




Density

$$D = m/v$$

Density

- Density is the amount of matter in a given amount of space
- Density is how closely packed particles of matter are.

Density

- How do we find the mass of an object?
 - Scale – (Triple beam balance)
- How do we find the volume of an object?
 - How do we find the volume of a liquid or a gas?
 - If it is a rectangular solid 
 - Length · width · height
 - If it is irregularly shaped use displacement
 - Use a graduated cylinder and see how high the water moves up when the object is put in

Formula for Density and its units

Use g/mL or g/cm³

$$D = \frac{m}{V}$$

I  Density

You can tell by observation which object is more dense

- Water has a density of 1 g/mL. If an object floats, is it more or less dense than water?
- When an object heats up, does it become more or less dense?

Examples

- Submarines
- <http://science.howstuffworks.com/submarine1.htm>

What evidence do we have that particles of matter are in motion?

- Air freshener spreads out to every part of a room.
- Vanilla escapes from a balloon.
- Food coloring spreads out in water.

Temperature affects how fast particles of matter are moving

- When particles are heated up they will speed up, spread apart and become less dense.
- That's why warm air rises, and warm water rises.

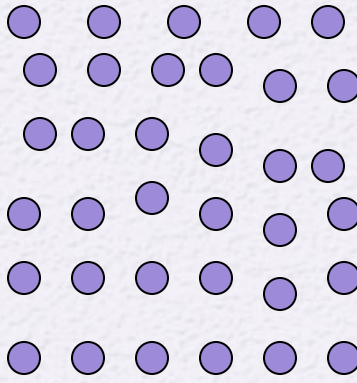
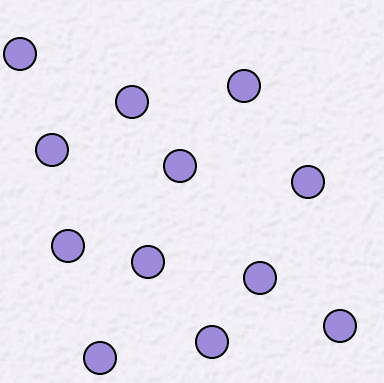
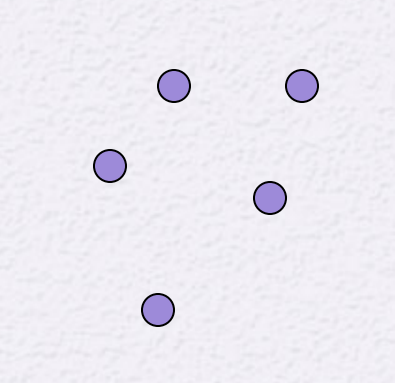
Examples

- <http://www.miamisci.org/af/sln/phases/index.html>

Substances expand when they heat up and contract when they cool down.

- Cracks in the sidewalk are made so that they can expand in the hot summer sun and not crack.
- The liquid in a thermometer expands and moves up when it heats up.



Solid	Liquid	Gas
 A diagram of a solid state showing particles (purple circles) arranged in a regular, closely packed grid. There are 6 columns and 6 rows of particles, with a few particles in the middle rows slightly offset from the grid.	 A diagram of a liquid state showing particles (purple circles) in a disordered, close-packed arrangement. There are approximately 10 particles scattered throughout the space.	 A diagram of a gas state showing particles (purple circles) in a sparse, scattered arrangement. There are 6 particles scattered throughout the space.