

Year 5 Science Progression Map

	Autumn 1	
Topic	Forces	
Unit Aim	To develop pupils' understanding of forces by exploring how different forces affect the movement of objects, including gravity, friction, air resistance and water resistance, and to apply this knowledge to explain and investigate real-world phenomena. <i>We are learning to understand how forces like pushes, pulls, gravity and resistance affect how things move, and to explain this using scientific ideas.</i>	
Prior Learning	Magnetism (a non-contact force): • Magnets attract or repel each other • Magnetic materials vs non-magnetic materials • Understanding that magnetic force acts at a distance Recognising that forces can be: • Contact forces (e.g. friction) • Non-contact forces (e.g. magnetism)	
Knowledge	Essential Knowledge	Working Scientifically
	Measuring force with force meter Recording results in a table Using arrows to represent forces in diagrams Controlling variables and taking measurements Recording data and writing a conclusion Understanding and controlling variables Taking measurements and recording data Taking measurements using a force meter Interpreting results to solve the problem Recording data from testing Interpreting patterns in results Explaining what they have learnt, completing the research investigation sheet or communicating in other ways	explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling objects identify the effects of air resistance, water resistance and friction that act between moving surfaces recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect
Vocabulary	pull, push, rough, smooth attract, balanced, compare, force, grip, interpret, machine, prediction, record, surface, variable air resistance, control variable, dependent variable, fair test, force meter, friction, gears, gravity, independent variable, lever, magnetic, mechanism, pulley, repel, streamlined, surface area, water resistance	
Future Learning	Apply their understanding of forces in other contexts (e.g. fair testing, investigations) Use ideas like gravity, friction, and air resistance when explaining results Develop stronger working scientifically skills, such as: • Planning investigations involving forces • Interpreting data more accurately	

KS2 End Point	Use our previous scientific learning to make choices and decisions about the world.
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	<u>Autumn 2</u>	
Topic	Earth and Space	
Unit Aim	To develop pupils' understanding of the Earth's place in the universe by exploring the relationships between the Sun, Earth and Moon, and to explain phenomena such as day and night, the movement of celestial bodies, and the structure of the solar system using scientific models. We are learning to understand how the Earth, Sun and Moon move, and how this explains day and night and our place in space.	
Prior Learning	Observing day and night patterns Noticing seasonal changes across the year Identifying different types of weather Recognising that the Sun gives light and warmth Understanding light: We need light to see things The Sun is a light source Basic idea that shadows change size and direction (linked to the Sun's position)	
Knowledge	<u>Essential Knowledge</u>	<u>Working Scientifically</u>
	Recording key data about planets; recording which parts of the globe are in darkness while others are light Testing which areas of a globe are in dark, when other areas are light Setting up a fair test to gather evidence the Earth is spherical Recording the phases of the Moon that we can see during orbit Communicate results of an investigation into day and night Observing and measuring the length of shadows Evaluating data about planets' orbits; explaining the relationship between the Sun, the Earth and the Moon	describe the movement of the Earth and other planets relative to the Sun in the solar system describe the movement of the Moon relative to the Earth describe the Sun, Earth, and Moon as approximately spherical bodies use the idea of the Earth's rotation to explain day and night and the apparent movement of the Sun across the sky
Vocabulary	day, moon, night, star, Sun analyse, cycle, data, evidence, orbit, planet, reflect, space, sphere, test asteroid, astronomer, artificial, axis, gravity, satellite	

Future Learning	Apply their knowledge in reading, writing, and investigations Use understanding of: • Day and night • The Earth's movement Strengthen working scientifically skills (e.g. interpreting models, explaining phenomena)
KS2 End Point	Use our previous scientific learning to make choices and decisions about the world.

	<u>Spring 1</u>	
Topic	Properties of Materials	
Unit Aim	To develop pupils' understanding of the properties of materials by investigating and comparing materials based on their characteristics, exploring how materials can be separated, and explaining reversible and irreversible changes using scientific knowledge. <i>We are learning to compare materials, investigate their properties, and understand how and why materials change.</i>	
Prior Learning	More detailed comparison of rocks and soils: Hardness Permeability (whether water passes through) Durability Introduction to fossils (as part of rocks topic) Beginning to link properties to uses in a more reasoned way Study of states of matter: Solids, liquids, gases Understanding that materials can change state: Melting, freezing, evaporation, condensation Learning that some changes are linked to temperature Measuring temperature and observing changes over time (e.g. melting ice)	
Knowledge	<u>Essential Knowledge</u>	<u>Working Scientifically</u>

	Plan different scientific enquiries to answer questions, including recognising and controlling variables where necessary. Take measurements using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, and bar and line graphs. Use test results to make predictions to set up further comparative and fair tests. Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. Identify scientific evidence used to support or refute ideas or arguments	Compare and group everyday materials based on their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. Use knowledge of solids, liquids and gases to decide how we might separate mixtures, including through filtering, sieving and evaporating. Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. Demonstrate that dissolving, mixing and changes of state are reversible changes. Explain that some changes result in the formation of new materials and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on the bicarbonate of soda
Vocabulary	insoluble saturation solution filtration boiling condensing evaporation freezing melting point chemical change physical change reversible change irreversible change	
Future Learning	Apply knowledge of materials and properties in investigations Use scientific reasoning when choosing materials for fair tests Work with concepts like: resistance, durability, and suitability in context (e.g. design tasks) Strengthen understanding of: - How to plan and justify choices of materials scientifically	
KS2 End Point	Use our previous scientific learning to make choices and decisions about the world.	

	<u>Spring 2</u>
Topic	Changes in Materials
Unit Aim	To develop pupils' understanding of how materials change by investigating reversible and irreversible changes, exploring dissolving and separating mixtures, and explaining these processes using scientific knowledge. <i>We are learning to understand how materials can change, which changes can be reversed, and how to separate different materials.</i>
Prior Learning	States of Matter Understanding the three states: - Solids, liquids, gases

	- Knowing that materials can change state: - Melting (solid → liquid) - Freezing (liquid → solid) - Evaporation (liquid → gas) - Condensation (gas → liquid) Reversibility (implicit understanding) - Recognising that some changes can be undone (e.g. freezing water back into ice) Role of Temperature - Knowing that heating and cooling can cause changes - Measuring temperature and observing effects over time	
Knowledge	Essential Knowledge	Working Scientifically
	Plan different scientific enquiries to answer questions, including recognising and controlling variables where necessary. Take measurements using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, and bar and line graphs. Use test results to make predictions to set up further comparative and fair tests. Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. Identify scientific evidence used to support or refute ideas or arguments	Compare and group everyday materials based on their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. Use knowledge of solids, liquids and gases to decide how we might separate mixtures, including through filtering, sieving and evaporating. Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. Demonstrate that dissolving, mixing and changes of state are reversible changes. Explain that some changes result in the formation of new materials and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on the bicarbonate of soda
Vocabulary	insoluble saturation solution filtration boiling condensing evaporation freezing melting point chemical change physical change reversible change irreversible change	
Future Learning	Apply knowledge of reversible and irreversible changes in investigations Use reasoning to explain results in: - Cooking, dissolving, melting, and mixing contexts Begin to justify whether changes are temporary or permanent Strengthen working scientifically skills: - Planning fair tests involving changes in materials	
KS2 End Point	Use our previous scientific learning to make choices and decisions about the world.	

	<u>Summer 1</u>	
Topic	Living Things and their Habitats	
Unit Aim	To develop pupils' understanding of how living things are classified and how they grow and reproduce, by exploring life cycles, comparing different groups of organisms, and explaining how living things depend on and adapt to their environments. <i>We are learning to understand how living things grow, change, and are grouped, and how they depend on their habitats to survive.</i>	
Prior Learning	Classification • Grouping living things in different ways: ◦ Vertebrates vs invertebrates • Classifying animals into groups such as: ◦ Mammals, birds, fish, amphibians, reptiles Habitats & Environmental Change • Recognising that environments can change and this can: ◦ Pose dangers to living things • Understanding human impact (e.g. deforestation, pollution – at a simple level) Food Chains • Constructing and interpreting more complex food chains • Using terms like: ◦ Producer ◦ Consumer ◦ Predator ◦ Prey	
Knowledge	<u>Essential Knowledge</u>	<u>Working Scientifically</u>
	Using diagrams and labels to record information and sort information into tables and charts Recording information by making labelled annotated sketches Explaining and communicating how plants reproduce – poster, presentation or animation Making a prediction about what will happen based on prior knowledge Setting up and carrying out a comparative test considering how to control variables Representing life cycles in annotated diagrams Presenting results and findings from an enquiry Communicating findings from observations Determining the best questions to be researched for an enquiry Making observations of animals over a life cycle and recording changes Recording changes in life cycles	describe the differences in the life cycles of a mammal, an amphibian, a reptile, an insect and a bird describe the life process of reproduction in some plants and animals

	using diagrams, tables and charts, making notes	
Vocabulary	insect, seed bulb, characteristic, disperse, dormant, flowering plant, independent, nurture, ospring, reproduce, survive, variable amphibian, clone, fertilisation, germination, gills, lava, metamorphosis, ovary, pollen, pollination, propagate, pupa, species	
Future Learning	Apply knowledge of classification and habitats in investigations Use scientific reasoning when explaining: • How organisms are adapted to environments • How changes in habitats affect living things Strengthen working scientifically skills: • Interpreting data about living things • Using classification keys more confidently	
KS2 End Point	Use our previous scientific learning to make choices and decisions about the world.	

	<u>Summer 2</u>
Topic	Animals including Humans
Unit Aim	To develop pupils' understanding of human development by exploring the stages of the human life cycle, including growth and reproduction, and to explain the changes that occur from birth to old age using scientific knowledge. <i>We are learning to understand how humans grow and change throughout their lives, and how our bodies develop over time.</i>
Prior Learning	Study of nutrition and the human body: Animals (including humans) need the right types and amounts of food Introduction to main food groups (balanced diet) Understanding that humans and some animals have: Skeletons for support Muscles for movement Learning that muscles work in pairs to move bones Focus on the digestive system: Main parts: mouth, oesophagus, stomach, small and large intestines Understanding how food is broken down and absorbed

	Identifying different types of teeth and their functions: Incisors, canines, molars Constructing simple food chains, linking to diet and energy	
Knowledge	<u>Essential Knowledge</u>	<u>Working Scientifically</u>
	plan different types of scientific enquiries to answer questions, including recognising, and controlling variables where necessary take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter, bar and line graphs use test results to make predictions to set up further comparative and fair tests report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations identify scientific evidence that has been used to support or refute ideas or arguments.	describe the changes as humans develop to old age.
Vocabulary	birth conception/fertilisation death develop egg foetus puberty sperm womb	
Future Learning	Apply knowledge of the human body and life cycles in explanations Strengthen understanding of: • Healthy lifestyles • Diet and exercise in maintaining health Use scientific skills to: • Interpret data about health (e.g. heart rate, exercise effects) • Explain observations using scientific vocabulary	
KS2 End Point	Use our previous scientific learning to make choices and decisions about the world.	