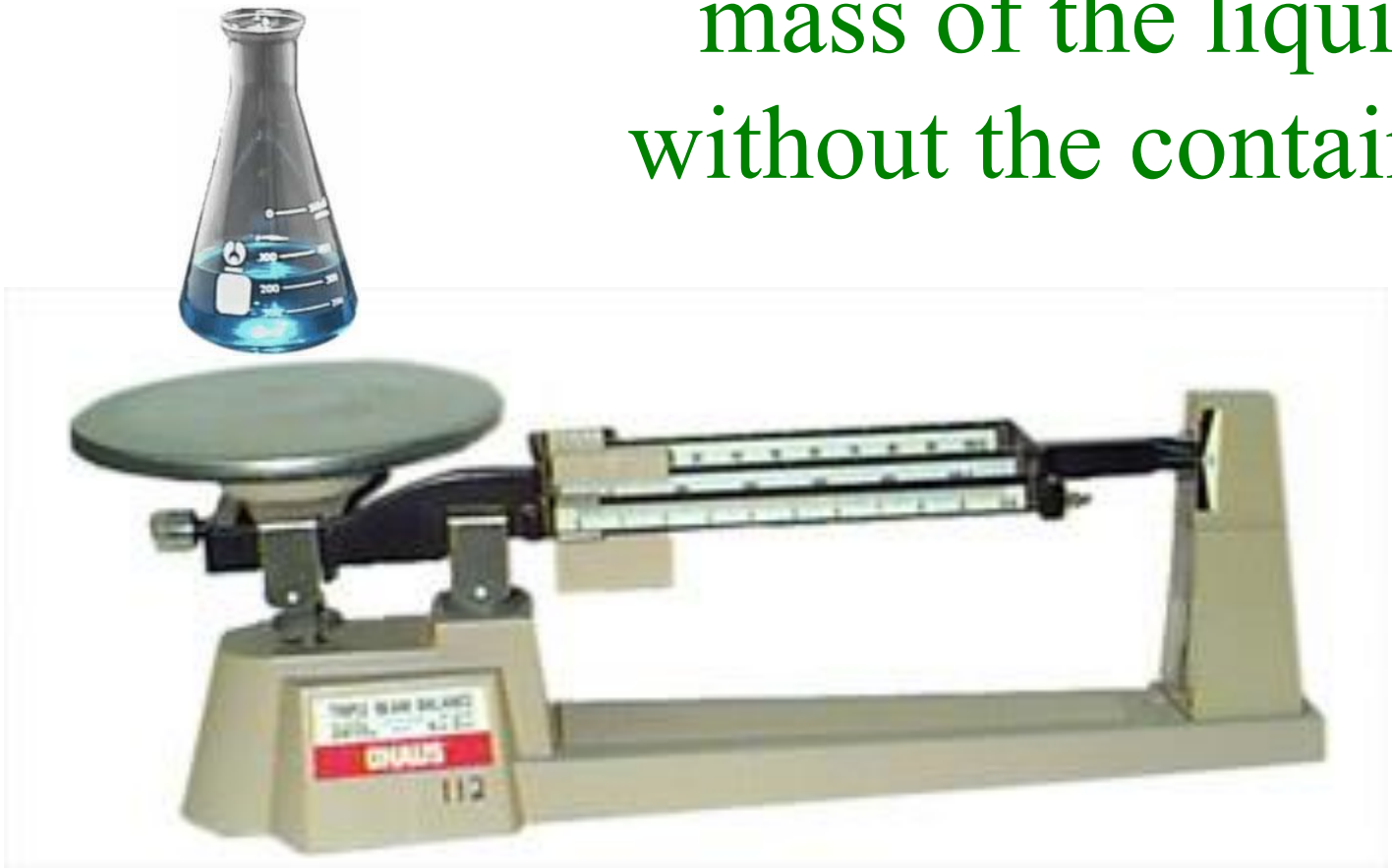
Method 2:

2. Measure the container with your liquid.

AIM: How are mass and weight measured?

Method 2:

3. Subtract to find the mass of the liquid without the container



AIM:How are mass and weight measured?

Method 3:

To find the mass of a powdery substance

AIM: How are mass and weight measured?

Method 3:

Never place a powder directly on the pan without "weigh paper"

AIM:How are mass and weight measured?

Method 3:

1. Place a piece of "weigh paper" on the pan, measure the "weigh paper"

AIM:How are mass and weight measured?

Method 3:

2. Add your powder sample to the "weigh paper" and measure both.

AIM:How are mass and weight measured?

Method 3:

3. Subtract the paper to find the mass of your powder without the paper

AIM: How are mass and weight measured?

STORAGE

PLACE THE BALANCE BACK WITH ALL RIDERS MOVED ALL THE WAY TO THE LEFT ON ZERO

AIM:How are mass and weight measured?

Summary

AIM: How are mass and weight measured?

Class Activity:

Lab: Determining Mass

Lab: Determining the mass of Water

Lab: How to Use a Balance- Lab (3 methods)

AIM:How are mass and weight measured?

INTERNET WEBSITE FOR PRACTICE

http://www.ohaus.com/input/tutorials/tbb/tbbentry.swf