Unit 2: Properties of materials:

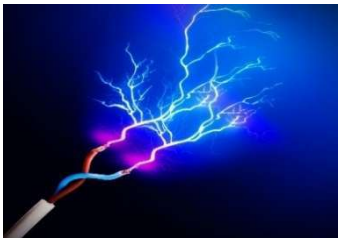
2.1: Metal and non-metals.

Metals are materials commonly used to make various objects due to their useful properties. These materials are strong, tough, and versatile, allowing them to be used in different jobs. For example, iron is used in bridges because it is strong, while gold is commonly used in jewelry because it is shiny.

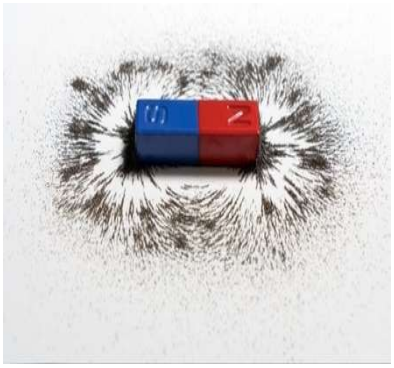
Key Properties of Metals:

Sonorous: Metals make a ringing sound when hit, like cymbals, which is called being "sonorous."

High Melting and Boiling Points: Most metals have high melting and boiling points, meaning they do not melt easily. Mercury is the only metal that is liquid at room temperature. A lot of heat is needed to melt metals.



Conductivity: Metals are good conductors of both heat and electricity. When you touch a metal, it conducts heat away from your hand, making it feel cold. Similarly, metals allow electric currents to flow through them.



Magnetic Properties: Some metals, like iron, steel, nickel, and cobalt, are magnetic. This property makes them useful in various applications such as motors and magnets.

Shiny Appearance: Metals are shiny when

freshly cut or polished, which is one reason why they are used in decorative items like jewelry.

Malleable: Metals are malleable, meaning they can be hammered into different shapes. This makes them ideal for creating objects of various forms, from utensils to building materials.

Ductile: Metals are also ductile, meaning they can be drawn into thin wires.

Key Properties of Non-Metals:

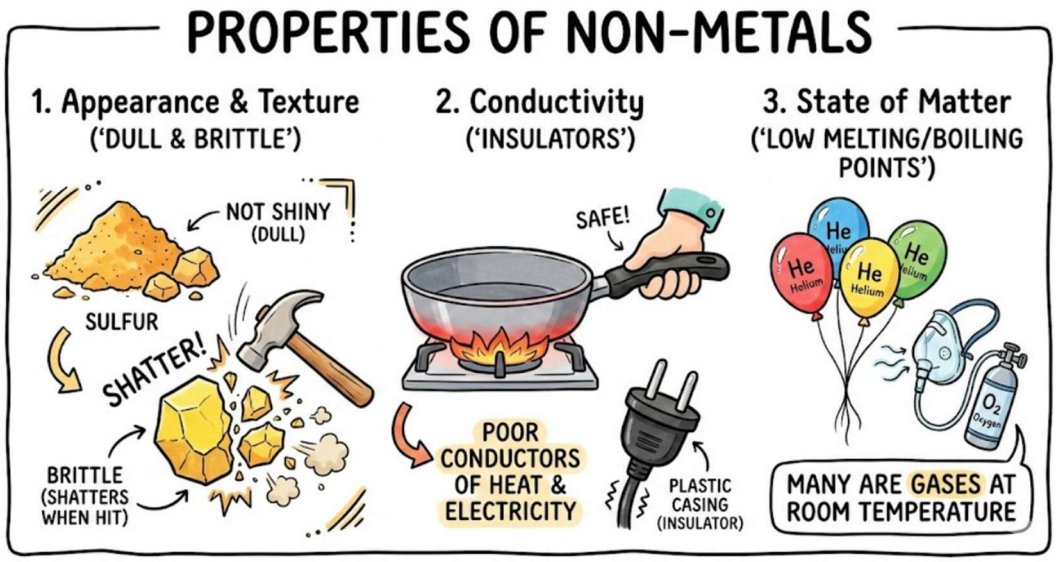


Figure 21: Properties of non-metals

Appearance & Texture

- **Dull:** They are not shiny; their surfaces are usually matte.
- **Brittle:** Solid non-metals (like Sulfur) are not malleable. When hit with a hammer, they do not bend; instead, they shatter into pieces or powder.

Conductivity (Insulators) Non-metals are generally **poor conductors**, making them excellent **insulators**:

- **Heat Insulation:** Used for pan handles (plastic/wood) to stop heat transfer and prevent burns.
- **Electrical Insulation:** Used for wire casings and plugs to prevent electric shocks and ensure safety.

State of Matter

- **Gases:** Many exist as gases at room temperature (e.g., Helium in balloons, Oxygen in tanks).
- **Low Melting/Boiling Points:** With few exceptions (like Diamond), they melt and boil at much lower temperatures compared to metals.

2.2: Comparing metals and non-metals.

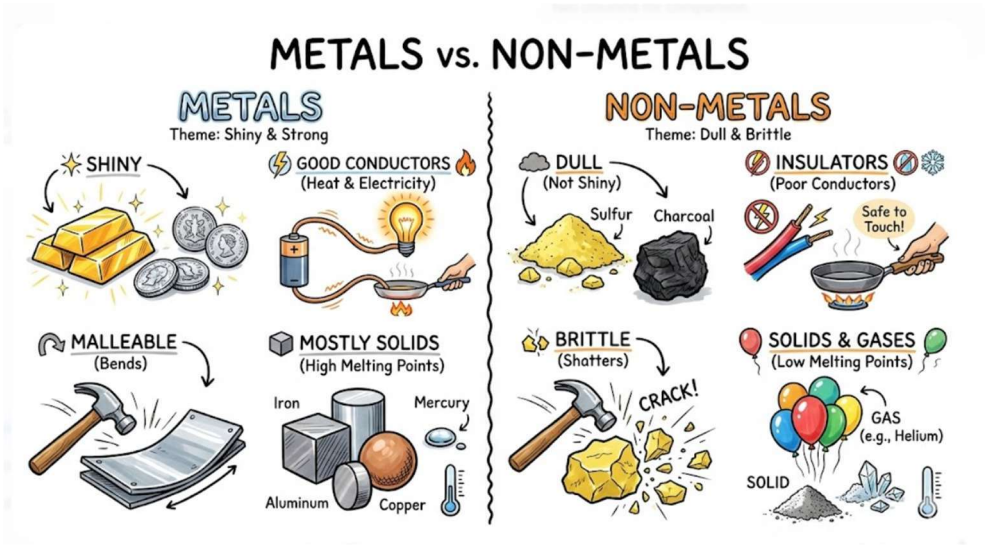


Figure 22: Comparing the physical properties of metals and non-metals

Metals	Non-metals
Most are solid at room temperature.	Many are gases at room temperature.
They are shiny.	They are dull.
They do not shatter.	They are brittle.