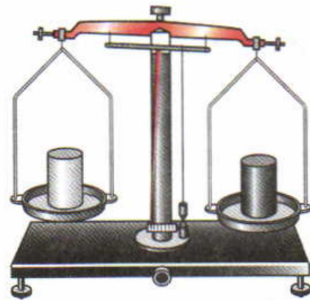
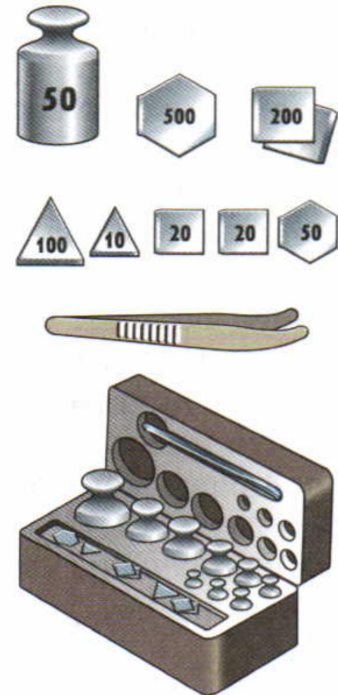




**Measuring mass.**



**Density.**

On the last picture above the black cylinder is made of lead, and the white is made of aluminum. They have same volume but the masses differ almost 4 times !

**Density** shows what is the mass of a unit volume of substance.

$$\text{Density} = \frac{\text{Mass}}{\text{Volume}}$$

We need to be careful about units. For example, density of silver is

$$\rho = 10500 \frac{\text{kg}}{\text{m}^3}$$

If we convert it to CGS :

$$\rho = 10.5 \frac{\text{g}}{\text{cm}^3}$$

Also, remember : density of the substance changes when it changes aggregate state :

$$\rho_{ice} = 900 \frac{kg}{m^3}$$

$$\rho_{water} = 1000 \frac{kg}{m^3}$$

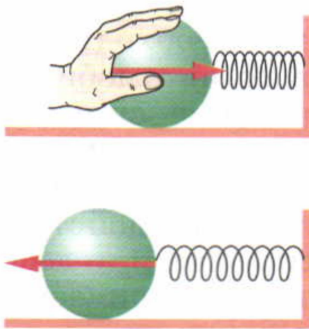
$$\rho_{vapor} = 0.59 \frac{kg}{m^3}$$



### Homework problems.

- (1) Density of milk is  $1030 \text{ kg/m}^3$ . What is the mass of one gallon of milk ? Note: 1 US gallon is about 3784 cubic cm.
- (2) The freight elevator can carry up to 3 tons. We are loading sheets of iron which are 3m long, 60cm wide and 4mm thick. How many sheets can the elevator carry? Density of iron is  $7.8 \text{ g/cm}^3$ .

### Force.



This is something we already spoke about – the force is the reason of the change of momentum...

... but here nothing moves – just the board bends when the girl is sitting on it... the change in the shape and size of the object is called **deformation**.

