

Materials

A material is **any substance that has a name**. For example: chalk, paper, wood, iron, air, water, clay, plastic, rubber, stone, leather, wax.

Everything is made up of materials. When we want to make something we need to choose the best material for the job.

The **property** of a material is something about it that we can measure, see or feel and helps us decide whether or not it is the best material.

Most materials have more than one property and can be **natural, man-made**, strong, weak, heavy, light in weight, rough, smooth, shiny, dull, hard, soft, flexible, brittle, magnetic, non-magnetic, transparent, opaque, electrical conductor, electrical insulator, conductor of heat, thermal (heat) insulator, burns when heated, does not burn, melt easily or not melt easily.

Materials exist in three states: a solid, a liquid or a gas. Materials can sometimes be changed from one state to another, perhaps by heating them – for example, ice is a solid which becomes a liquid when it's heated.



Words to know:

conductor - a substance, body, or medium that allows heat, electricity, light, or sound to pass along it or through it

dissolved - to become absorbed in a liquid solution, or make a solid do this

flexibility - able to bend or be bent repeatedly without damage or injury

gas - a substance that is neither a solid nor a liquid at ordinary temperatures and has the ability to expand infinitely, e.g. air

homogeneous - having the same kind of constituent elements, or being similar in nature

irreversible - impossible to reverse or undo

liquid - a substance in a condition in which it flows, that is a fluid at room temperature and whose shape but not volume can be changed

malleable - describes a metal or other substance that can be shaped or bent without breaking

man-made - made by human beings and not occurring naturally

material - the substance used to make things

microscope - a device that uses a lens or system of lenses to produce a greatly magnified image of an object

natural - present in or produced by nature, not artificial or synthetic

particle - a very small piece of something

property - a characteristic quality or distinctive feature of something

reversible - able to be changed or undone

solid - of a shape that resists change, unlike a liquid or gas

solution - a substance consisting of two or more substances mixed together

transparency - the quality or state of being transparent or see-through

viscosity - the property of a fluid or semifluid that causes it to resist flowing

Top 10 facts

1. **Plastic** is made from oil – we now use about 20 times more plastic than we did 50 years ago.
2. While aluminium is the most common **metal** found in the Earth's crust, the most common metal found on our planet is iron, mostly because it makes up such a large part of the Earth's core.
3. **Tungsten** has a very high melting point (after carbon the second-highest melting point of all elements).
4. **Wool** is an insulator and is used for making warm clothes and blankets. It resists water when in its natural state, without the oil removed.
5. All matter exists as **solids, liquids, or gases**. These are called the **states of matter**. Matter can change from one state to another if heated or cooled. If ice (a solid) is heated it changes to water (a liquid). If water is heated, it changes to steam (a gas). The particles of ice, water, and steam are identical, but arranged differently.
6. We can use many natural materials and by working with them change them into man-made substances, for example paper is made from wood.
7. On average every UK family uses around 330 glass bottles and jars every year. Glass bottles and jars can easily be recycled to make new glass bottles and jars or used in industry as aggregate (building material) or sand.
8. Hardness is a measure of how easily a material can be scratched. The Mohs hardness scale arranges 10 minerals from 1 to 10. The higher the number, the harder the mineral. Each mineral in the scale will scratch all those below it. Other materials can be compared to these minerals. Copper, for example, has a hardness of 2.5.
9. Mercury is a liquid metal that is poisonous. When mercury is dropped onto a surface, it rolls off in little balls. This is because the forces between the mercury particles are very strong, so the particles clump together.
10. The energy saved from recycling one plastic bottle can power a 100 watt light bulb for almost an hour.