What is Matter?
Objectives

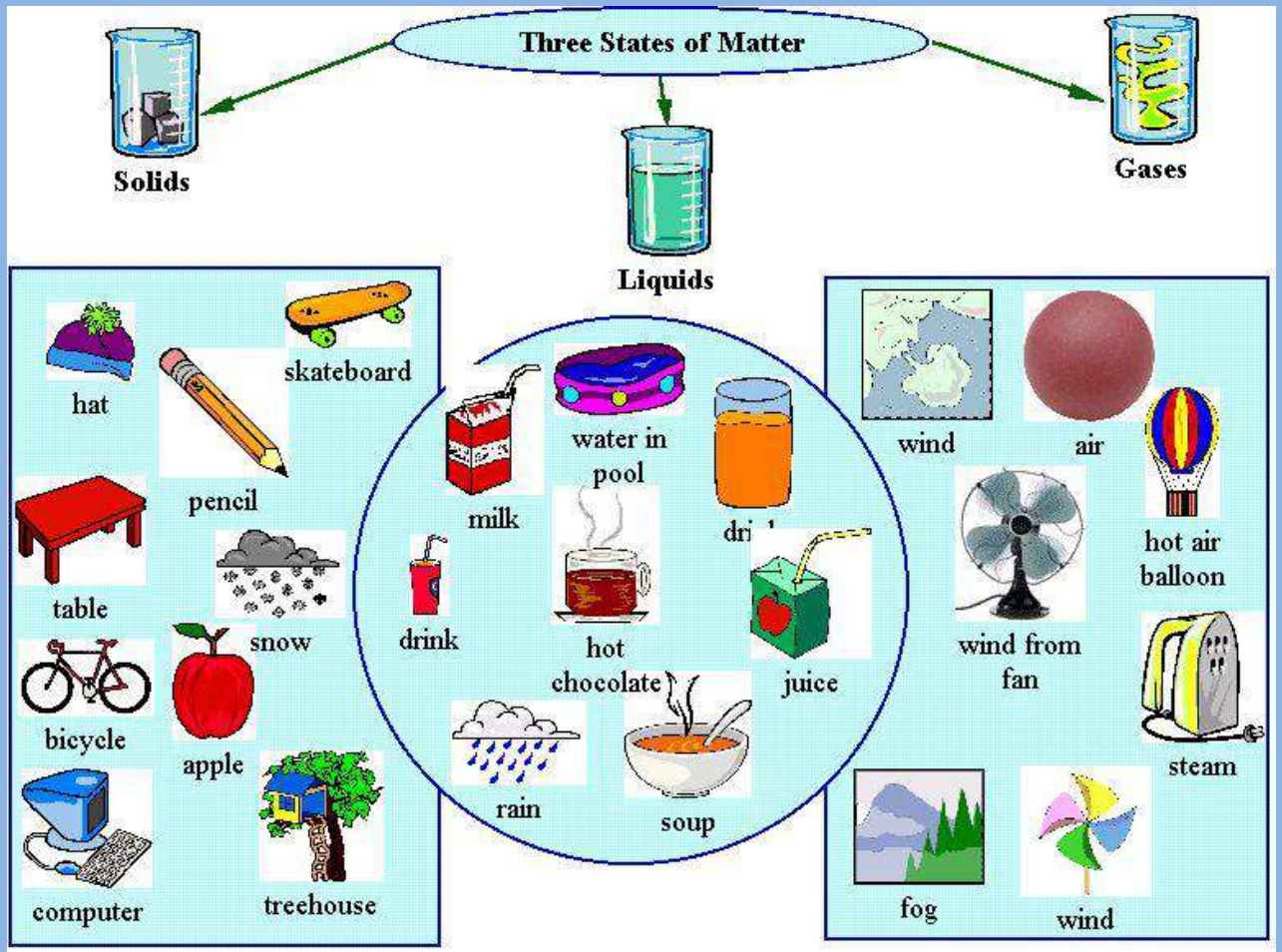
- **Describe** the two properties of all matter.

- **Identify** the units used to measure volume and mass.
- **Compare** mass and weight.

- **Explain** the relationship between mass and inertia.

I. Matter

A. A Universe Full of Matter Matter is anything that has mass and takes up space. It's that simple! Everything in the universe that you can see is made up of some type of matter.



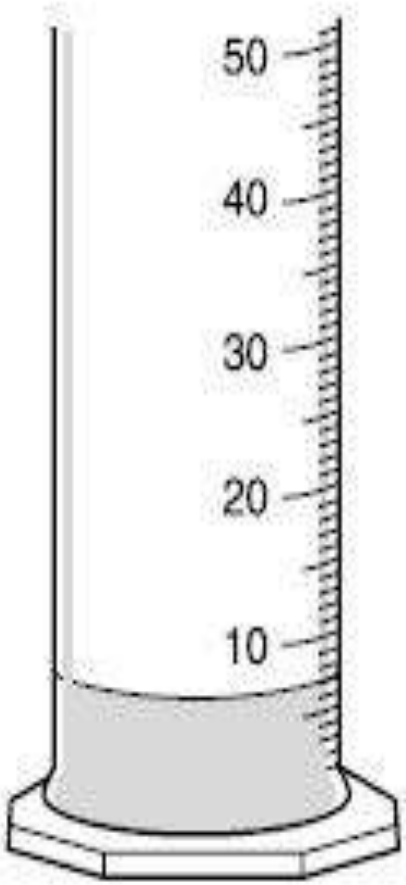
II. Matter and Volume

A. Liquid Volume Liters (L) and milliliters (mL) are the units used most often to express the volume of liquids.

B. **Measuring the Volume of Liquids** In your science class, you'll probably use a graduated cylinder instead of a measuring cup to measure the volume of liquids.

C. Measure liquid volume at the bottom of the meniscus.

What is the volume in milliliters?



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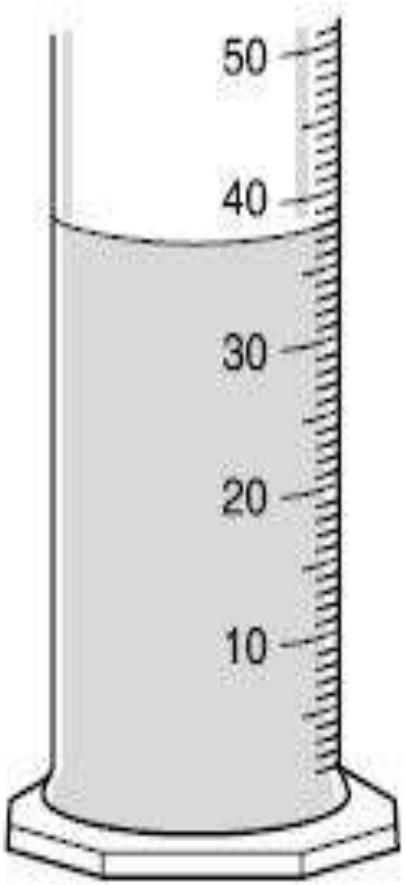

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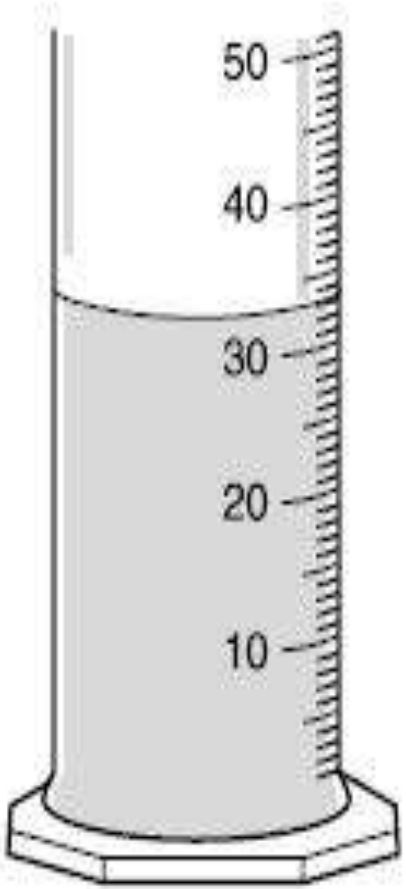

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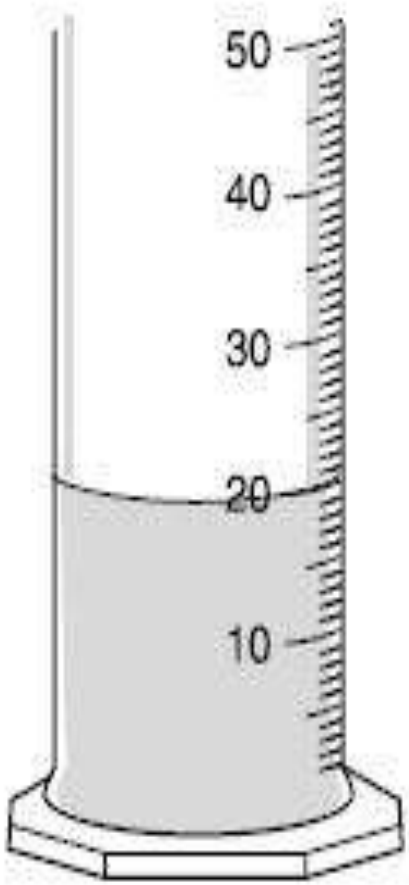
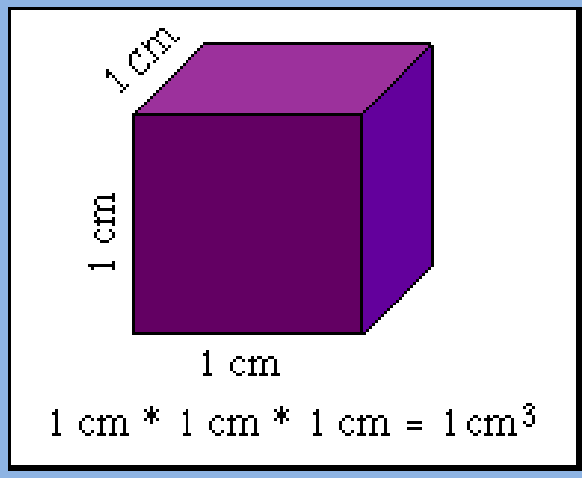


4. _____

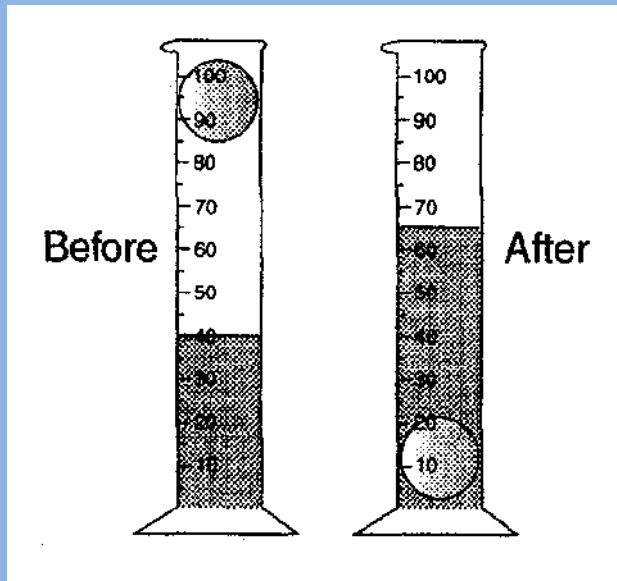
II. Matter and Volume *continued*

D. Volume of a Regularly Shaped Solid Object The volume of any solid object is expressed in cubic units.

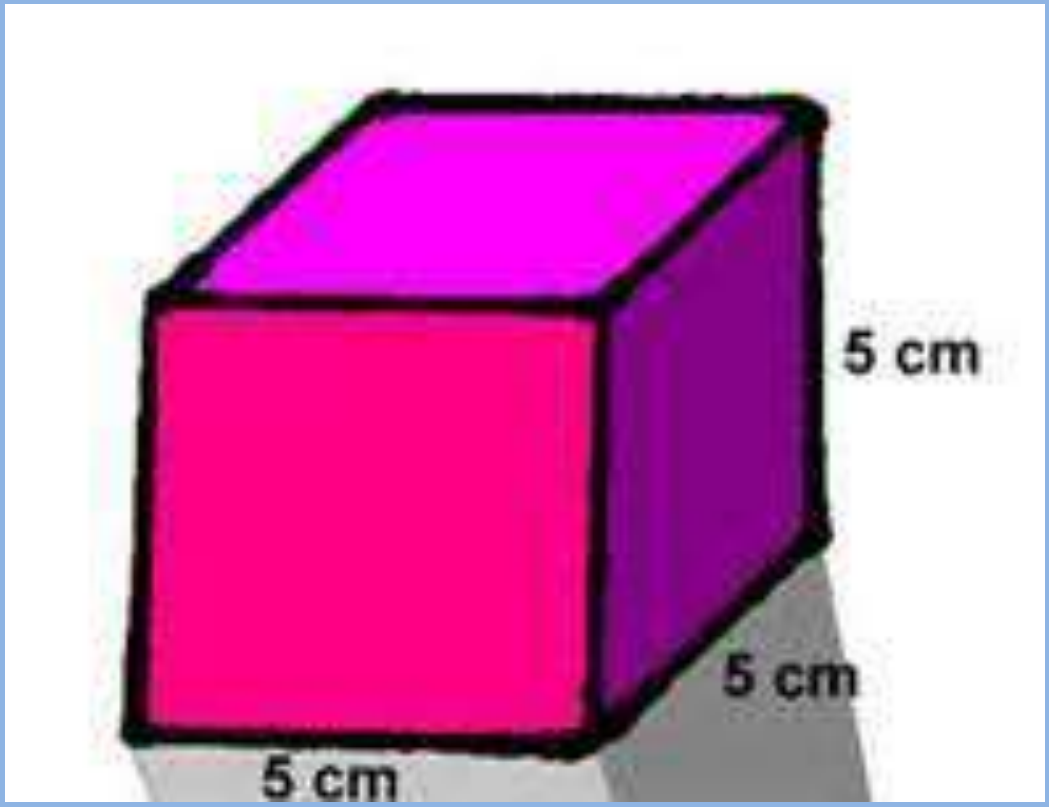
Volume=length x width x height



E. **Volume of an Irregularly Shaped Solid Object** You can measure the volume of any solid object by measuring the volume of water that the object displaces.



What is the volume of the object?



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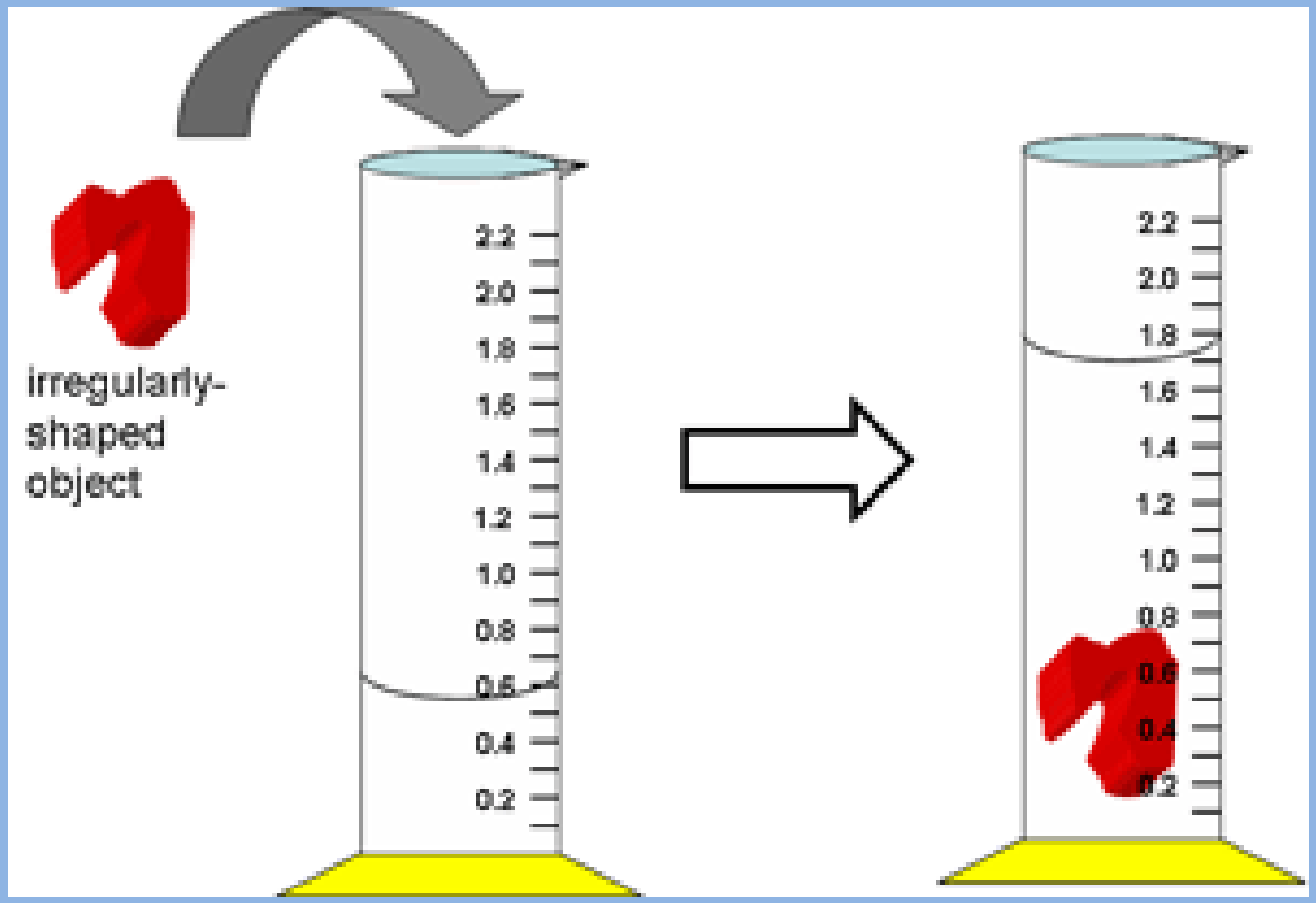
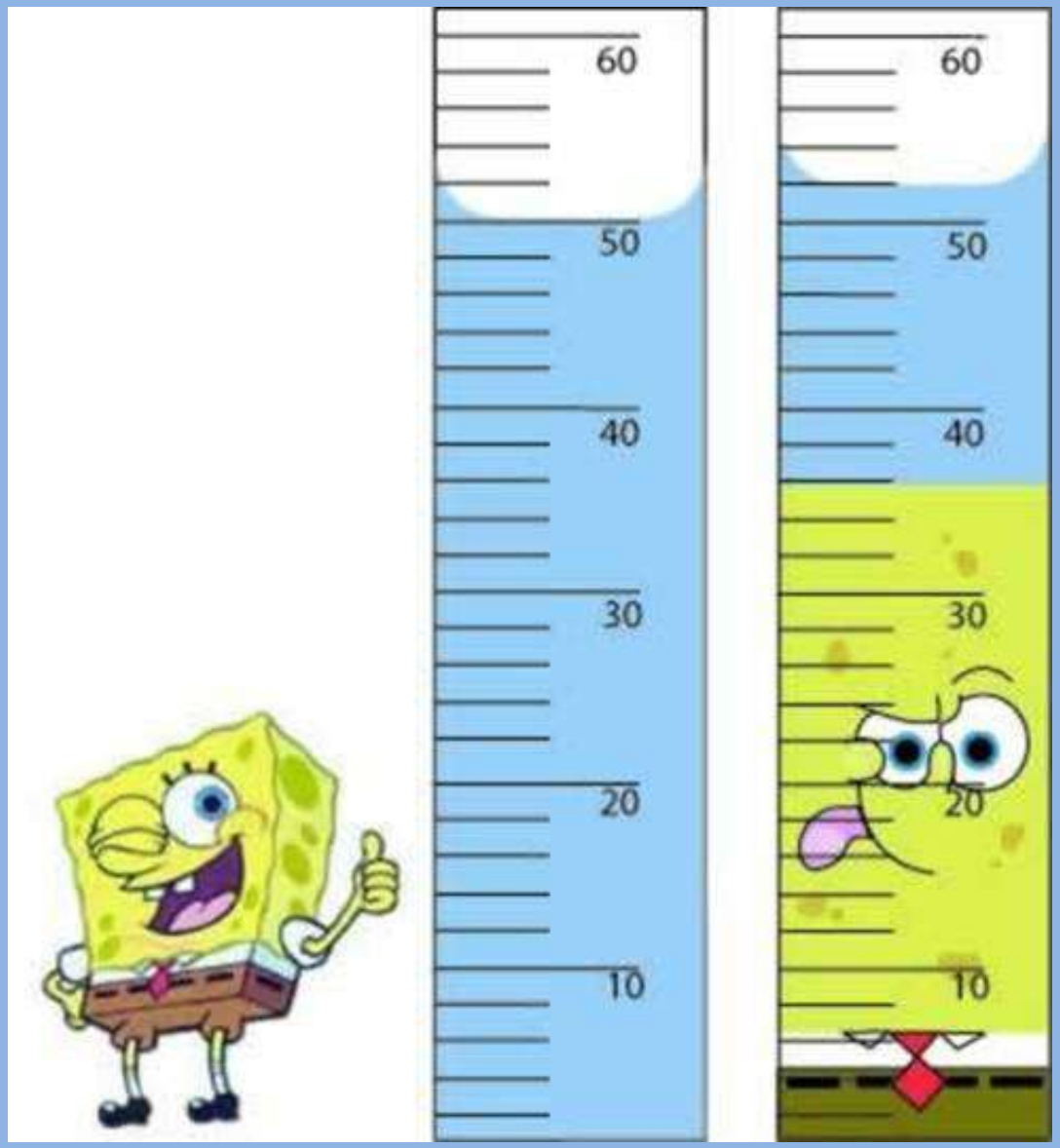


What is the volume of Sponge Bob?



I. Matter and Mass

A. The Difference Between Mass and Weight
Weight is a measure of the gravitational force exerted on an object. Mass is the amount of matter in an object. The differences between mass and weight are shown on the next slide.

B. **Measuring Mass and Weight** The SI unit of mass is the kilogram (kg), but mass is often expressed in grams (g) and milligrams (mg), too. Weight is a measure of gravitational force and is expressed in the SI unit of force, the Newton (N).

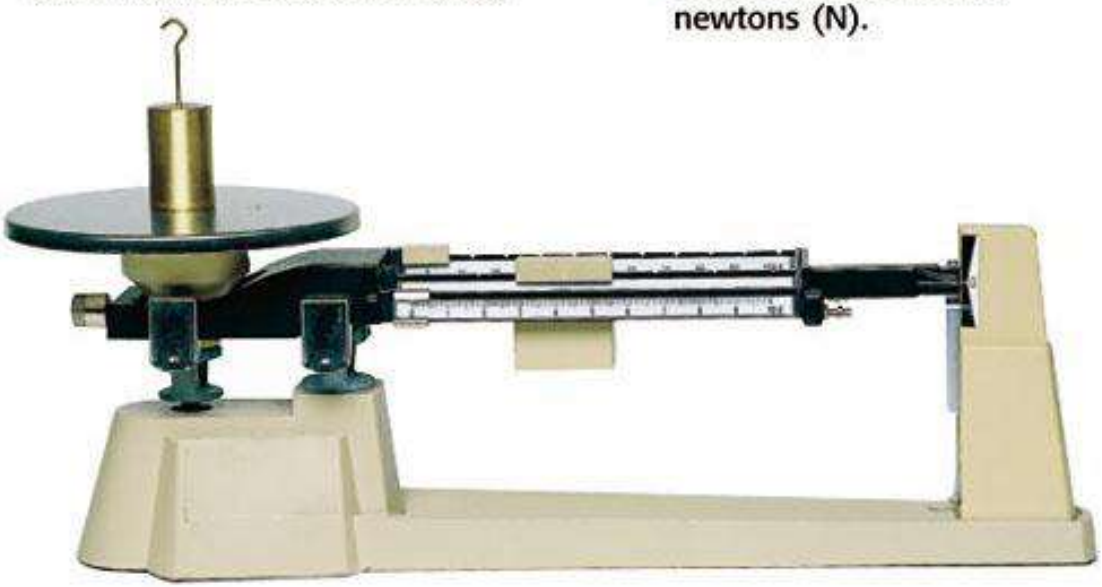
The Difference Between Mass and Weight

Mass

- Mass is a measure of the amount of matter in an object.
- Mass is always constant for an object no matter where the object is located in the universe.
- Mass is measured by using a balance (shown below).
- Mass is expressed in kilograms (kg), grams (g), and milligrams (mg).

Weight

- Weight is a measure of the gravitational force on an object.
- Weight varies depending on where the object is in relation to the Earth (or any large body in the universe).
- Weight is measured by using a spring scale (shown at right).
- Weight is expressed in newtons (N).



II. Inertia

A. What Is Inertia? Inertia is the tendency of an object to resist a change in motion.

B. **Mass: The Measure of Inertia** Mass is a measure of inertia. An object that has a large mass is harder to get moving and harder to stop than an object that has less mass.

Word Bank

weight
milliliter
mass
cubic cm
matter
motion
volume
gravity