

Matter and its properties

Printable revision sheet — Galaxscia

LEVEL 1

What is matter?

Matter makes up everything around us: objects, air, living things, planets and even invisible gases. It has a mass and it can be transformed to make useful objects.

A concrete example: a smartphone contains more than 30 different materials: plastic (case), glass (screen), metals (circuits).

Where materials come from

Natural materials: taken directly from nature, such as:
wood, stone, cotton, wool, gold.

Artificial materials: made by humans and not found in nature, such as:
plastics, glass, metal alloys.

Synthetic materials: made by humans by copying natural materials, such as:
artificial silk, synthetic diamonds, synthetic rubber.

The main families of materials

Organic materials: from living things:
wood, cotton, leather, oil and its by-products (plastics, fuels).

Metallic materials: from metal ores:
iron, copper, aluminium, steel, bronze, brass.

Mineral materials: from rock:
granite, marble, glass, ceramic, concrete.

Key points — revision questions

Name three examples of matter around you.

What is the difference between a natural material and an artificial material?

Give an example of a synthetic material and explain why.

Which family do these belong to: wood, aluminium, glass, plastic, wool?

Why is oil classed as an organic material?

LEVEL 2

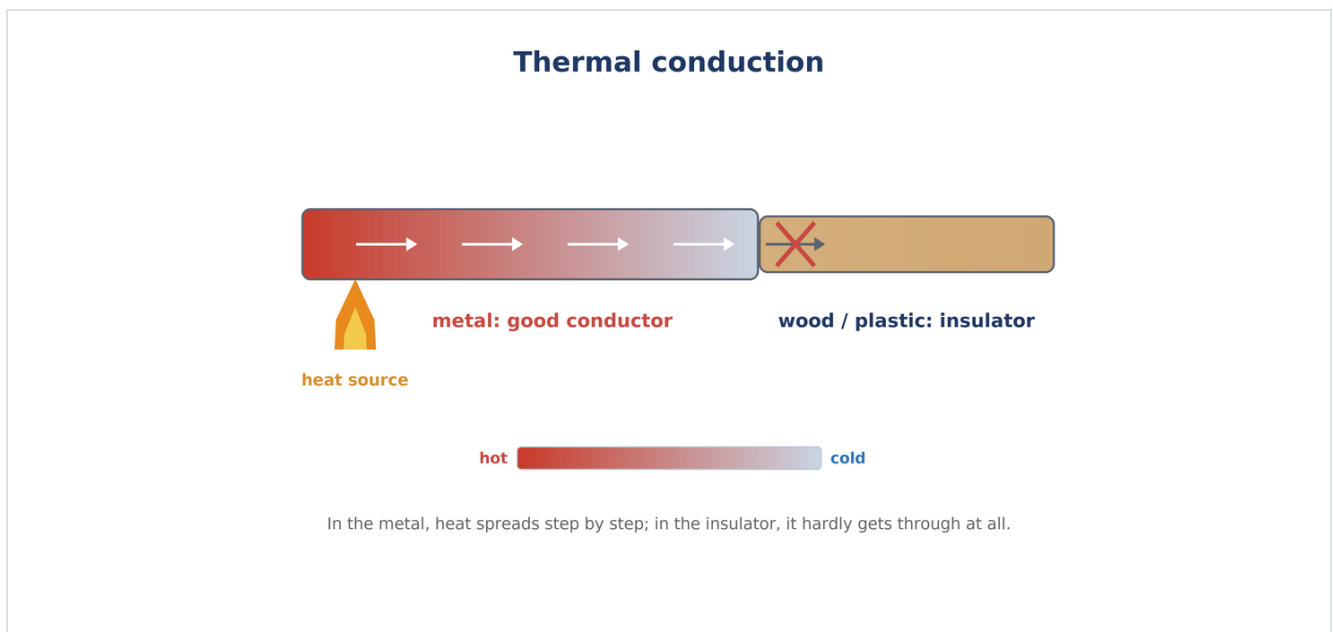
Thermal conduction

This is a quantity that measures how well a material passes heat on.

Example : in a frying pan, the metal part heats up quickly (good conductor), while the plastic or wooden handle stays cool (insulator).

Good thermal conductors: metals (copper, aluminium, iron).

Thermal insulators: wood, plastic, wool, polystyrene.



Electrical conduction

This measures how well a material lets an electric current through.

Electrical conductors: they let electricity through metals, graphite, salty water.

Electrical insulators: they do not let electricity through plastic, rubber, glass, ceramic, dry wood.

Example : an electric wire is made of a conductor (copper) surrounded by an insulator (plastic) for safety.

Electrical conduction

Conductor



current can flow

Insulator



current cannot flow

Density

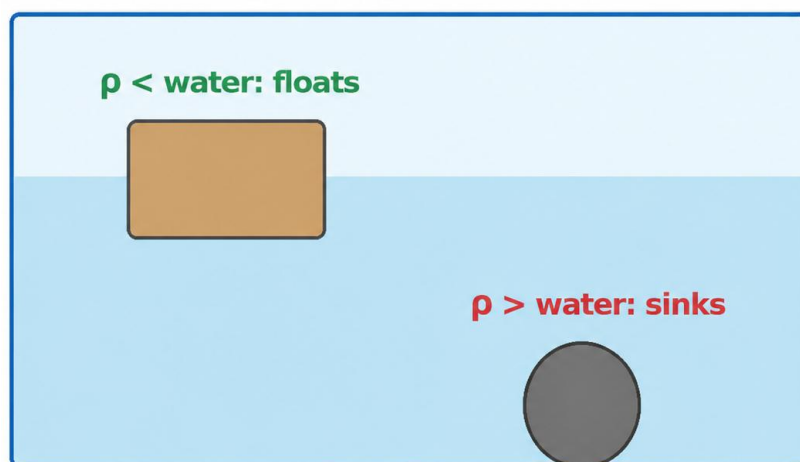
Density tells you how much matter there is in a given volume. A kilogram of feathers takes up more space than a kilogram of lead: feathers are therefore less dense.

Less dense than water → it floats (wood, cork, oil).

Denser than water → it sinks (metals, glass, stone).

Example : ice floats on water because it is less dense than liquid water.

Float or sink



Other properties

Hardness: diamond is very hard, lead is very soft.

Transparency: glass is transparent, tracing paper is translucent, wood is opaque.

Mechanical strength: steel is tough, glass is brittle.

Key points — revision questions

What is thermal conduction?

What is electrical conduction?

Name the two types of material in the case of electrical conduction.

Does a heavy object always sink in water? Justify your answer with an example.

Give one practical use of thermal conduction, of electrical conduction and of density.