3.1 - The Periodic Table

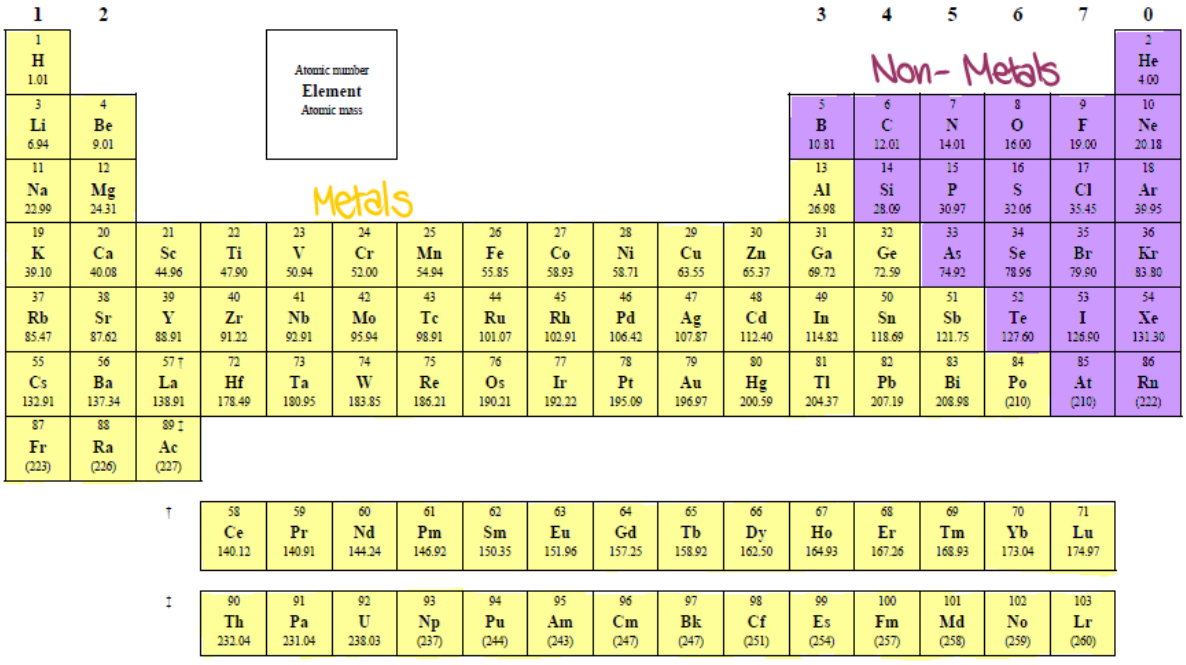
3.1.1 - Describe the arrangement of elements in the periodic table in order of increasing atomic number

Elements in the periodic table are arranged in order of **increasing atomic number** (Z). There is a division between metals and non-metals. Metals are on the left and non-metals are on the right. Metals tend to have a smaller number of electrons in their outer shell

The long metal periods are divided into the **transition metals**, **lanthanides** and **actinides**

Hydrogen is difficult to place, however it is place in group 1 because it displays some of the same characteristics as these elements, although it is a non-metal

Helium is still a noble gas because its outer shell is filled by 2 electrons



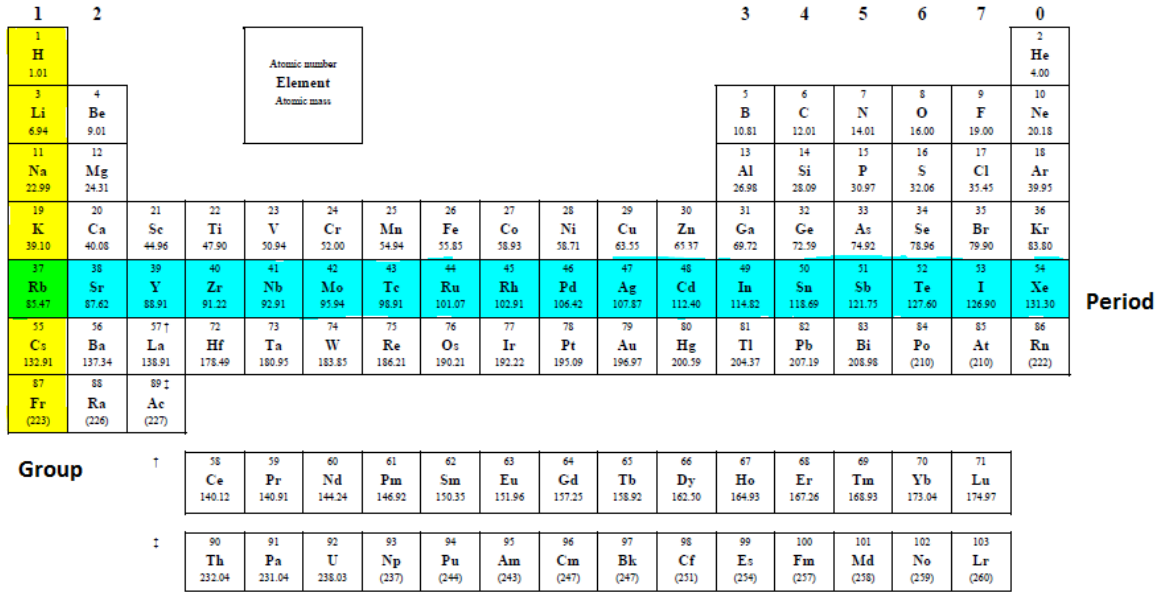
3.1.2 - Distinguish between the terms group and period

Group - A vertical column of elements.

These have been classified in a number of ways - IB numbers them 1 to 7, with the noble gases being group 0. Some groups have names, such as Alkali metals (group 1) and Halogens (groups 7). Groups 3 to 6 have both metal and non-metal elements. The metalloids (B, Si, Ge, As, Sb, Te and Po) have characteristics of both metals and non-metals.

Period - A horizontal row of elements

These are numbered 1 to 7. The number matches the number of its outer shell electrons. Elements of the same period have the same number of occupied electron shells



3.1.3 - Apply the relationship between the electron arrangement of elements and their position on the periodic table up to Z = 20

The position of elements on the periodic table is linked to their **electron configuration**. Elements in the same group have the same outer shell electron configuration. Elements of the same period have the same number of occupied electron shells. This in turn affects their physical and chemical properties.

e.g. Sulfur is in group 6 and period 3

Its electron arrangement is 2.8.6 (6 outer electrons, 3 shells)

1st Shell	2nd Shell	3rd Shell	4th Shell
2	8	8	2

** The fourth shell can hold more electrons, but at SL, you will only use up to two

3.1.4 - Apply the relationship between the number of electrons in the highest occupied energy level for an element and its position in the periodic table

Group Number

- The same as the number of electrons in the outer shell
- Group 1 = 1 outer shell electron

Period Number

- The same as the number of shells in the atom
- All except the outer shell will be full