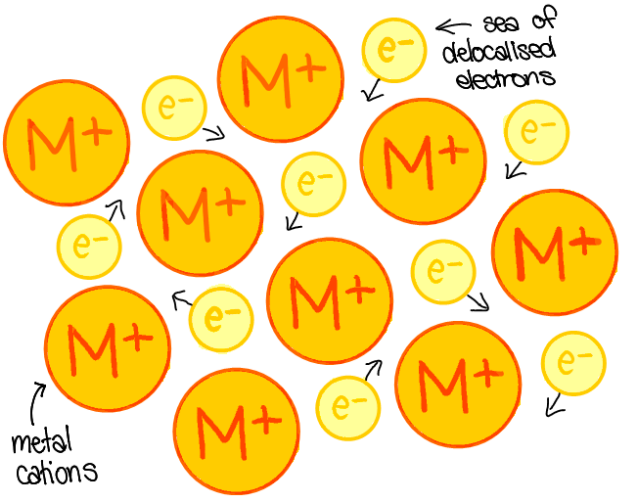
# 4.4 - Metallic Bonding

## 4.4.1 - Describe the metallic bonds as the electrostatic attraction between a lattice of positive ions and delocalised electrons

Metals form a **3D lattice of cations** surrounded by a 'sea' of **delocalised electrons**. Only the valence electrons become delocalised. The electrons in this arrangement reduce repulsion between the ions.




*Malleability* - the ability to bend without breaking

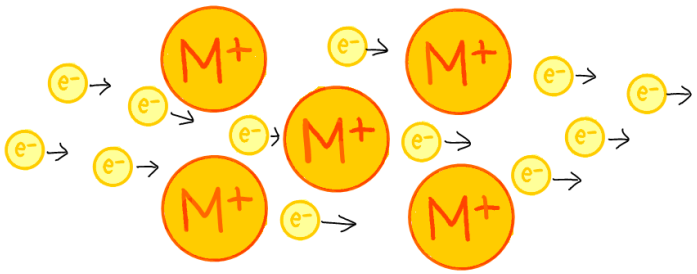
*Ductility* - the ability to be drawn into a wire

By releasing the valence electrons, the metal ions have noble gas configuration. The electrons move about freely between the cations, maintaining a neutral charge all the time.

## 4.4.2 - Explain the electrical conductivity and malleability of metals

*Electrical conductivity*

This is a result of the **delocalised electrons**, move freely and respond to the application of a potential difference. The cations will vibrate and cause a barrier to the smooth flow of electrons. Some energy is lost, causing the metal to heat when electricity passes though.



*Malleability*

Since the cations are surrounded by a sea of delocalised electrons, the electrons are able to move about when the metal is bent, and prevent it from breaking.