

Key Facts

Materials and their properties

- **Solids** retain their shape when transferred from place to place unless a force is applied to them, for example, to cut or shape them. The particles making up the solid are held in a tight structure where they can vibrate but cannot move in relation to each other. Powders can be poured but will form a pile rather than a pool. Each grain of a powder maintains its shape and volume.
- **Liquids** when transferred from place to place take the shape of the container they are in but do not change in volume. The surface of a liquid will remain horizontal when the container is tipped. The particles in a liquid remain in contact with each other so the liquid cannot be compressed, but they are more loosely bound and so can move in relation to each other, allowing changes of shape.
- **Gases** change in shape and volume to fill the space they are in. The particles in a gas move freely so, under pressure, the gas will take up less space.

Conductors and insulators

A conductor is a material that transmits something like electricity or heat well. An insulator is a material that does this less well or not at all. Metals are very effective thermal and electrical conductors. Plastics and woods are poor thermal and electrical conductors but very good thermal and electrical insulators. Both these materials are ideal for using in contexts where heat requires insulating to protect the user, for example, for the handles of metal cooking pans or for cooking spoons that are used with hot food. However, wood may char or burn if it becomes too hot and plastic might melt - so care does need to be taken. Plastics are also used to insulate cables and plugs on electrical appliances and in the wiring of our homes, specifically because they are such effective electrical insulators.

Common misconceptions:

Children sometimes use the word 'material' to describe fabric and textiles. They need to be reminded that in science the word 'material' is a generic adjective used to describe what something is made of. Many children believe that all metals are magnetic. Only metals containing iron (including steel), nickel and cobalt are magnetic (i.e. can be attracted to a magnet).



Science

Year 5

Autumn 1

Get Sorted

Vocabulary

Word	Definition
Conductor	Some materials let electricity (electrical conductor) and heat (thermal conductor) pass through
Elastic	Capable of returning to its original
Environmentally friendly	Causes minimal harm to the environment.
Hardness	The quality of being hard.
Insoluble	Incapable of being dissolved.
Insulator	Some materials do not allow electricity (electrical insulator) or heat (thermal insulator) to pass through
Magnetic	An object that has the power to pull items made of iron toward itself.
Opaque	Not transparent (does not admit
Soluble	Capable of being dissolved (making a
Transparent	Admits light.
Viscosity	Viscosity is a measure of a fluid's resistance to flow.

Knowledge and Understanding:

Children will learn:

This module builds on earlier learning that began in Key Stage 1 and then continued in Year 4. During those years children compared and grouped materials according to whether they were solids, liquids or gases, and learned about changes of state that take place when materials are heated or cooled. This series of modules offers the final chemistry related learning for children in Key Stage 2.

In this module children identify, compare and classify a variety of materials according to both their properties and their uses. They explore familiar materials in a wide range of contexts and begin to recognise that a single material name, like 'metal' or 'plastic' can describe a considerable number of different materials that may display very different properties, but which still have features in common. Specific scientific and other vocabulary is used by children as they describe, explain and communicate their understanding of materials, succinctly and in ways appropriate to a science context.

Key skills and concepts:

Children will be able to:

When working scientifically, children plan and carry out different enquiry types to answer questions, including their own, about materials and their uses.

They sort, compare, group and classify materials, and develop their abilities to plan and carry out comparative and fair tests, controlling variables, as appropriate.

Key Questions

What scientific vocabulary can be used to describe the properties of materials?

What specific criteria could you use to compare, sort and group materials?

Can you describe the different properties of hard solids and soft solids?

Can you describe how viscosity varies from liquid to liquid?

Can you identify the properties of a variety of different metals, including which metals are magnetic?

Are you able to explain that particular metals are used for specific purposes because of their properties, and give examples (for example, aluminium used for making super-thin foil, steel used for door closures, copper used for wires in cables)?

Can you explain the importance of recycling and reusing plastics whenever possible?