

## Year 9 Springboard - C1: Periodic table

### Lesson 1 - Introducing Particles

**Keywords:**

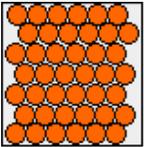
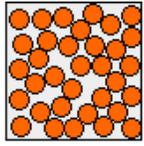
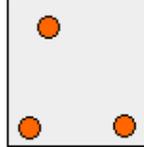
**Matter:** anything that has mass

**Particle:** tiny piece of matter such as an atom, ion or molecule.

**Particle model:** scientific idea used to explain the properties of solids, liquids and gases.

**State:** the form that a substance has, solid, liquid, gas, under given temperature and pressure.

**Minimum Knowledge**

State	Diagram	Arrangement of particles	Relative distance between particles	Main movement of particles
Solid		regular	very close	vibrate about fixed positions
liquid		random	close	move around each other
gas		random	far apart	move quickly in all directions

### Lesson 2 - Chemical and Physical Changes

**Keywords:**

**Physical changes:** change such as a change of state, that does not result in new substances being made

**Chemical Change:** change that produces new substances

**Chemical reaction:** process in which substances react to form different substances

E.g methane + oxygen → Carbon dioxide + water

**Minimum Knowledge**

Physical changes mean **no new substances are formed**, they are usually reversible. e.g solid Ice becomes liquid water when it melts.

Chemical changes mean **a new chemical is formed**, they are usually not reversible.

### Lesson 3 - Changing state

**Keywords:**

**Melt-** to change state from the solid state to the liquid state

**Boil-** to change state from liquid to gas state

**Condense-** to change from the gas state to liquid

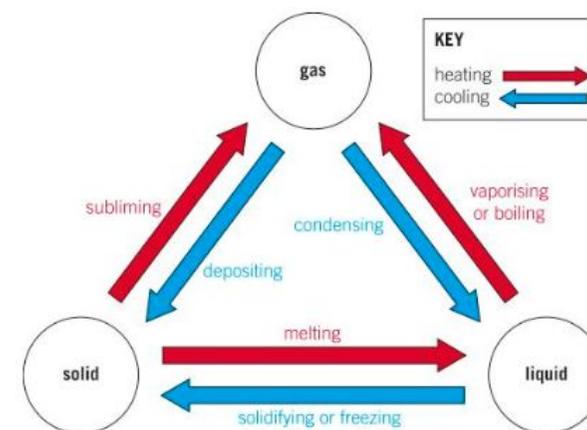
**Freeze-** to change state from liquid to solid state

**Sublime -** to change state

directly from solid to gas state

**Minimum Knowledge**

Some bonds break when a substance melts, all remaining bonds break when a substance boils, Some bonds form when a substance condenses, many bonds form when a substance freezes.



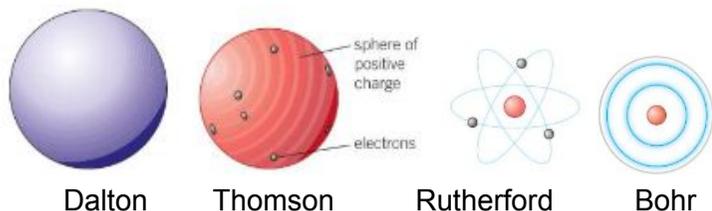
#### Lesson 4 - Developing the atomic model

##### Keywords:

**Plum Pudding Model:** J.J. Thomson's model of the atom, the plums are the electrons.

##### Minimum Knowledge

Dalton's atoms were solid spheres, Thomson's model was the plum pudding model, positive spheres with electrons dotted around inside, Rutherford planetary model shows a nucleus with electrons orbiting like planets. Bohr showed electrons occupy fixed energy levels.



#### Lesson 5 & 6 - Periodic Table

##### Keywords:

**Atomic number**-number of protons in the nucleus of an atom.

**Chemical symbol**-letter or letters used to represent elements

**Mass number**- number of protons and neutrons in a nucleus of an atom

##### Minimum Knowledge

Mendeleev arranged all the known elements in order of atomic weight, and grouped together elements with similar chemical properties.

The group to which the element belongs corresponds to the number of electrons in its outer shell, i.e group 1 has one electron, group 7 has seven, group 0 has a full outer shell, the period an element is in corresponds to the number of shells of electrons it has.

#### Lesson 7 - Metals and Non metals

##### Keywords:

**Metal:** a substance that is usually shiny, malleable, ductile and a good conductor.

**Non-metal:** a substance that is usually dull, brittle and a poor conductor.

**Physical properties:** features of a substance that can be observed.

##### Minimum Knowledge

Metal elements are placed on the left, non metals on the right of the periodic table. Metals lose electrons to become positive ions, non metals gain electrons to form negative ions, metals do not react with each other. Metal oxides are alkaline, non metal oxides are acidic.

#### Lesson 8 - Group 1 Alkali metals

##### Keywords:

**Alkali metals:** an element in group 1 of the periodic table

**Density:** mass per unit volume, measured in  $\text{g/cm}^3$  high density feels heavy for its size.

**Reactivity:** the tendency for a substance to take part in chemical reactions.

##### Minimum Knowledge

Alkali metals are very reactive, the more readily they lose their outer electron the more reactive, they are soft and have low melting and boiling points. They react vigorously with water to produce a metal hydroxide and hydrogen gas.

#### Lesson 9 - Group 7 The Halogens

##### Keywords:

**Diatomic molecule:** Containing 2 atoms.  $\text{I}_2$ ,  $\text{H}_2$ ,  $\text{N}_2$ ,  $\text{Br}_2$ ,  $\text{O}_2$ ,  $\text{Cl}_2$ ,  $\text{F}_2$

**Displacement:** reaction where a more reactive element displaces a less reactive element from its compound.

##### Minimum Knowledge

All group 7 elements have 7 electrons in their outer shell, they exist as diatomic molecules that are covalently bonded, reactivity decreases going down the group. Halogens react with alkali metals to form salts. A more reactive Halogen will displace a less reactive one from its compound.

#### Lesson 10 - Noble gases group 0

##### Minimum Knowledge

They are so unreactive, they take part in very few chemical reactions, they are all gases at room temperature, they have a complete outer shell of electrons, they have no tendency to lose or gain electrons to form ions, or share electrons to form molecules. Melting point, boiling point and density increases going down the group.

