

Inspiring and enabling our school community to live life to the full



YEAR 5 SCIENCE

Properties and uses of Materials

Our Science curriculum aims to enthuse children and help them to be curious and develop a sense of excitement about the world. Through a range of teaching, learning and extra-curricular opportunities, children will develop scientific knowledge and conceptual understanding to recognise the uses and implications of Science, today and for the future. We encourage children to ask their own questions; predict how things will behave and analyse causes, using Science to explain what is happening.

Characteristics of an Effective Learner

Courage
Commitment
Collaboration
Creativity
Curiosity

Prior Learning:

- In Year 1, children identify the material an object is made from
Children describe properties of different materials
Understand how brick and glass are made
Investigate the waterproof properties of different materials
- In Year 2, children identify and compare the suitability of a variety of everyday materials and find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching
- In Year 3, children test materials for magnetism
- In Year 4, children sort materials according to whether they are solids, liquids or gases and observe changes that occur from heating and cooling

Key Vocabulary taught in this unit:

Construction, design, disassemble, dispose, flow, invent, invention, leak, pour, structure, criterion, dependent variable, independent variable, survey, brittle, ductile, fragile, impermeable, malleable/malleability, permeable, thermal conductors, thermal insulators, viscosity, viscous, wear and tear, comparative test, control variable, data, evaluate, observe, observation, predict, predicting, scale, variable, absorb/absorbent, compost, decompose, durable, elastic/elasticity, electrical conductor, insulator, flexible, flexibility, hard, hardness, liquid, magnetic, non-magnetic, opaque, property, solid, transparent/transparency, weathering.

Key Questions:

Q How can we compare and group materials?

Q Which materials did the builders use when constructing our school and why?

Q Which liquid is the thickest?

Q Who invents things?

Q Can the same container keep cold things cold and hot things hot?

Q Which materials are absorbent, permeable or waterproof?

Intent: What do we want the children to know, be able to do by the time they complete this unit?

Materials have properties that make them fit for certain purposes. These may include being: absorbent, brittle, durable, ductile, elastic, electrical conductor, electrical insulator, flexible, hard, malleable, transparent, translucent, opaque, permeable/impermeable, rigid, thermal conductor, thermal insulator, magnetic. Materials are used in many different ways and for particular purposes based on their properties.

Materials can be fit-for-purpose. How materials may vary in form (e.g. plastics of different types) and why they are used for particular purposes. Weathering, wear and tear can occur over time and this will have an impact upon a material's fitness-for-purpose. Liquids have properties which include

having: [a fixed weight, a fixed volume,] an ability to flow, a level of viscosity and they take on the shape of a container. Viscosity is the property of a liquid that describes how fast or slowly it will flow. The viscosity of a liquid describes how thick or thin it is. A liquid with high viscosity (thick) will flow slowly and a liquid with low viscosity (thin) will flow quickly. Inventors discover new uses for materials and create new materials. Inventors design objects using their knowledge of the properties of materials. A thermal insulator is a material that provides high resistance to heat flow. Examples include rubber, wool, wood, polystyrene/foam, plastics. A thermal conductor is a material that provides low resistance to heat flow. Examples include metals, such as aluminium, copper, steel, and iron. A thermal insulator keeps hot things hot and cold things cold. Materials can be absorbent and can soak up and take in liquid. Some materials are permeable and let water pass through. Some materials are waterproof and do not let water pass through. The use of some materials can have an impact on the environment.

Working Scientifically:

Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.

Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.

Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.

Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations.

Identifying scientific evidence that has been used to support or refute ideas or arguments.

Impact / Outcome:

What will the final product / result be?

Children will learn about the methods scientists use to build scientific knowledge about materials and how they can be used in different ways.

They will learn that scientists make and use observations to answer scientific questions and explain natural phenomena, that they use scientific equipment to quantify their observations and use models to help understand how systems and processes work.

They will understand that scientific knowledge is tentative and subject to change; over time areas of science change and develop in response to new evidence.

They will learn that inventors use scientific knowledge and methods when inventing and testing new designs.

They will use the following types of enquiry: identifying and classifying; comparative [and fair] testing.

P4C Inquiry (where appropriate)