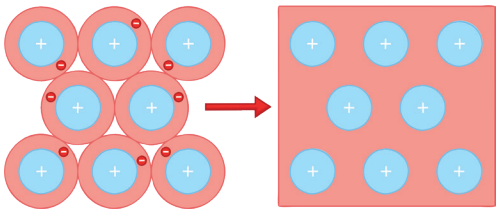
# Metallic Bonding

1. Label both pictures with as much detail as you can.



2. Complete the following sentences:

   The metal ions have a _____ charge.

   The electrons have a _____ charge.

   The electrons in the _____ shell of the metal atoms are _____ (free).

   There is a strong force of attraction between the metal ions and the delocalised _____ because opposite charges attract. This creates a large, regular pattern called a _____.

3. For each of the following properties of metals, write an explanation for them.

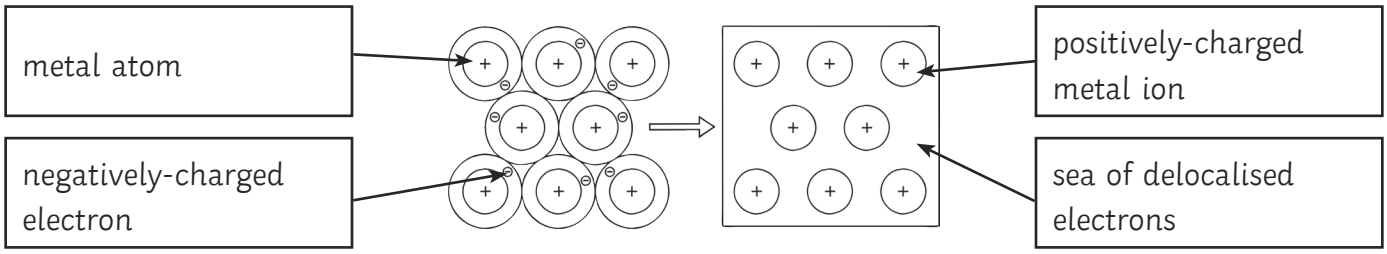
   a. High melting and boiling point.

   b. Can conduct electricity and thermal energy (heat).

   c. Malleable and ductile.

# Metallic Bonding Answers

1. Label both pictures with as much detail as you can.




2. Complete the following sentences:

   The metal ions have a **positive** charge.

   The electrons have a **negative** charge.

   The electrons in the **outer** shell of the metal atoms are **delocalised** (free).

   There is a strong force of attraction between the metal ions and the delocalised **electrons** because opposite charges attract. This creates a large, regular pattern called a **lattice**.

3. For each of the following **properties** of metals, write an **explanation** for them.

   a. High melting and boiling point.
   **A lot of energy is required to overcome the strong force of attraction (electrostatic force) between the positive metal atoms and sea of negative electrons.**

   b. Can conduct electricity and thermal energy (heat).
   **The delocalised (free) electrons can carry an electrical charge throughout the metal. The delocalised electrons gain thermal energy and start to move around the structure, moving the thermal energy (heat) throughout.**

   c. Malleable and ductile.
   **The layers of metal atoms can slide over one another and so can be bent, hammered or rolled into various shapes. The layers of metal atoms can slide over one another and so can be pulled into wires.**