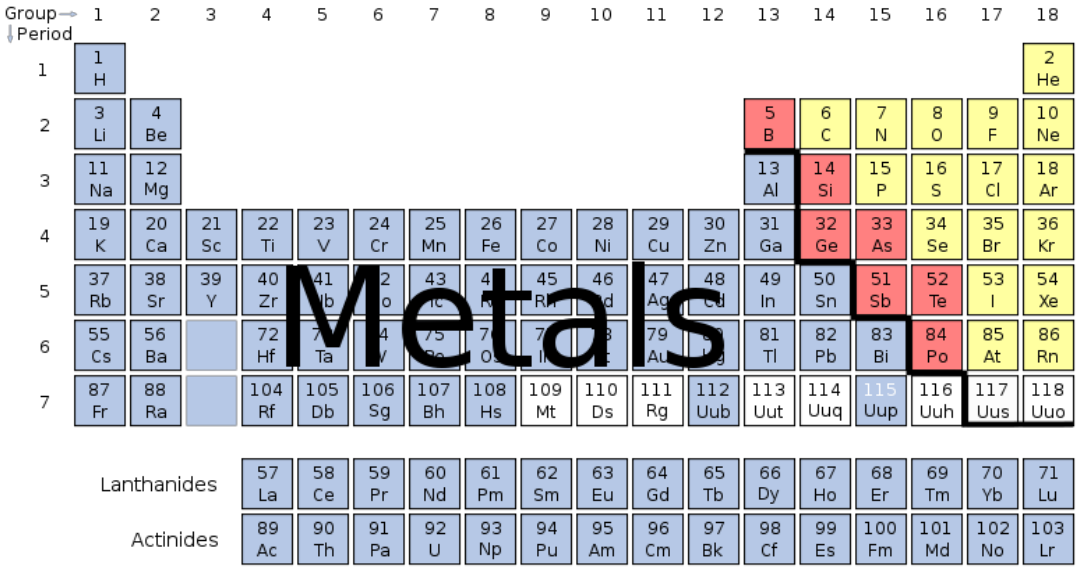
33 - Metals and Plastics

Most of the elements are **metals**. The left hand side of the periodic table is all metals.
You must know Copper (Cu), Zinc (Zn), Aluminium (Al), Iron (Fe), Silver (Ag), Gold (Au).

The **non-metals** you must know are Carbon (C), Oxygen (O), Sulfur (S), Hydrogen (H) and Nitrogen (N).



Properties of Metals

Metals are **lustrous** (shiny!) e.g. jewellery, mirrors
Metals are **ductile** (easy to stretch) e.g. electrical wire
Metals are **malleable** (beat into different shapes) e.g. car-panel beaters

Metals are strong, have a high melting point, are heavy and good conductors.

Properties of Non-Metals

Non-Metals are **dull**.
They do not **stretch**.
They are **brittle** and shatter easily. e.g. carbon in pencil
They have **low** melting and boiling points - many are gases.
They are **light** and have a low density.
They are **poor conductors** of heat
None are **magnetic**.

Metal or Non-metal?

The easiest way to test if something is a metal or not is to see if it.....

Alloys

An Alloy is a mixture of metals.

Examples are brass, steel and bronze.

Brass = Copper and Zinc

Bronze = Copper and Tin

Steel = Iron and Carbon

Group 1 Metals - The Alkali metals

These do not occur freely in nature usually as they are so reactive.
They lose their outer electron easily to react with other elements.
They are stored under oil to avoid contact with Oxygen.

Examples - **Sodium + Oxygen ⟶ Sodium Oxide**

Sodium + Water ⟶ Sodium Hydroxide + Hydrogen

All the Alkali metals are soft, easy to cut, react with oxygen and water. They all release Hydrogen gas (**pop!**) and form a Hydrogen compound.

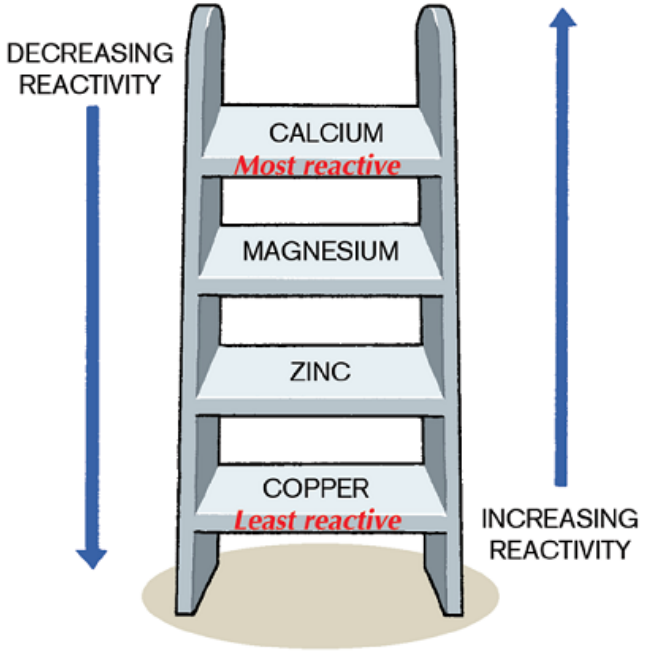
Uses - Lithium is used in batteries. Sodium is used in street lights.

Reactivity

Some are more reactive than others.

These metals are tested in water and acid.
They always react the same way and give off Hydrogen gas.

Video!



Corrosion of Metals

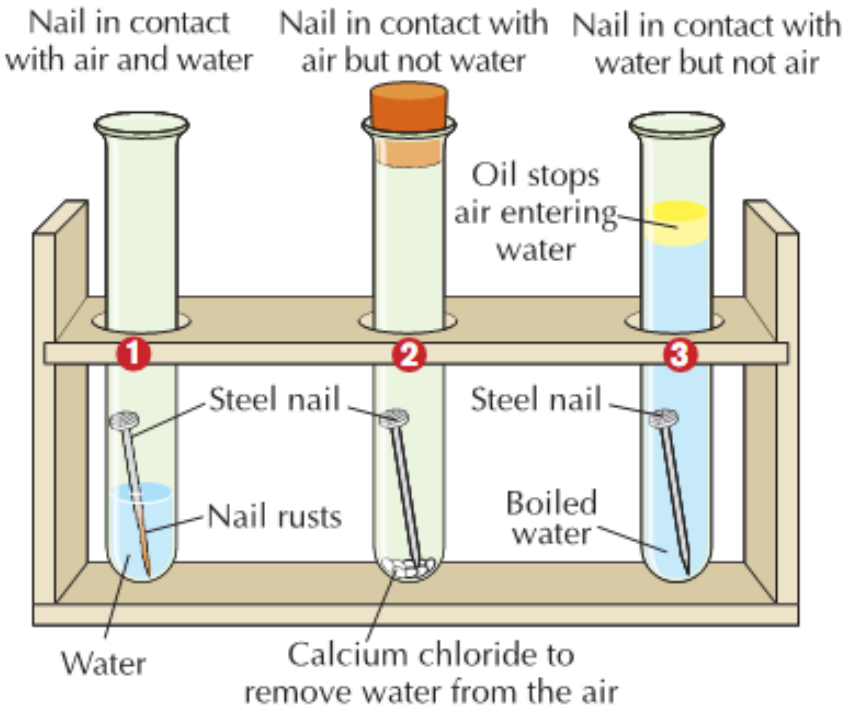
The corrosion of Iron and steel is known as **Rusting**.

Causes - there are 2 things necessary for rusting. **Oxygen and Water**.

Prevention - there are several ways to stop rusting.

- Painting
- Oiling
- Greasing
- Galvanising (covered in zinc)

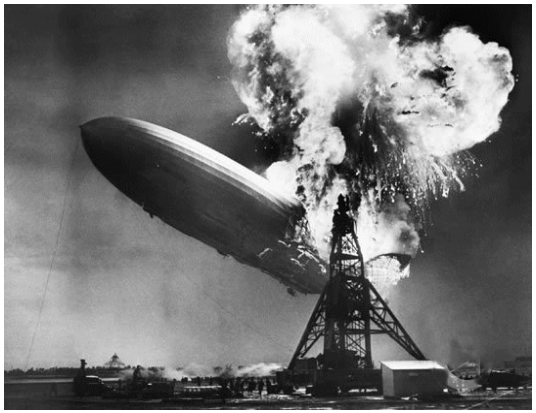
Oxygen and Water are needed for Rusting



Reaction of Metals and Acid

Zinc + Hydrochloric Acid ⟶ Zinc Chloride + **Hydrogen Gas**

$Zn + HCL \longrightarrow ZnCl_2 + \mathbf{H_2}$



Should pop!

Plastics

Common plastics - polythene, polystyrene, nylon and PVC

Most plastics come from crude oil.

Properties of Plastics -

Easily Moulded
Easy to Maintain
Inexpensive
Light
Good Insulators

Plastics and the environment

Non biodegradable
Poisonous Fumes