SNC1D CHEMISTRY

ATOMS, ELEMENTS, & COMPOUNDS

- Matter
  (P.136-140)

Matter

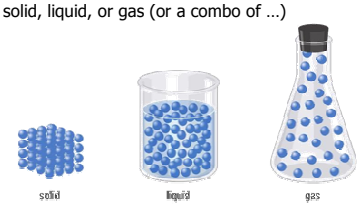
Fireworks are an ancient technology, first invented in China over 2000 years ago. Today, fireworks can be seen around the world and creating them is an art form called pyrotechnics. Pyrotechnics is a branch of chemistry, the science concerned with understanding and changing matter.

Matter

Matter *is anything that has mass and volume. Matter can be solid, liquid, or gas or a combination of these states. For example, foam is a mixture of a liquid and a gas, or a solid and a gas.*

MATTER

- anything that has mass and volume
- can be a solid, liquid, or gas (or a combo of …)



Matter

Mass *is a measure of the quantity of matter in an object. Mass is often measured in kilograms (kg) or in grams (g).*

MASS

- measure of the quantity of matter in an object
- measured in 'kg' or 'g'

Matter

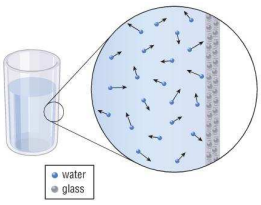
Volume *is a measure of how big an object is or how much space a fluid takes up. Volume is often measured in litres (L) or in millilitres (mL).*

VOLUME

- measure of how much space an object or fluid takes up
- measured in 'L' or 'mL'

The Particle Theory of Matter

All matter is made of tiny particles. Different kinds of matter are made of different kinds of particles. For example, the particles that make up water are different from the particles that make up the glass containing it. The ***particle theory of matter*** *is a way to describe the structure of matter and its behaviour.*



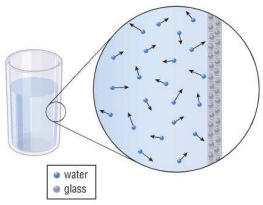
PARTICLE THEORY OF MATTER

- theory that describes the composition and behaviour of matter

The Particle Theory of Matter

According to the particle theory:

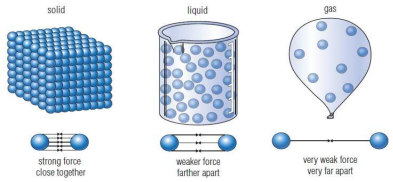
- *particles are attracted to each other and are always moving*
- *when heated, particles gain energy and begin to move faster*
- *the distances between the particles change for different states of matter*
- *the amount of attraction is different for different kinds of particles*



The Particle Theory of Matter

PARTICLE THEORY OF MATTER

① All matter is made up of tiny particles.
② All particles have empty spaces between them.
③ Different substances are made up of different kinds of particles.
④ Particles are in motion and move faster as temperature increases.
⑤ Particles attract each other.

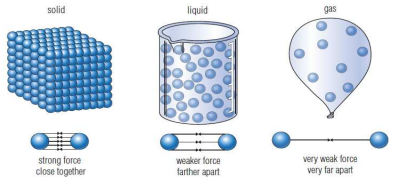


The Particle Theory of Matter

PRACTICE

1. Use the diagram below to complete following chart.

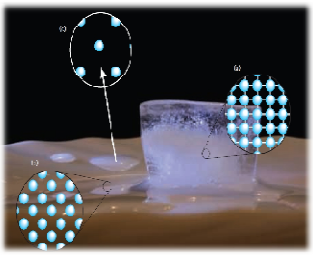
	solid	liquid	gas
force			
space			



Particles & Heat

NOTE!

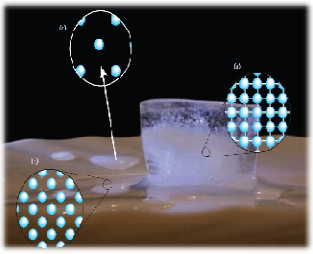
For a given substance, such as water, the state it is in is related to its temperature. As heat (energy) is added, the particles vibrate more quickly, which weakens the attraction between them.



Particles & Heat

PRACTICE

2. Water can exist as ice, liquid water, or gas. In each of the following, is heat added (+) or removed (–) in order to change the state of water?
   (a) evaporation +
   (b) condensation –
   (c) freezing –
   (d) melting +



Particles & Heat

PRACTICE

3. If you put olive oil in the fridge, the oil becomes solid. Explain what has happened using the particle theory of matter.

   since heat was removed the particles slowed down

Particles & Heat

PRACTICE

4. Tin is a metal with a melting point of 232°C and a boiling point of 2602°C. What is its state of matter at each of the following temperatures?
   (a) 0°C solid
   (b) 1000°C liquid
   (c) 2000°C liquid
   (d) 4000°C gas

Particles & Heat

PRACTICE

5. The melting point of aluminum metal is 660°C. Is its freezing point slightly less than, equal to, or slightly more than 660°C?

   the freezing point is equal to 660°C (i.e. the transition temperature)

Particles & Heat

PRACTICE

6. According to the particle theory of matter, gases contain particles that are far apart. Do the particles in a solid have spaces between them? Are the particles moving? Explain.

   yes there are spaces and yes the particles are vibrating, but they are vibrating very slowly

✔ Check Your Learning

TEXTBOOK

P.147 Q.1-3,5,6,10