

Science Year 3 Skills and knowledge documents to support medium term planning



	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Topic	<u>Forces, Earth and Space</u> Forces and Magnets	<u>Materials</u> Rocks and soil	<u>Energy</u> Light	<u>Animals including humans</u> Nutrition and Movement	<u>Plants</u> Plant Reproduction	<u>Making Connections</u> Does hand span affect grip strength?

Progression of Working Scientifically Skills

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Posing questions	<p>Asking simple scientific questions and noticing that questions can be answered in different ways.</p> <p>Exploring the world around them and raising their own simple questions.</p> <p>Recognising there are different types of enquiry (ways to answer a question).</p> <p>Responding to suggestions on how to answer questions.</p>		<p>Asking my own scientific questions & using different ways to answer them.</p> <p>Beginning to raise further questions during the enquiry process.</p> <p>Considering what makes a testable question.</p> <p>Beginning to recognise that there are different types of enquiry and that they are suitable for different questions.</p> <p>Beginning to make suggestions about how different questions could be answered.</p> <p>Asking scientific questions.</p> <p>Raising questions throughout the enquiry process.</p> <p>Identifying testable questions.</p> <p>Selecting the most appropriate enquiry method to answer questions and give justification.</p>		<p>Asking scientific questions.</p> <p>Raising questions throughout the enquiry process.</p> <p>Identifying testable questions.</p> <p>Selecting the most appropriate enquiry method to answer questions and give justification.</p>	
Planning	<p>Planning how to find things out with help (including planning tests)</p>		<p>Able to plan tests (inc. fair tests) with help.</p> <p>Able to plan different types of scientific enquiries to answer questions.</p>		<p>Able to plan different types of scientific enquiries to answer questions.</p>	

<p>Predicting</p>	<p>Suggesting what might happen, often justifying with personal experience.</p>	<p>Making predictions about what they think will happen by:</p> <ul style="list-style-type: none"> ● Using scientific Knowledge and/or personal experience to explain their prediction (because...) ● Beginning to consider cause and effect when making predictions, where appropriate. ● Predicting a trend by considering how the changing variable will affect the measured variable. (The smoother the surface, the longer the distance the car will travel) <p>Making increasingly scientific predictions by:</p> <ul style="list-style-type: none"> ● Using previous scientific Knowledge and evidence to inform their predictions. ● Using scientific language to describe a potential outcome or explain why they think something will happen. ● Making links between topics to evidence a prediction. 	<p>Making increasingly scientific predictions by:</p> <ul style="list-style-type: none"> ● Using previous scientific Knowledge and evidence to inform their predictions. ● Using scientific language to describe a potential outcome or explain why they think something will happen. ● Making links between topics to evidence a prediction.
<p>Observing (Qualitative)</p>	<p>Able to observe, describe & compare.</p> <p>Using their senses to describe, in simple terms, what they notice or what has changed.</p>	<p>Able to observe, describe & compare using scientific language.</p> <p>Using their senses to describe, in more detail and with simple scientific vocabulary, what they notice or what has changed.</p> <p>Able to observe, describe and compare in detail using scientific language.</p> <p>Using their senses to describe, in detail and with a broader range of scientific vocabulary, what they notice or what has changed.</p>	<p>Able to observe, describe and compare in detail using scientific language.</p> <p>Using their senses to describe, in detail and with a broader range of scientific vocabulary, what they notice or what has changed.</p>

<p>Measuring (Quantitative)</p>	<p>Able to measure using non-standard and standard measures e.g. rulers, metre sticks, trundle wheels, weighing scales, balance scales)</p> <p>Using non-standard units to measure and compare.</p> <p>Beginning to use standard units and read simple scales to measure and compare.</p> <p>Beginning to use simple measuring equipment to make approximate measurements.</p>	<p>Able to use a variety of equipment to measure accurately (such as data loggers, newton meters, weighing scales, thermometers, stopwatches, rules, metre sticks, trundle wheels, measuring cylinders)</p> <p>Using standard units to measure and compare.</p> <p>Using measuring equipment with increasing accuracy.</p> <p>Reading scales with unmarked intervals between numbers.</p> <p>Able to select different equipment to measure with precision & take repeat readings when needed</p> <p>Using standard units to measure and compare with increasing precision (decimals).</p> <p>Reading a wider variety of scales with unmarked intervals between numbers.</p>	<p>Able to select different equipment to measure with precision & take repeat readings when needed</p> <p>Using standard units to measure and compare with increasing precision (decimals).</p> <p>Reading a wider variety of scales with unmarked intervals between numbers.</p>
<p>Researching</p>	<p>Gathering specific information from one simplified, specified source.</p>	<p>Gathering specific information from a variety of sources.</p> <p>Gathering answers to open-ended questions from a variety of sources.</p>	<p>Gathering answers to open-ended questions from a variety of sources.</p>
<p>Recording</p>	<p>Gathering & recording simple data on tables, pictograms & bar charts.</p>	<p>Able to gather, record and present data in different ways inc. drawings, labelled diagrams, tables.</p> <p>Choosing how to record data and results using scientific diagrams, labels, classification, keys, tables.</p>	<p>Choosing how to record data and results using scientific diagrams, labels, classification, keys, tables.</p>

Grouping and classifying	Beginning to be able to sort and order.	Classifying things & using keys. Sorting and classifying with precise reason.	Sorting and classifying with precise reason.
Graphing	Able to gather & record simple data on tables, pictograms & bar charts.	Recording and presenting data in different ways inc. scattergrams and bar charts. Learning to choose how to record data and results using scatter, bar and line graphs.	Learning to choose how to record data and results using scatter, bar and line graphs.
Analysing and drawing conclusions	Able to talk, write and draw about what I've found out. Explaining why (in a simple way). Able to use simple scientific language.	Communicating my findings in a variety of ways. Explaining using cause and effect and scientific facts and ideas Able to use relevant scientific language. Gathering the things I've learned and say why they matter to me. Explaining using cause and effect, scientific facts and own ideas. Able to use relevant scientific language.	Gathering the things I've learned and say why they matter to me. Explaining using cause and effect, scientific facts and own ideas. Able to use relevant scientific language.
Evaluating		Able to talk about how to improve my work. Learning to evaluate and able to improve my own work.	Learning to evaluate and able to improve my own work.

Y3: Autumn 1

Topic title: Forces and Magnets

Enquiry question: Do all forces need contact? Are all materials magnetic?

<p>Prior Learning Nursery Explore how things work. Explore and talk about different forces they can feel Talk about the differences in materials and changes they notice. Reception Explore the natural world around them Describe what they see, hear and feel whilst outside. Y2 Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching Future learning: Y5 Forces KS3 Magnetic fields and field line diagrams, Earth's magnetism, compass and navigation.</p>	<p>Knowledge: Know some examples of contact and non-contact forces. Know that some forces are a result of contact between two surfaces, but some forces can act at a distance (e.g. magnetism). Name the North and South poles of a magnet. Name examples of magnetic materials, including iron and nickel, and how they react to a magnet and each other. Know some different examples of magnets, including bar, horseshoe, button and ring. Know some uses of magnets. Know that magnetism is a non-contact force that affects objects containing magnetic metal. Understand that the opposite poles of a magnet attract one another and like poles repel one another. Understand that the strength of different magnets may vary. Know that friction is a contact force that acts between two surfaces to slow an object down. Know that rougher surfaces have more friction between them than smoother surfaces.</p>	<p>Skills: Use arrows and scientific vocabulary to show the direction of a contact force. Use evidence to support conclusions. Identify the variables to change, measure and control. Write a method to explain how to use a magnet to sort and classify materials as magnetic or non-magnetic. Label the axes of a bar chart. Draw bars on a chart accurately. Identify key information from a source. Use more than one source to research a question.</p>	<p>Vocabulary: Force, push, pull, twist, contact force, non-contact force, magnetic force, magnet, strength, bar magnet, ring magnet, button magnet, horseshoe magnet, attract, repel, magnetic material, metal, iron, steel, poles, north pole, south pole.</p>
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<p>Critical Content Statements:</p> <ul style="list-style-type: none"> Some forces are a result of contact between two surfaces but some forces can act at a distance (e.g. magnetism). 	<p>Common Misconceptions Pupils May Have: Some pupils may think that</p> <ul style="list-style-type: none"> The bigger the magnet the stronger it is. All metals are magnetic.
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- Magnetism is a non-contact force that affects objects containing magnetic metal.
- The ends of a magnet are called the poles.
- Magnets have a north and south pole.
- Some examples of magnetic materials, including iron and nickel.
- Magnetic metals will stick to a magnet.
- The strength of different magnets may vary.
- The opposite poles of a magnet attract one another and like poles repel one another.
- Friction is a contact force that acts between two surfaces to slow an object down.
- Rougher surfaces have more friction between them than smoother surfaces.

Y3: Autumn 2

Topic title: Rocks and Soil

Enquiry question: Are all rocks the same?

<p>Prior learning:</p> <p>Y1 distinguish between an object and the material from which it is made. Identify and name a variety of everyday materials Describe the simple physical properties of a variety of everyday materials Compare and group together everyday materials based on simple physical properties/ Y2 Identify and compare the suitability of everyday materials for specific uses.</p> <p>Future learning:</p> <p>Y6 Evolution and Inheritance KS3 Composition of Earth, structure of Earth, rock cycle and the formation of igneous, sedimentary and metamorphic rocks.</p>	<p>Knowledge:</p> <p>Know that rocks can be grouped based on their appearance or properties, (e.g. colour, texture, hardness, permeability.) Know that rocks may contain grains, crystals or fossils. Know that grains and crystals appear differently and can be used to classify rocks. Know that soils are made from rocks and dead matter. Understand the relationship between the properties of rocks and their uses. Know that fossils can form from the remains of living things. Know that rocks can change over time (e.g. erosion, weathering).</p>	<p>Skills:</p> <p>Use a magnifying glass correctly to observe the appearance of a rock in detail. Use results to choose the appropriate rock type for a specific use, suggest a better choice of rock for a specific use and predict how a rock will be affected by the weather. Research and present information on fossil formation using a single source. Use a model of the fossil record to determine the relative age of a fossil, to suggest how a living thing has changed over time and to suggest what living things were around in a certain era. Draw and label the bars on a bar chart. Accurately draw and label the layers of sediment in a sedimentation jar.</p>	<p>Vocabulary:</p> <p>Rock, stone, pebble, boulder, grain, crystals. Layers, hard, soft, texture, absorb water, fossil, bone, flesh, minerals, marble, chalk, granite, sandstone, slate, soil, types of soil, (eg peaty, sandy, chalk, clay)</p>
<p>Critical Content Statements:</p> <ul style="list-style-type: none">• We can sort rocks based on appearance or properties (e.g. colour, texture, hardness and permeability).• Rocks may contain grains, crystals or fossils.		<p>Common Misconceptions Pupils May Have:</p> <p>Some children may think that</p> <ul style="list-style-type: none">• Rocks are all hard in nature• Rock-like, man made substances such as concrete or brick are rocks	

- Grains and crystals look different and can be used to sort and classify rocks.
- Soils are made from rocks and dead matter.
- The properties of rocks make them useful for making different things.
- Fossils can form from the remains of living things.
- Rocks can change over time (e.g. erosion and weathering).

- Materials which have been polished or shaped for use such as granite worktop, are not rocks as they are no longer natural
- Certain found artefacts, like old bits of pottery or coins are fossils
- A fossil is an actual piece of the extinct animal or plant
- Soil and compost are the same thing.

Y3: Spring 1

Topic title: Light

Enquiry question: What is a source of light? How are shadows made?

Prior learning:

Nursery

Explore how things work.
Talk about the differences in materials and changes they notice.

Reception

Describe what they see, hear and feel whilst outside.

Y1

Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.

Describe simple physical properties of a variety of everyday materials.

Knowledge and skills:

Know that light travels from a source (eg the Sun, light bulbs and torches).

Recall examples of light sources, know which objects that do not give out light

Know that darkness is the absence of light.

Know that light from the Sun can be dangerous and how to protect their eyes. Describe ways to protect our eyes, We should not look directly at the Sun and protect our eyes by wearing sunglasses or sun hats in bright light.

Describe what happens when light reflects, give examples of reflective surfaces or materials and describe factors that may affect the quality of a reflected image.

Describe how shadows form and identify patterns between groups of materials and the shadows produced.

Recall factors that affect the way a shadow appears, including what causes shadows to change throughout the day and factors that change the size of a shadow

Vocabulary:

Light, light source, dark, absence of light, surface, shadow, reflect, mirror, Sun, sunlight, dangerous, luminous, non-luminous.

(Y2- opaque, translucent, transparent, reflective, non-reflective)

(Y1- shiny, dull, see-through, not see-through, senses, see, eyes)

<p>Future learning: Y6 Light and Reflection</p>	<p>Describe the pattern of changing shadows throughout the day. Describe how the light source's distance affects the shadow's size. Explain why a particular material is appropriate to make a shadow puppet and use knowledge of shadows to animate it.</p>	
<p>Critical Content Statements:</p> <ul style="list-style-type: none"> • Light travels from a source • The Sun, light bulbs, candles and torches are all sources of light. • We see things because our eyes can sense light and objects are easier to see if there is more light. • Dark is the absence of light. • We cannot see anything in complete darkness. • Light from the Sun can be damage our eyes. We should never look directly at the Sun and we can protect our eyes using a sunhat, sunglasses or staying in the shade. • All materials reflect light. • Shadows form when the light from a light source is blocked by an opaque object. • Shadows change if we change the position of the light source or change the distance between the light source, object and surface. • Shadows change position and length throughout the day as the Sun changes position in the sky. 		<p>Common Misconceptions Pupils May Have:</p> <ul style="list-style-type: none"> • We can still see when there is an absence of light. • Our eyes 'get used to' the dark. • The moon and reflective surfaces are light sources. • A transparent object is a light source. • Shadows contain details of the objects, such as facial features on their own shadow. • Shadows result from objects giving off darkness.

Y3: Spring 2

Topic title: Movement and Nutrition

<p>Prior learning:</p> <p>Y1 Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. Identify and name a variety of common animals that are carnivores, herbivores and omnivores. Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals)</p> <p>Y2 Find out about and describe the basic needs of animals including humans for survival (water, food air) Describe the importance for humans of exercise, eating the right amounts of different types of food and hygiene.</p> <p>Future learning:</p> <p>Y4 Digestion and food. Y6 Circulation and Health</p>	<p>Knowledge:</p> <p>Know that animals can be grouped based on the presence of a skeleton. Know that the skeleton in humans and some animals is used for movement, protection and support. To know that the muscular system in humans and some animals works with the skeleton for movement. To know the main bones in the body. To know that animals, including humans, need the right types and amount of nutrition. To understand that humans cannot make their own food and therefore eat to get the nutrition needed. To know the main nutrient groups (carbohydrates, protein, fats, fibre, vitamins, minerals and water) and their simple functions. To know that a balanced diet should include all nutrient groups. To describe the diets of different animals.</p>	<p>Skills:</p> <ul style="list-style-type: none"> • Use information about skeletons to group animals. • Record measurements of different bones and use the data to sort them into size order. • Describe some ways scientific research has improved the field of bionics/prosthetics, such as the choice of materials or linking their movement to muscles in the arm. • Find relevant data on food packaging and make numerical comparisons. • Summarise key information using secondary sources. • Describe some changes to scientific knowledge and jobs that require this information. 	<p>Vocabulary:</p> <p>Nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, joints, support, protect, move, skull, ribs, spine.</p>
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<p>Critical Content Statements:</p> <ul style="list-style-type: none"> • Humans and some animals have a skeleton that is used for movement, protection and support. • Humans and some animals have muscles which work with the skeleton to help us move. 	<p>Common Misconceptions Pupils May Have:</p> <p>Some pupils may think that</p> <ul style="list-style-type: none"> • Certain whole food groups like fats are “bad” for you • Certain specific foods like cheese are also “bad” for you • Diet and fruit drinks are “good” for you
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- **In the human skeleton there are many bones including the skull, spine, ribs, pelvis.**
- **Humans cannot make food in their body and so they must eat to get everything they need.**
- **Animals including humans need to eat the right food to stay healthy.**
- **Food contains nutrients.**
- **Carbohydrates and fats give us energy.**
- **Protein helps up to grow and repair our bodies.**
- **Fibre keeps our digestive system healthy.**
- **We need small amounts of lots of different vitamins and minerals.**
- **Water keeps our body hydrated.**
- **A balanced diet contains all these different nutrients.**

- **Snakes are like worms, so they must also be invertebrates**
- **Invertebrates have no form of skeleton**

Y3: Summer 1

Topic title: Plant Reproduction

Enquiry question: What are seeds? How do plants make seeds?

<p>Prior learning: Y2 Observe and describe how seeds and bulbs grow into mature plants Find out and describe how plants need light, water and a suitable temperature to grow and stay healthy.</p> <p>Future learning: Y5 Human timeline KS3 Reproduction in plants</p>	<p>Knowledge: Describe the structure and function of the parts of flowering plants. Know that water is transported within a plant from the root, through the stem, to the leaves. Know that plants need water, light, air, nutrients and a suitable temperature for growth and health. Understand that the needs for growth and health vary from plant to plant. Know the life cycle of a flowering plant from seed to mature plant. Know that flowers are the reproductive organ of a plant. Know that the process of pollination is the transfer of pollen to the female (part of the) flower. Know that the process of seed formation is the growth of a seed after pollination. Explain how seeds are dispersed and the benefits of each.</p>	<p>Skills:</p> <ul style="list-style-type: none"> • Pose relevant questions. • Design and record in results tables. • Plan a simple enquiry. • Complete, read and interpret data in a bar chart. • Identify and suggest changes to an enquiry. • Use results to draw conclusions. 	<p>Vocabulary:</p> <p>Photosynthesis, pollen, insect/wind pollination, male, female, seed formation, seed dispersal, wind dispersal, animal dispersal, water dispersal, air, nutrients, soil, absorb, transport.</p>
<p>Critical Content Statements:</p> <ul style="list-style-type: none"> • Plants need to right conditions to grow and be healthy. They need water, light, air, nutrients and a suitable temperature. • Most plants have roots, stem, leaves and flowers. • The roots get nutrients and water from soil. The stem holds up the plant. A plant uses its leaves to make food using sunlight. Flowers are used for reproduction and to make seeds. • Plants grow from seeds into seedlings and then become mature plants. • Pollination is when pollen from one plant is transferred to the flower of another plant. • Seeds are formed after a plant is pollinated. • Seeds can be dispersed in different ways such as by wind, animals or by water. 		<p>Common Misconceptions Pupils May Have: Some children may think that</p> <ul style="list-style-type: none"> • Plants eat food • Food comes from the soil via the roots • Flowers are merely decorative rather than a vital part of the life cycle in reproduction • Plants only need sunlight to keep them warm • Roots suck in water which is then sucked up the stem. 	

Y3: Summer 2

Topic title: Making connections

Enquiry question: Does hand span affect grip strength?

Prior learning:
this unit builds on learning from Year 3 units.

- Knowledge:**
- Recall key knowledge from previous units.
 - Apply knowledge in new contexts.

- Skills:**
- Carry out a full scientific enquiry.

Vocabulary:

bar chart, bone, carbohydrate, conclusion, evaluate, fat, flower, fruit, friction, grip strength, joint, light source, material, muscle, nutrition, opaque, predict, property, protein, seed, shadow, trustworthy, variable.