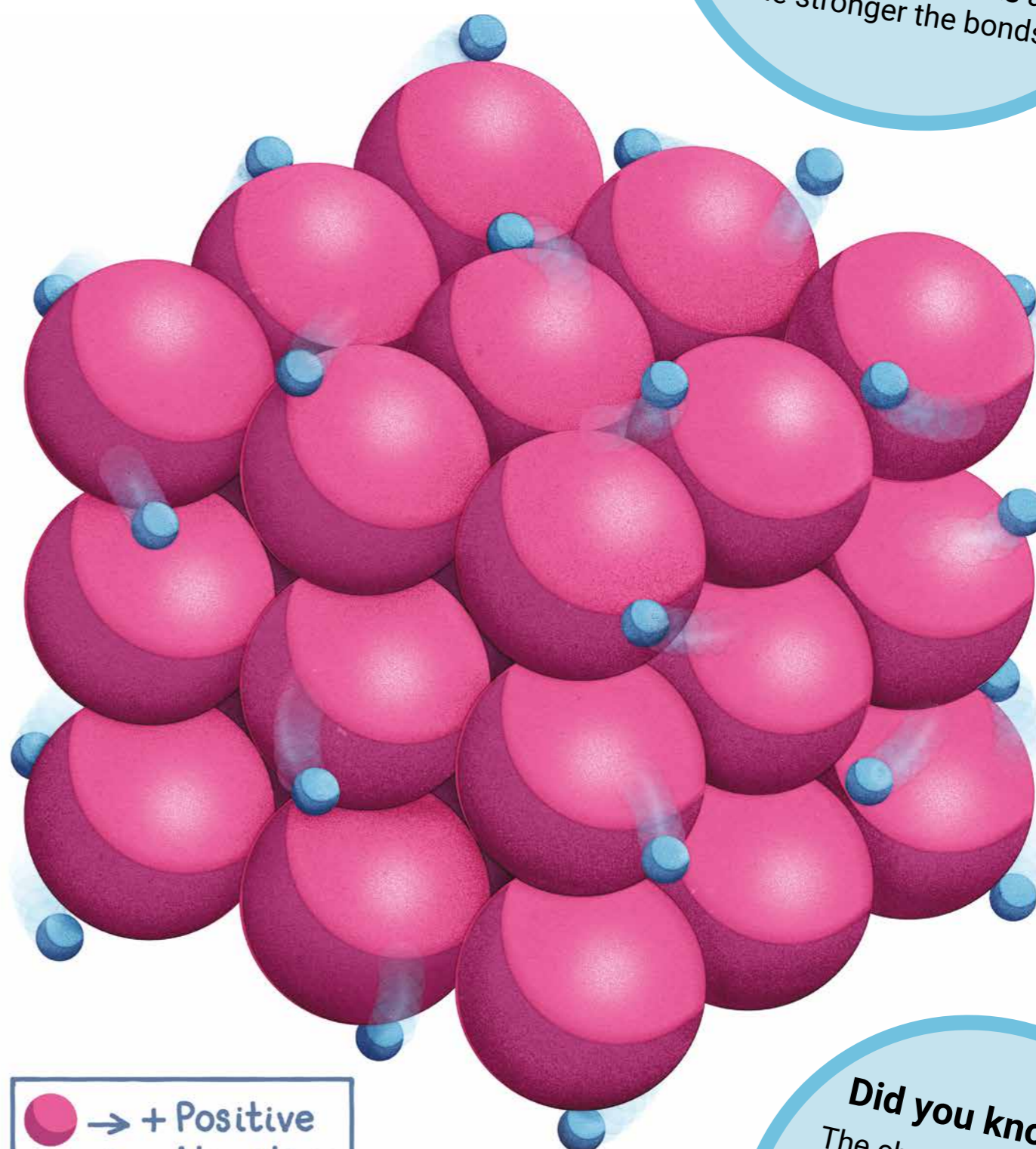


Metallic bonding

Metallic bonding is a type of strong chemical bond that occurs in pure metals and **alloys**. Metals are **giant three-dimensional structures** where layers of **positive metal ions** are surrounded by a sea of **delocalised outer-shell electrons**.



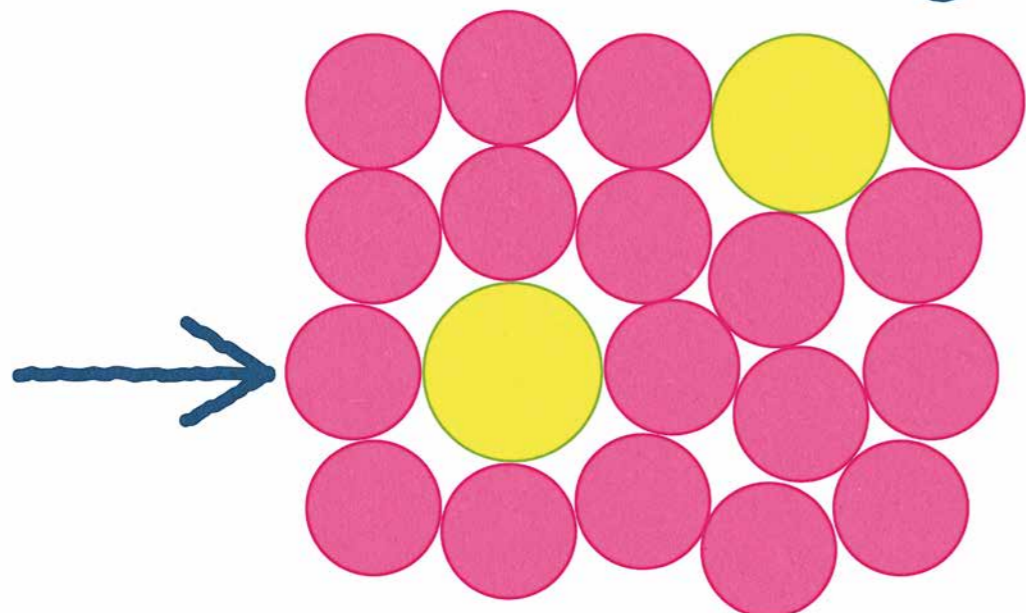
Did you know ...?
Aluminium alloys are used to make aircraft, because they're lightweight and very strong. They are also resistant to corrosion.



Did you know ...?
The melting and boiling points of metals are related to the number of outer shell electrons. The greater the **charge** of the metal ion, the greater the number of **delocalised electrons** and the stronger the bonds.

Did you know ...?
The chemical formula of a metal is just the symbol for the element as metallic lattices do not contain a fixed number of atoms – eg sodium is represented as Na.

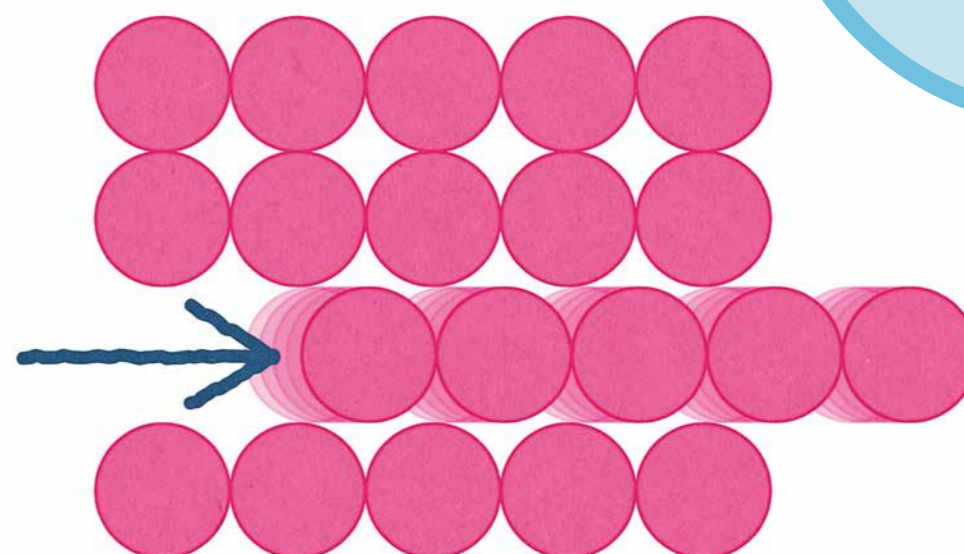
Metal alloy



Alloys are mixtures of two or more elements where at least one is a metal. Metallic bonds are the **strong electrostatic attractions** between **positively charged metal ions** and **delocalised electrons**.

In an **alloy**, the atoms are different sizes which distorts the layered structure. This means greater force is needed to make the layers slide over one another, which makes an **alloy** harder and stronger than the **pure metal**.

Pure metal



Pure metals only contain one type of metal atom, so the atoms are arranged in layers which can slide over one another. This means they are **malleable** – can be hammered or pressed into shape without breaking or cracking – and **ductile**, so they can be drawn into wires.