



Box 1: Keywords

Group	A vertical column in the periodic table containing elements with similar chemical properties
Period	A horizontal row in the periodic table
Properties	The characteristics of a substance. This will include melting point and reactivity
Reactivity	How easily a substance undergoes a chemical reaction
The Noble Gases	Elements in group 0 of the periodic table
Inert	Substances which do not readily react with other substances
The alkali metals	Elements in group 1 of the periodic table
Trends	Patterns in the properties of elements in the same group in the periodic table
The halogens	Elements in group 7 of the periodic table
Displacement	When a more reactive element takes the place of a less reactive element in a compound

Box 2: Key skills

- Explain how scientific theories have changed over time
- Recognise or describe patterns and trends in data presented in a variety of tabular, graphical and other forms.

Box 3: Development of the periodic Table

Before protons, neutrons and electrons were discovered scientists tried to classify the elements by arranging them in order of their atomic weights (which we now call relative atomic mass).

Early attempts to arrange the elements were incomplete and had some elements placed in the wrong groups.

Mendeleev ordered elements by their atomic weight but overcame some of the problems by

- leaving gaps for elements that he thought had not been discovered
- changed the order of elements so that elements with similar properties ended up in the same group.

Mendeleev made predictions for undiscovered elements based on the properties of elements in the same group.

When elements were discovered, their properties matched Mendeleev's prediction and filled the gaps.

The discovery of isotopes made it possible to explain why the order based on atomic weights was not always correct.

Box 4: The modern periodic Table

Elements in the modern periodic table are ordered according to atomic (proton) number.

There are 8 groups of elements which are group 1-0..

Elements in the same group have the same number of electrons in their outer shell

Elements in the same period have the same number of shells.



Box 5: Metals and non metals

In the periodic table, **metals** are on the **left** and **non metals** are on the **right**.
We can separate the metals from non metals using a staircase to starting at B-Al.

Legend: ■ Metals ■ Non-metals

Metals are shiny, have high melting and boiling points and good conductors of electricity. They lose electrons and form ions with a positive charge

Non-metals are dull, many have low melting and boiling points and are poor conductors of electricity. They gain electrons and form ions with a negative charge

Box 7: Group 0 – The Noble Gases

They have a **stable electron structure** because they have a full outer shell..

They are very unreactive (Inert) because of their stable electron structure

Their boiling point increases as you go down the group.

Box 8: Group 7 The halogens

They are very reactive non metals because they only need to **gain** 1 electron to obtain a full outer shell
They exist as diatomic molecules (Cl₂, Br₂, I₂)

Their melting and boiling point increases as you go down the group

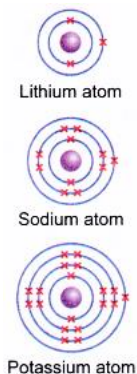
They react with metals forming metal compounds



They become **less reactive** as you go down the group because

- The atoms get larger and the outer electron is further from the nucleus
- The attraction between the positive nucleus and the outer shell decreases
- It becomes harder to gain an electron

Box 6: Group 1 The Alkali metals



These are very reactive metals because they only need to **lose** 1 electron to obtain a full outer shell

React quickly with oxygen to form metal oxides

React quickly with water and will float, move around and fizz



They become **more reactive** as you go down the group because

- The atoms get larger and the outer electron is further from the nucleus
- The attraction between the positive nucleus and the outer negative electron decreases
- It becomes easier to lose an outer electron

Box 9: Pathway

Previous knowledge: KS3 periodic table, KS4 atomic structure

Future links: KS4 structure and bonding

Careers: organic chemists, biochemists, medical researchers developing new medicines and vaccines, polymer chemists, doctors, nurses, food scientists

Box 10: Cross curricular links