GCSE Chemical Bonding

You can mix two substances together without either substance changing, as seen when mixing salt and sand. You can easily separate the two after mixing them. In chemical reactions, however, the outcome is very different as when the atoms of two or more elements react they make a compound. In this case, separating them again is much trickier.

When atoms react, they take part in changes which give them a stable arrangement of electrons. They do this by sharing electrons (covalent bonding) or by transferring electrons (ionic bonding).

Ionically bonded atoms lose or gain electrons to form charged particles called ions. Ions have the electronic structure of a noble gas, as seen in the bonding of sodium and neon. Sodium (2,8,1) loses an electron if left with a stable structure like neon (2,8). However, it's left with one more proton in its nucleus than there are electrons around it. The proton is positively charged, so the sodium atom has now become a positive ion. The formula Na^+ is used here and Na^+'s electronic structure is 2,8.

Negative ions are made when non-metals react with metals. The non-metal atoms gain electrons to become a stable noble in structure. Chlorine has the electronic structure 2,8,7 but by gaining an electron, it gets the stable structure of argon (2,8,8). Now, there is one more electron than there are positive protons in the nucleus. Therefore, this chlorine atom becomes a negatively charged ion, otherwise known as Cl^- with an electronic structure of 2,8,8.