



Key Vocabulary

Atomic Weight

Atomic weight is a measure of how heavy an atom is.

Elements

A pure substance which is made from only one type of atom. Elements are listed on the periodic table.

Atoms

The smallest particle of an element. We often think of atoms as tiny spheres, but in fact they are made from smaller particles called protons, neutrons and electrons.

Periods

Elements in a period are in the same horizontal row going across in the periodic table.

Groups

Elements in a group are in the same vertical column going down in the periodic table. They have similar properties.

Periodic Table

All *elements* are arranged in a chart called the periodic table. The arrangement of elements is based on their structure and properties. A Russian scientist named Dmitri Mendeleev produced one of the first practical periodic tables in the 19th century.

Ambitious Vocabulary

Molecule, Periodic Table, Elements

Developing the Periodic Table

In the 1800s, scientists had discovered many new *elements*, but no system existed to organise them. Scientists were trying to look for similarities in their properties to arrange them in a meaningful way. A Russian scientist called Dmitri Mendeleev produced one of the first practical periodic tables in the 19th century.

The modern periodic table is based closely on the ideas he used.

These ideas were:

- The elements are arranged in order of increasing atomic mass
- The horizontal rows are called periods
- The vertical columns are called groups
- Elements in the same group are similar to each other

Mendeleev's ideas are still in use today. However, the modern periodic table arranges the elements by increasing atomic number, rather than atomic mass.

The Periodic Table

In the modern periodic table: The elements are arranged in order of increasing atomic number. The horizontal rows are called *periods*. The vertical columns are called *groups*. Elements in the same group are similar to each other.

Group 1

Alkali metals are stored in oil to prevent them from reacting with the oxygen in the air. When the alkali metals react with water they produce an alkaline solution.

Properties

Soft – they are easily cut with a knife. The further down the group, the easier they are to cut. Low density – they are able to float on top of water. The melting point of the alkali metals decreases as you go down the group. The boiling point of the alkali metals decreases as you go down the group. The density trend of the metals is that it increases as you go down the group.

Reactivity

The metals react with water producing the metal hydroxide and hydrogen. As you go down the group, the metals get more reactive.

Group 7

The halogens are found in group 7 of the periodic table. They can be commonly found in disinfectants and bleach.

Properties

The colour of the halogens gets darker as you go down the group. At room temperature, they have all three states of matter within the group. The elements have decreasing energy as you go down the group. Fluorine and chlorine are gases. Bromine is a liquid. Iodine and astatine are solids. The density trend of the halogens is that they increase as you go down the group.

Reactivity

A more reactive halogen will displace a less reactive halogen from their salt. The halogens become less reactive as you go down the group. This is because the electron to be gained from another element is further from the nucleus.

Displacement Reactions

Displacement reactions are *chemical reactions* which involve a metal and a *compound* containing a different metal. These compounds containing metals and non-metals are called salts. For example, iron (a metal) reacts with copper sulfate (a salt containing copper). In a displacement reaction, a *less* reactive metal is displaced from its compound by a *more* reactive metal. There is no reaction between a metal and a salt of the same metal. For example, iron cannot *displace* iron from iron chloride (a salt).