**Chemistry Concept Review**

**Atomic theory explains the composition and behaviour of matter**

1. A physical property is anything you can observe about matter, such as density, state, colour, melting point, and boiling point.
2. The kinetic molecular theory describes matter as made up of tiny particles in constant motion.
3. A pure substance is made of one kind of substance and can be either an element or a compound.
4. John Dalton proposed that matter is made of atoms, which can be part of an element (one kind of atom) or a compound (more than one kind of atom joined together).
5. Ernest Rutherford discovered the nucleus, a tiny dense region at the centre of an atom. Most of the volume of an atom is occupied by electrons, which exist in specific electron shells first discovered by Niels Bohr.

**Elements are the building blocks of matter**

1. Each element contains only one kind of atom, and all other forms of matter are made from combinations of these atoms and elements.
2. The periodic table lists the elements in order of increasing atomic number, arranged into families according to their properties.
3. In the periodic table, metals are on the left side, non-metals on the right, and metalloids form a diagonal line near the right side.
4. Electrons can be pictured as arranged in shells in a specific pattern around the nucleus.
5. Elements in the same chemical family have the same number of valence electrons in their outermost occupied electron shell.
6. A Bohr model diagram shows the arrangement of electrons in a specific pattern around the nucleus.

**Elements combine to form compounds**

1. A compound is a pure substance made up of two or more different elements in which the atoms are connected.
2. In covalent compounds, atoms join together by sharing electrons, whereas in ionic compounds, oppositely charged ions attract each other.
3. Polyatomic ions are groups of atoms that are joined to each other by covalent bonds and to other ions by electrical attraction.)
4. In an ionic compound with only two elements, the first ion is always a positive metal ion, and the second ion is always a negative non-metal ion.
5. A metal that can form an ion in more than one way is described as multivalent. Its name includes a Roman numeral to indicate the positive ion charge.
6. Chemical changes produce new substances with new properties, whereas physical changes do not change the identity of a substance.