

# CHEMICAL BONDS

Chemia planet



# LEARNING POINTS



1

State the three types of bonding and whether metals and/ or non-metals are involved.

2

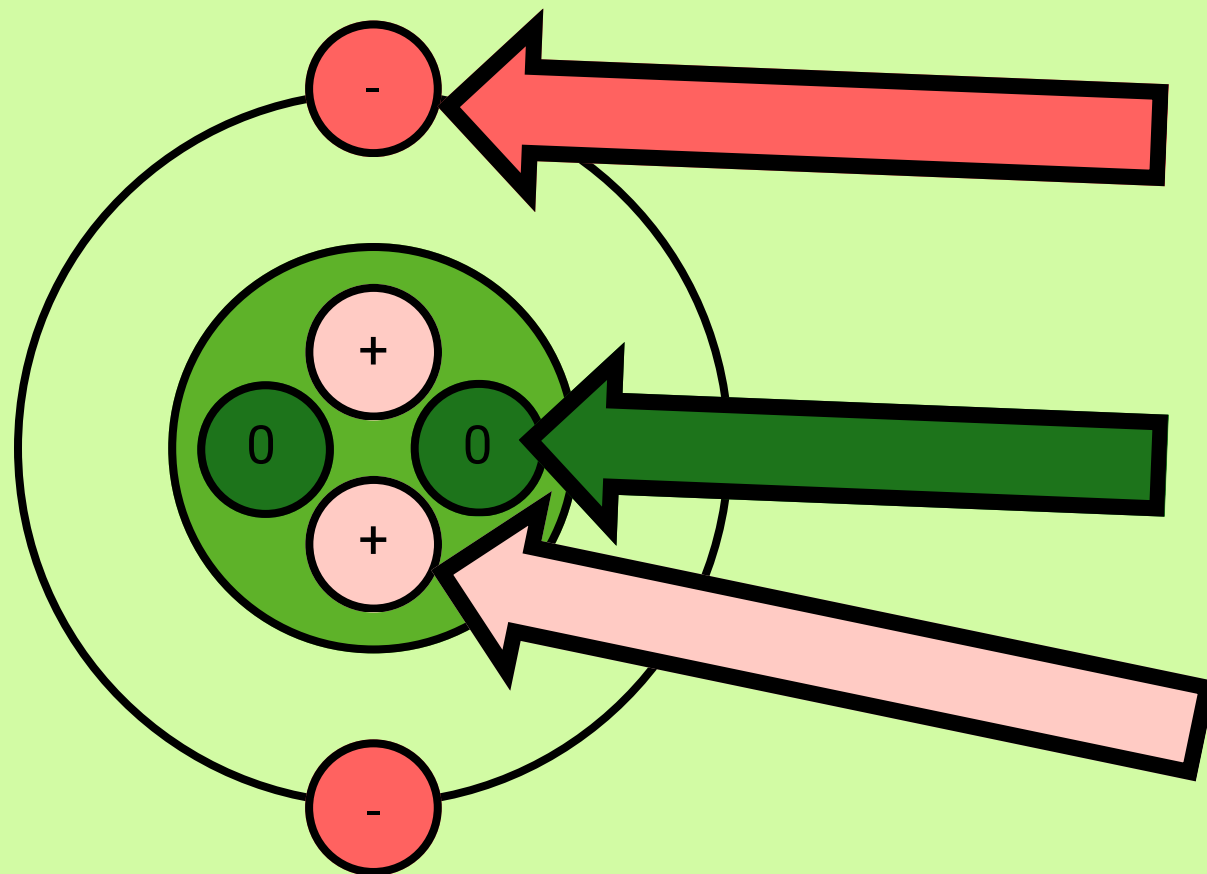
Define each type of bonding in terms of electrons.

3

Explain the arrangement of giant ionic and covalent structures.

# WHAT ARE CHEMICAL BONDS?

Chemical bonds can be generally described as an attraction between two or more atoms. The electrons in atoms are key to the atoms ability to bond.



Electron

Neutron

Proton

The three types of chemical bond:

- Covalent
- Ionic
- Metallic

# METALS UNDERGO METALLIC BONDING

Metals are shiny elements which are good conductors of electricity. They have a giant structure and their atoms are arranged in a regular pattern.

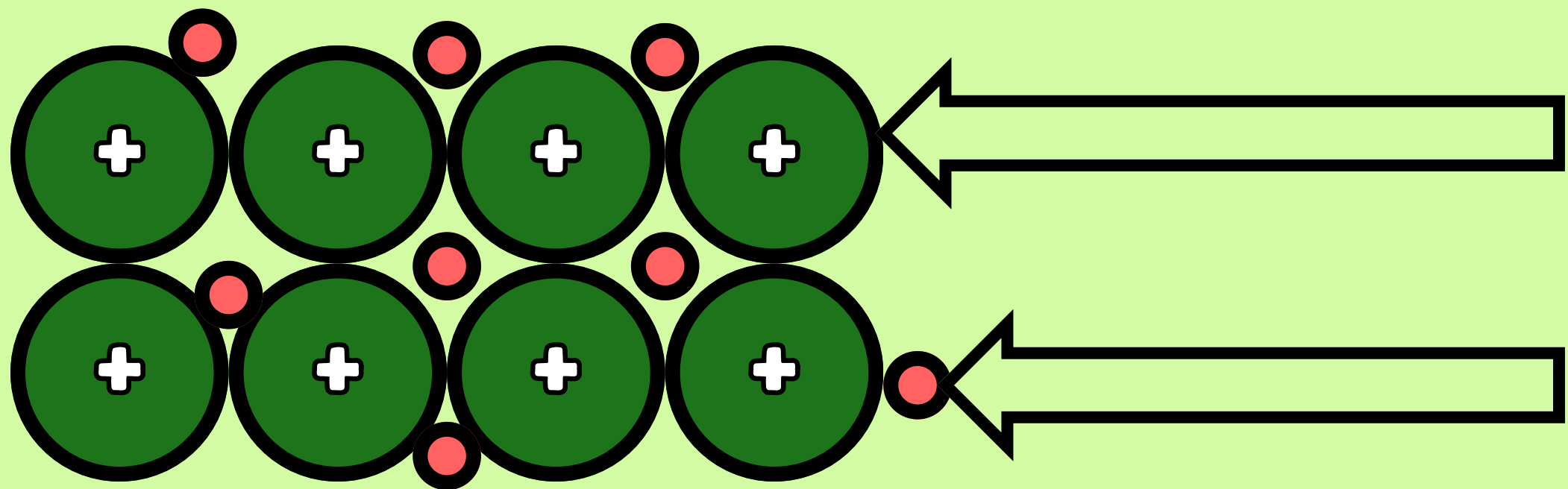


**METALS**

Metals can be found on the left hand side (groups 1 and 2) and in the middle (transition metals) of the periodic table.

# METALLIC BONDING

The electrons from the outer shell of metal atoms, become delocalised. They are free to move. The strong electrostatic attraction between the positive ions and negative delocalised electrons, results in strong metallic bonds.



Positive metal ions

Delocalised electrons

# NON-METALS UNDERGO COVALENT BONDING

Non-metals form strong covalent bonds with other non-metal atoms. Whilst covalent bonds are strong, the resultant simple molecules have low melting and boiling points, due to weak intermolecular forces between molecules.

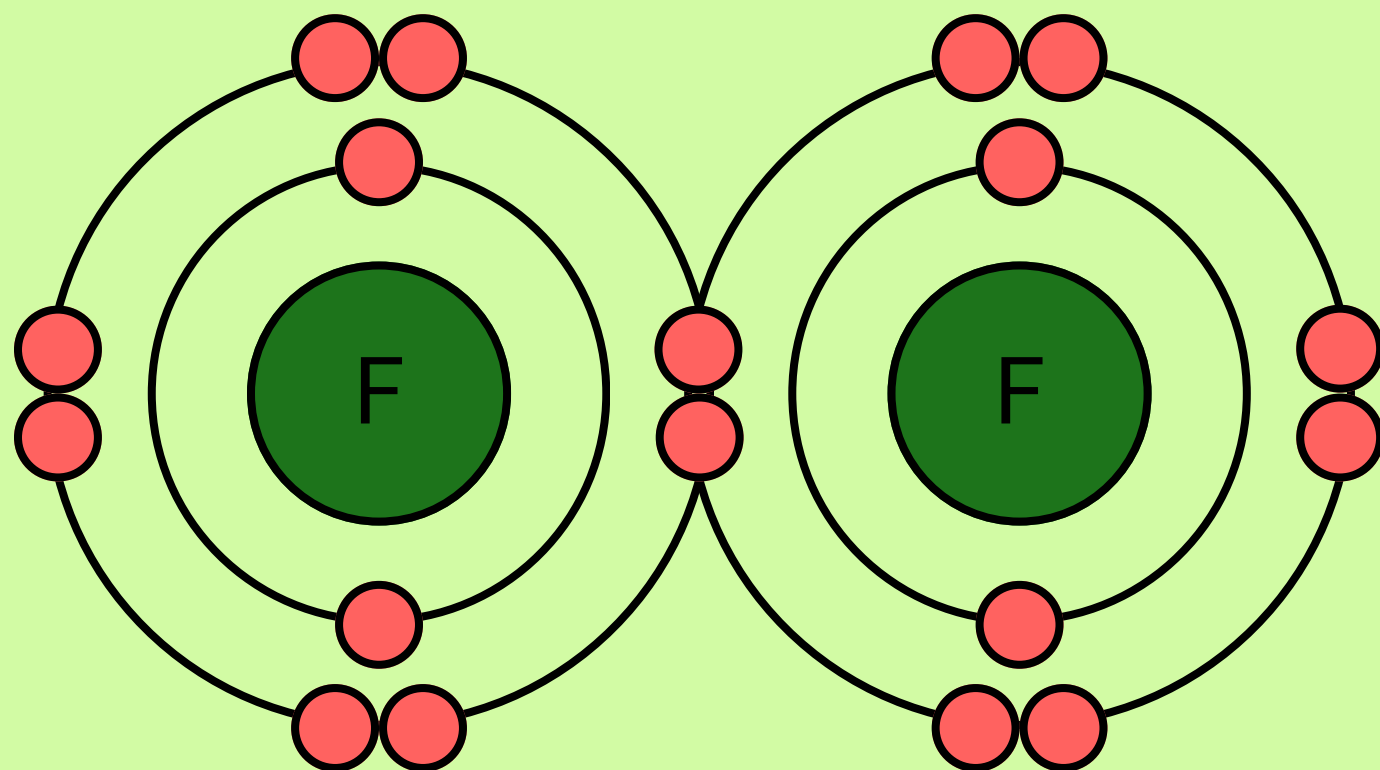


NON-METALS

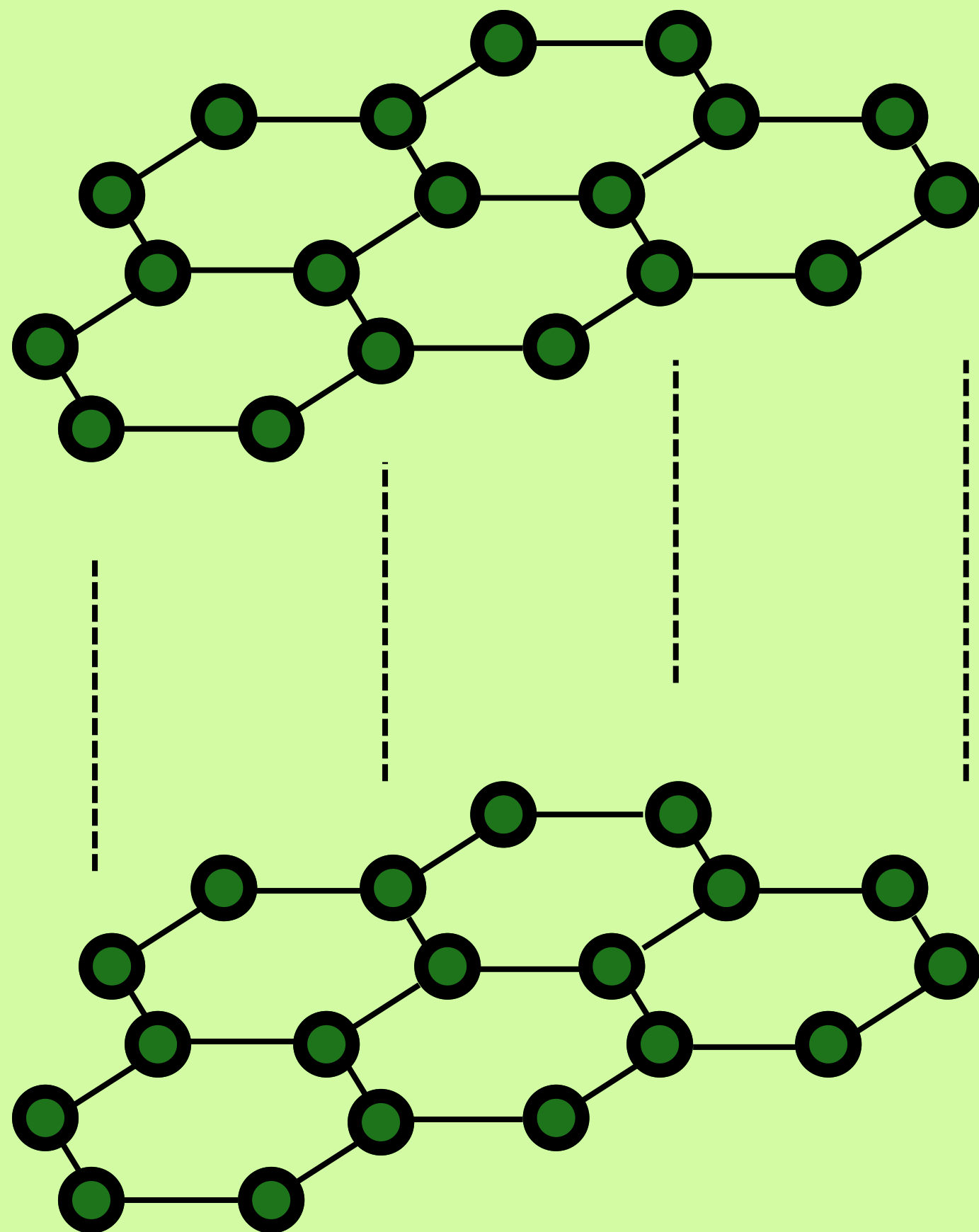
Non-metals can be found in the earlier periods in groups 4 to 7. All of group 0 are non-metals but they are inert.

# COVALENT BONDING

A covalent bond is formed when two atoms share a pair of electrons. Usually each atom contributes one electron from their outer shell, but some atoms can react to make multiple covalent bonds.



Sharing the electrons, provides each atom in the covalent bond with the desirable full outer shell of electrons.



# GIANT COVALENT

Giant covalent structures contain many atoms covalently bonded in a regular arrangement. This is known as a lattice.

The image shows graphite, which is an allotrope of carbon. Graphite (in a pencil) is soft, because layers of carbon can slide over each other.



# **METALS & NON-METALS UNDERGO IONIC BONDING**

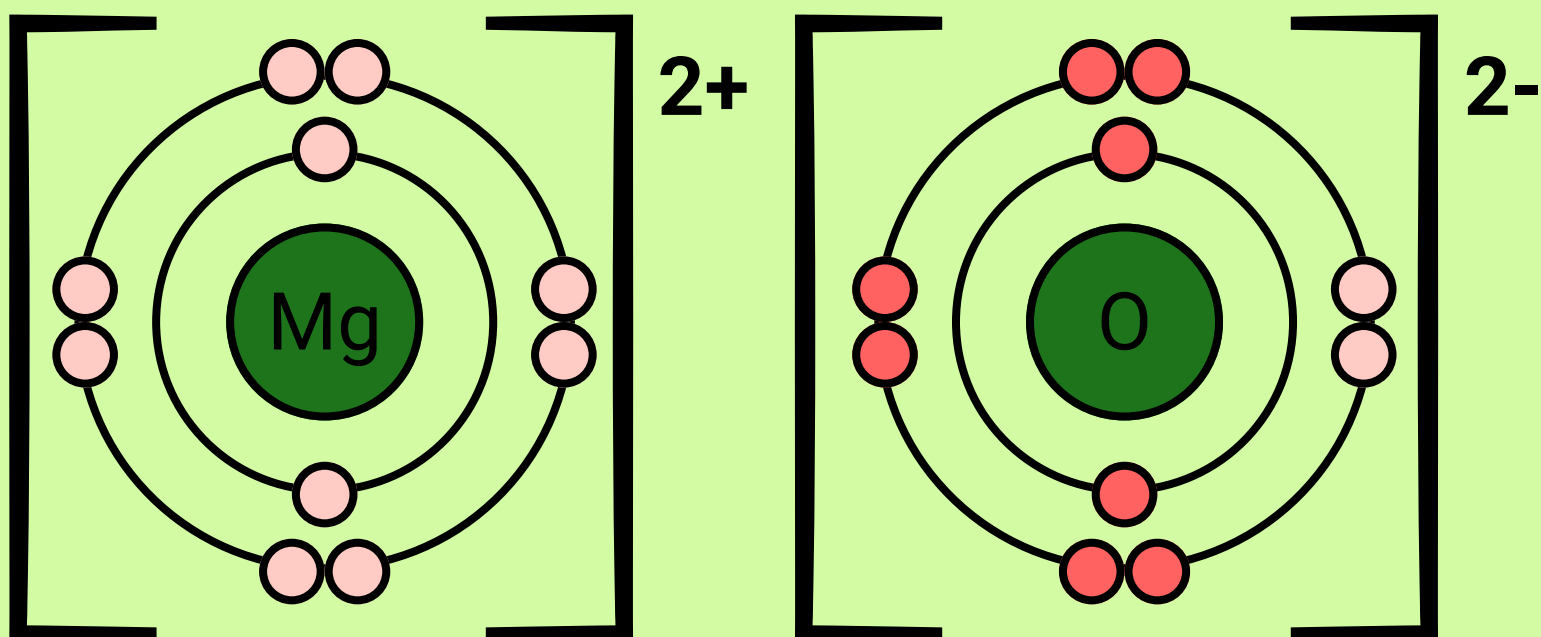
An ionic bond is the strong attraction between oppositely charged ions.

**METALS & NON-METALS  
ARE INVOLVED**

Metals and non-metals  
react together to form  
ionic bonds.

# IONIC BONDING

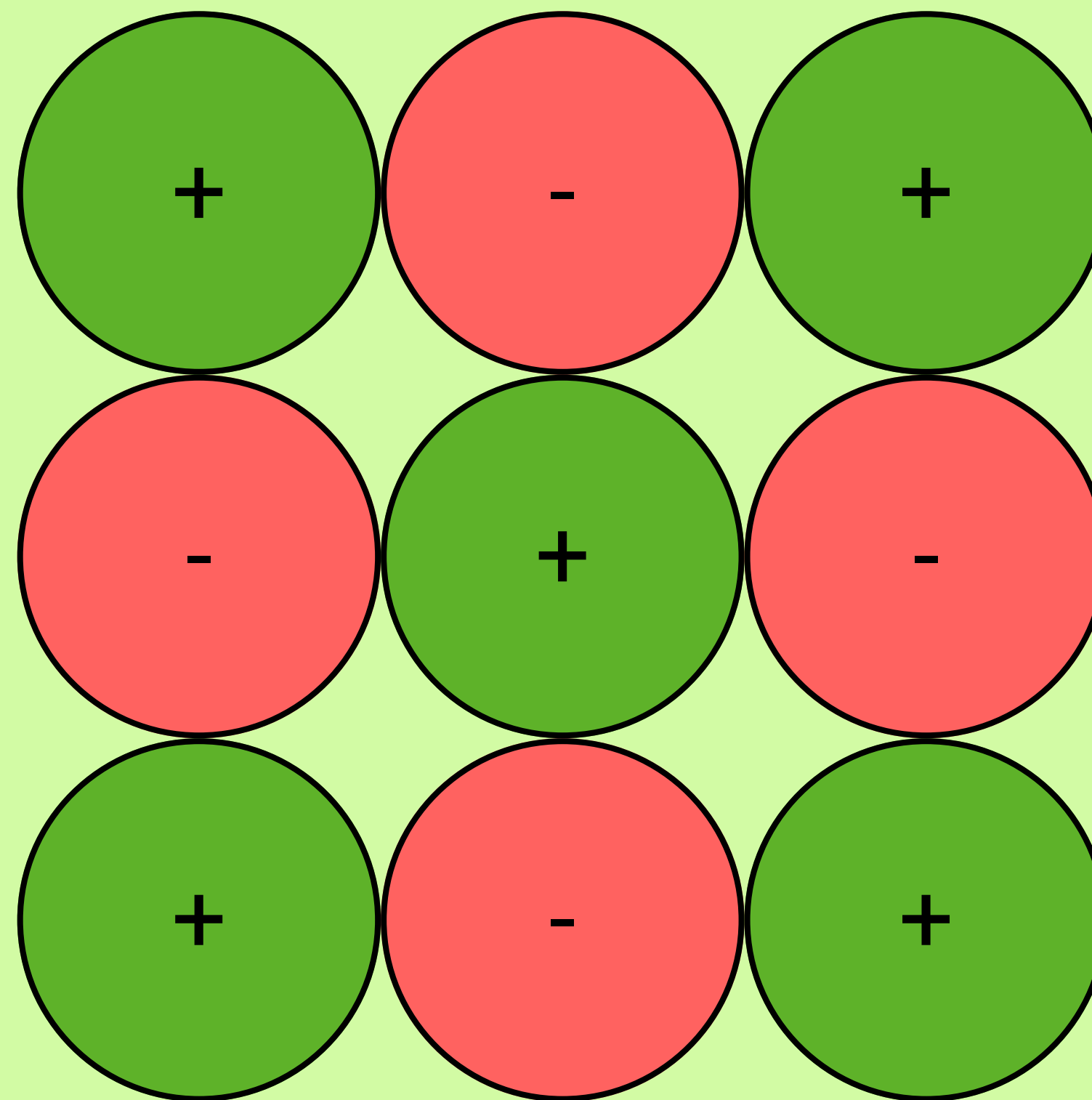
Metal atoms become positively charged ions by losing electrons. Non-metal atoms become negatively charged ions by gaining electrons. The oppositely charged ions are very strongly attracted to each other. This is known as an electrostatic attraction.



In this example, the metal magnesium has transferred two electrons to the non-metal oxygen. Magnesium becomes a positive ion and oxygen becomes a negative ion.

# IONIC LATTICE

Ionic compounds are composed of a regular repeating structure of ions. This is known as a giant ionic lattice. The lattice is held together by the electrostatic attraction of oppositely charged ions.



# TIME FOR A QUIZ

Chemia Planet