# Science Curriculum Knowledge and Working Scientifically Skills Progression Map: Southwold Primary School

| Science Units Overview | | | | | | |
|---|---|---|---|---|---|---|
| | Autumn | | Spring | | Summer | |
| | Autumn 1 | Autumn 2 | Spring 1 | Spring 2 | Summer 1 | Summer 2 |
| **EYFS** | **EYFS** children will explore science in concrete and meaningful ways. The expectations of outcomes depend on the age of the children (N1, N2 and F2). Children will explore science through a book-based curriculum and activities which flow from these stories. Where possible, real-life experiences will be created to enable authentic learning.<br><br>Children will learn about:<br>• The seasons and how this will bring about changes to our local environment and to the weather. Pupils will observe and name these changes.<br>• Children will learn about different habitats and the different animals that we can find there. They will compare and name differences and similarities.<br>• Children will explore how materials change through baking, colour mixing and Art and DT-projects. They will explore processes like freezing and melting, and lifecycles. Children will make observation and talk about what they see. Older children will do observational drawings.<br>• Children will learn about the importance of Healthy Living and Oral Hygiene.<br><br>At the end of Reception, children are measured against the Early Learning Goal Understanding the World and The Natural World.<br><br>Children at the expected level of development will:<br>• Explore the natural world around them, making observations and drawing pictures of animals and plants<br>• Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class<br>• Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter | | | | | |

| Biology | Chemistry | Physics |
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| | Autumn | | Spring | | Summer | |
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| | Autumn 1 | Autumn 2 | Spring 1 | Spring 2 | Summer 1 | Summer 2 |
| Year 1 | **Animals including Humans**<br>The Human Body L4-6<br>*Biology* | **Everyday Materials**<br>L1-6<br>*Chemistry* | **Animals including Humans**<br>Animal Grouping L1-3<br>*Biology* | **+ Caring for the planet WR**<br>*Sustainability*<br><br>**+ Seasonal changes**<br>What is Spring? L1<br>*Biology* | **Plants**<br>L1-8<br>*Biology* | + Growing and Cooking WR<br>Investigation<br>**Chemistry/Sustainability** |
| | **+ Seasonal Changes**<br>What is Autumn L3<br>*Biology* | **+ Seasonal changes**<br>What is winter? L4<br>*Biology* | **+ Plants – Winter WR**<br>Observe Changes<br>*Biology* | **+ Plants – Spring WR**<br>Observe Changes<br>*Biology* | **+ Plants – Summer WR**<br>Observe Changes<br>*Biology* | **+ Seasonal changes**<br>What is summer? L2 + L5-6<br>*Biology* |
| Year 2 | **Animals including Humans**<br>Survival/Groups L1-2<br>+ Y1 Recap<br>*Biology* | **Materials**<br>L1-5<br>*Chemistry*<br><br>**+ Plastic WR**<br>Investigation<br>*Sustainability* | **Plants (Light and Dark)**<br>Investigation<br>(L3 + Parts of Plant)<br>*Biology*<br><br>**Animals including Humans**<br>Exercise/Health L5-8<br>*Biology* | **Living Things and Their Habitats**<br>L1-6<br>*Biology* | **Plants (Bulbs and Seeds)**<br>L1-2, 4-5<br>*Biology* | **Animals Including Humans**<br>Growing Up/Life Cycles L3-4<br>*Biology*<br><br>**+ Wildlife WR**<br>Investigation<br>**Sustainability** |

# Science Curriculum Knowledge and Working Scientifically Skills Progression Map: Southwold Primary School

| | Autumn | | Spring | | Summer | |
|---|---|---|---|---|---|---|
| | Autumn 1 | Autumn 2 | Spring 1 | Spring 2 | Summer 1 | Summer 2 |
| Year 3 | **Animals including Humans** Skeletons/Movement/Nutrition + Diet L1-5 *Biology* | + **Food Waste WR** Investigation *Sustainability*<br>**Rocks and Soils** Rocks L1-4 *Chemistry* | **Rocks and Soils** Fossils + Soils L5-6 + investigation/experiment *Chemistry* | **Light** L1-6 *Physics* | **Plants** L1-6 *Biology* Check findings EOT | **Forces and Magnets** L1-6 *Physics*<br>+ **Biodiversity WR** Investigation *Sustainability* |
| Year 4 | **Living Things and Their Habitats** Classification/Data Collection L1-6 *Biology* *Revisit data collection on Invertebrates in Summer Forest School.* | **States of Matter** L1-7 **Chemistry** | **Sound** L1-7 *Physics* | **Electricity** L1-5 *Physics*<br>+ **Sustainability – Energy WR** Investigation *Sustainability* | **Living Things and Their Habitats** Invertebrates Investigation Revisit habitats and classification keys L3-6 – Forest School *Biology*<br>+ **Deforestation WR** Investigation *Sustainability* | **Animals including Humans** The Digestive System + Food Chains L1-5 *Biology* |

| | Autumn | | Spring | | Summer | |
|---|---|---|---|---|---|---|
| | Autumn 1 | Autumn 2 | Spring 1 | Spring 2 | Summer 1 | Summer 2 |
| Year 5 | **Forces** L1-6 *Physics* | **Earth and Space** L1-6 *Physics*<br>+ Global Warming WR Investigation **Sustainability** | **Properties of Materials** *Chemistry* | **Living Things and Their Habitats** L1-6 Life Cycles *Biology* | **Living Things and their Habitats** Sexual/Asexual Reproduction Plants - Investigation *Biology*<br>Reversible and Irreversible Changes Revisit Investigation *Chemistry* | **Animals including Humans** Human Life Cycle/Reproduction *Biology*<br>+ Plastic Pollution WR Investigation *Sustainability* |
| Year 6 | **Living Things and Their Habitats** L1-6 *Biology* | **Electricity** L1-5 *Physics*<br>+ Renewable Energy WR Investigation **Sustainability** | Light L1-6 **Physics**<br>+ Light Pollution WR Investigation **Sustainability** | **Animals including Humans** L1-6 *Biology* | SATs<br>**Evolution** | **Evolution** Variations/Adaptions/Fossils *Biology*<br>+ Themed Projects WR (Y7 Transition) |

# Science Curriculum Knowledge and Working Scientifically Skills Progression Map: Southwold Primary School

## Science curriculum overview – Substantive and Disciplinary knowledge

| National curriculum - Working scientifically skills – disciplinary knowledge (end point statements: KS1, Year 3&4, Year 5&6) | | National curriculum - substantive knowledge | | | | | |
|---|---|---|---|---|---|---|---|
| | | Autumn | | Spring | | Summer | |
| | | Autumn 1 | Autumn 2 | Spring 1 | Spring 2 | Summer 1 | Summer 2 |
| **Year 1** | Asking questions and recognise that they can be answered in different ways:<br>• Asking simple questions and recognising that they can be answered in different ways<br>Making observations and taking measurements:<br>• Observing closely, using simple equipment Engaging in practical enquiry to answer questions:<br>• Performing simple tests<br>• Identifying and classifying Recording and presenting evidence:<br>• Gathering and recording data to help in answering questions Asking questions and concluding:<br>• Using their observations and ideas to suggest answers to questions<br><br>*Non-statutory guidance: With help, begin to use simple scientific language to record and communicate their findings* | **Animals including humans**<br>• to identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense | **Everyday materials**<br>• to distinguish between an object and the material from which it is made<br>• to identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock<br>• to describe the simple physical properties of a variety of everyday materials<br>• to compare and group together a variety of everyday materials on the basis of their simple physical properties | **Animals including humans**<br>• to identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals<br>• to identify and name a variety of common animals that are carnivores, herbivores and omnivores<br>• to describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets) | **Seasonal changes**<br>• to observe changes across the 4 seasons<br>• to observe and describe weather associated with the seasons and how day length varies | **Plants**<br>• to identify and name a variety of common wild and garden plants, including deciduous and evergreen trees<br>• to identify and describe the basic structure of a variety of common flowering plants, including trees | **Seasonal changes**<br>• to observe changes across the 4 seasons<br>to observe and describe weather associated with the seasons and how day length varies<br><br>Pupils should use the local environment throughout the year to observe how plants grow. Pupils should use the local environment throughout the year to observe how plants grow. |
| | | **Seasonal changes**<br>• to observe changes across the 4 seasons<br>• to observe and describe weather associated with the seasons and how day length varies<br><br>Pupils should use the local environment throughout the year to observe how plants grow. | **Seasonal changes**<br>• to observe changes across the 4 seasons<br>• to observe and describe weather associated with the seasons and how day length varies<br><br>Pupils should use the local environment throughout the year to observe how plants grow. | **Plants**<br>• to identify and name a variety of common wild and garden plants, including deciduous and evergreen trees<br>• to identify and describe the basic structure of a variety of common flowering plants, including trees | **Plants**<br>• to identify and name a variety of common wild and garden plants, including deciduous and evergreen trees<br>• to identify and describe the basic structure of a variety of common flowering plants, including trees | **Plants**<br>• to identify and name a variety of common wild and garden plants, including deciduous and evergreen trees<br>• to identify and describe the basic structure of a variety of common flowering plants, including trees | |
| **Year 2** | These opportunities for working scientifically should be provided across years 1 and 2 so that the expectations can be met by the end of year 2. | **Animals includingHumans**<br>• notice that animals, including humans, have offspring which grow into adults<br>• find out about and describe the basic needs of animals, including humans, for survival (water, food and air)<br>• describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene | **Everyday materials**<br>• identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses<br>• find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching | **Plants**<br>• find out and describe how plants need water, light and a suitable temperature to grow and stay healthy<br><br>Pupils should use the local environment throughout the year to observe how plants grow.<br><br>**Animals including Humans**<br>describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene | **Living things and habitats**<br>• to explore & compare the differences between things that are living, dead, and things that have never been alive<br>• to identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other<br>• to identify and name a variety of plants and animals in their habitats, including microhabitats<br>to describe how animals obtain their food from plants and other animals, using the idea of a food chain, identify and name different sources of food | **Plants**<br>• observe and describe how seeds and bulbs grow into mature plants<br><br>Pupils should use the local environment throughout the year to observe how plants grow. | **Animals including Humans**<br>• notice that animals, including humans, have offspring which grow into adults<br>• find out about and describe the basic needs of animals, including humans, for survival (water, food and air) |

# Science Curriculum Knowledge and Working Scientifically Skills Progression Map: Southwold Primary School

## Science curriculum overview – Substantive and Disciplinary knowledge

| National curriculum - Working scientifically skills – disciplinary knowledge (end point statements: KS1, Year 3&4, Year 5&6) | | National curriculum - substantive knowledge | | | | | |
|---|---|---|---|---|---|---|---|
| | | Autumn | | Spring | | Summer | |
| | | Autumn 1 | Autumn 2 | Spring 1 | Spring 2 | Summer 1 | Summer 2 |
| Year 3 | Asking questions and recognise that they can be answered in different ways:<br>Asking simple questions and recognising that they can be answered in different ways<br>Making observations and taking measurements:<br>Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers<br><br>Engaging in practical enquiry to answer questions:<br>Setting up simple practical enquiries, comparative and fair tests<br>Recording and presenting evidence:<br>Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions<br>Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables<br>Asking questions and concluding:<br>Using straightforward scientific evidence to answer questions or to support their findings.<br>Identifying differences, similarities or changes related to simple scientific ideas and processes<br>Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions<br>Evaluating and raising further questions and predictions<br>Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions<br><br>Non-statutory guidance: Pupils should use relevant scientific language to discuss their ideas and communicate their findings.<br><br>These opportunities for working scientifically should be provided across years 3 and 4 so that the expectations can be met by the end of year 4. | **Animals including humans**<br>• identify that animals, including humans, need the right types and amount of nutrition, this comes from what they eat and that they cannot make their own food | **Rocks and fossils**<br>• to compare and group different kinds of rocks on the basis of appearance and simple physical properties<br>• to describe in simple terms how fossils are formed when things that have lived are trapped within rock<br>• to recognise that soils are made from rocks and organic matter | **Rocks and fossils**<br>• to compare and group different kinds of rocks on the basis of appearance and simple physical properties<br>• to describe in simple terms how fossils are formed when things that have lived are trapped within rock<br>• to recognise that soils are made from rocks and organic matter | **Lights and shadow**<br>• to recognise that they need light in order to see things<br>• to notice that light is reflected from surfaces<br>• to recognise that light from the sun can be dangerous<br>• to recognise that shadows are formed when the light from a light source is blocked by a solid object<br>• to find patterns in the way that size of shadows change | **Plants**<br>• identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers<br>• explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how<br>• they vary from plant to plant<br>• investigate the way in which water is transported within plants<br>• explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. | **Forces and magnets**<br>• to compare how things, move on different surfaces<br>• to notice that some forces need contact between 2 objects, but magnetic forces can act at a distance<br>• to observe how magnets, attract or repel each other<br>• to compare and group together materials on the basis of whether they are attracted to a magnet<br>• to describe magnets as having 2 poles<br>• to predict whether 2 magnets will attract or repel |
| Year 4 | | **Living things and habitats**<br>• to recognise that living things can be grouped in a variety of ways<br>• to explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment<br>• to recognise that environments can change and that this can sometimes pose dangers to living things | **States of matter**<br>• to compare and group solids, liquids and gases to observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)<br>• to identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature | **Sound**<br>• to identify how sounds are made, associating some of them with something vibrating<br>• to recognise that vibrations from sounds travel through a medium to the ear<br>• to find patterns between the pitch of a sound and features of the object that produced it<br>• to find patterns between the volume of a sound and the strength of the vibrations that produced it<br>• to recognise that sounds get fainter as the distance from the sound source increases | **Electricity**<br>• to identify common appliances that run on electricity<br>• to construct a simple circuit, naming its basic parts<br>• to identify whether a circuit is complete<br>• to recognise that a switch opens and closes a circuit<br>• to recognise some common conductors and insulators, and associate metals with being good conductors | **Living things and habitats**<br>• to recognise that living things can be grouped in a variety of ways<br>• to explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment<br>• to recognise that environments can change and that this can sometimes pose dangers to living things | **Human body – digestion and teeth**<br>• To describe the simple functions of the basic parts of the digestive system in humans<br>• To identify the different types of teeth in humans and their simple functions<br>• to construct and interpret a variety of food chains, identifying producers, predators and prey |

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| National curriculum - Working scientifically skills – disciplinary knowledge (end point statements: KS1, Year 3&4, Year 5&6) | | National curriculum - substantive knowledge | | | | | |
|---|---|---|---|---|---|---|---|
| | | Autumn | | Spring | | Summer | |
| | | Autumn 1 | Autumn 2 | Spring 1 | Spring 2 | Summer 1 | Summer 2 |
| Year 5 | Asking questions and recognise that they can be answered in different ways:<br>• Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary<br>Making observations and taking measurements:<br>• Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate<br>Engaging in practical enquiry to answer questions:<br>• Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary<br>Recording and presenting evidence:<br>• Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs<br>Asking questions and concluding:<br>• Identifying scientific evidence that has been used to support or refute ideas or arguments<br>• Reporting and presenting 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<br>Evaluating and raising further questions and predictions<br>• Reporting and presenting 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 | **Forces**<br>• to explain effects of air/water resistance and friction<br>• to recognise that some mechanisms allow a smaller force to have a greater effect (levers, pulleys and gears) | **Earth and Space**<br>• to describe the movement of the Earth and other planets relative to the sun in the solar system<br>• to describe the movement of the moon and Earth<br>• to describe the sun, Earth and moon as spherical<br>• to explain the process of day and night<br>• to explain that unsupported objects fall to Earth due to the force of gravity between Earth and the falling object | **Property of Materials**<br>• to compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets<br>• to know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution<br>• to use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating<br>• to give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic | **Living things and their habitats – Life Cycles**<br>• to describe changes as humans, develop to old age | **Living things – reproduction and plants**<br>• to describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird<br>• to describe the life process of reproduction in some plants and animals<br>**Property of Materials**<br>• to demonstrate that dissolving, mixing and changes of state are reversible changes<br>• to 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 bicarbonate of soda | **Animals including Humans – Human life cycle**<br>• describe the changes as humans develop to old age. |
| Year 6 | | **Living things – classification and micro-organisms**<br>• describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals<br>• give reasons for classifying plants and animals based on specific characteristics. | **Electricity**<br>• to associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit<br>• to compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches<br>• to use recognised symbols when representing a simple circuit in a diagram | **Light**<br>• to recognise that light appears to travel in straight lines<br>• to use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye<br>• to explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes<br>• to use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them | **Human body**<br>• to identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood<br>• to recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function<br>• to describe the ways in which nutrients and water are transported within animals, including humans | **Evolution and adaptation**<br>• to recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago<br>• to recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents<br>• to identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution | |

# Science Curriculum Knowledge and Working Scientifically Skills Progression Map: Southwold Primary School

Working Scientifically Guidance (non statutory from the National Curriculum)

**Year 1 & 2**
Pupils in years 1 and 2 should explore the world around them and raise their own questions. They should experience different types of scientific enquiries, including practical activities, and begin to recognise ways inwhich they might answer scientific questions.
They should use simple features to compare objects, materials and living things and, with help, decide how to sort and group them, observe changes over time, and, with guidance, they should begin to notice patternsand relationships.
They should ask people questions and use simple secondary sources to find answers.
They should use simple measurements and equipment (for example, hand lenses, egg timers) to gather data, carry out simple tests, record simple data, and talk about what they have found out and how they found itout. With help, they should record and communicate their findings in a range of ways and begin to use simple scientific language.
These opportunities for working scientifically should be provided across years 1 and 2 so that the expectations in the programme of study can be met by the end of year 2. Pupils are not expected to cover each aspectfor every area of study.

**Year 3 & 4**
Pupils in years 3 and 4 should be given a range of scientific experiences to enable them to raise their own questions about the world around them. They should start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions; recognise when a simple fair test is necessary and help to decide how to set it up; talk about criteria for grouping, sorting and classifying; and use simple keys. They should begin to look for naturally occurring patterns and relationships and decide what data to collect to identify them. They should help to make decisions about what observations to make, howlong to make them for and the type of simple equipment that might be used. They should learn how to use new equipment, such as data loggers, appropriately. They should collect data from their own observations and measurements, using notes, simple tables and standard units, and help to make decisions about how to record and analyse this data.
With help, pupils should look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions. With support, they should identify new questions arising from thedata, making predictions for new values within or beyond the data they have collected, and finding ways of improving what they have already done. They should also recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations.
Pupils should use relevant scientific language to discuss their ideas and communicate their findings in ways that are appropriate for different audiences.
These opportunities for working scientifically should be provided across years 3 and 4 so that the expectations in the programme of study can be met by the end of year 4. Pupils are not expected to cover each aspectfor every area of study.

**Year 5 & 6**
Pupils in years 5 and 6 should use their science experiences to: explore ideas and raise different kinds of questions; select and plan the most appropriate type of scientific enquiry to use to answer scientific questions;recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why. They should use and develop keys and other information records to identify, classify and describe living things and materials, and identify patterns that might be found in the natural environment.

They should make their own decisions about what observations to make, what measurements to use and how long to make them for, and whether to repeat them; choose the most appropriate equipment to make measurements and explain how to use it accurately. They should decide how to record data from a choice of familiar approaches; look for different causal relationships in their data and identify evidence that refutes orsupports their ideas. They should use their results to identify when further tests and observations might be needed; recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact.
They should use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas and should talk about how scientific ideas have developed over time.
These opportunities for working scientifically should be provided across years 5 and 6 so that the expectations in the programme of study can be met by the end of year 6. Pupils are not expected to cover each aspectfor every area of study.

# Science Curriculum Knowledge and Working Scientifically Skills Progression Map: Southwold Primary School

## Working Scientifically Skills Progression

| | EYFS | Year 1 & 2 | Year 3 & 4 | Year 5 & 6 |
|---|---|---|---|---|
| | | **Asking questions and recognise that they can be answered in different ways** | | |
| PLANNING | Choose resources needed for a chosen activity and say when help is or isn't needed. | Asking simple questions and recognising that they can be answered in different ways<br>• While exploring the world, the children develop their ability to ask questions (such as what something is, how things are similar and different, the ways things work, which alternative is better, how things change and how they happen). Where appropriate, they answer these questions.<br>• The children answer questions developed with the teacher often through a scenario.<br>• The children are involved in planning how to use resources provided to answer the questions using different types of enquiry, helping them to recognise that there are different ways in which questions can be answered. | Asking relevant questions and use different types of scientific enquiry to answer them<br>• While exploring the world, the children develop their ability to ask questions (such as what something is, how things are similar and different, the ways things work, which alternative is better, how things change and how they happen). Where appropriate, they answer these questions.<br>• The children answer questions developed with the teacher often through a scenario.<br>• The children are involved in planning how to use resources provided to answer the questions using different types of enquiry, helping them to recognise that there are different ways in which questions can be answered. | Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary<br>• Children independently ask scientific questions. This may be stimulated by a scientific experience or involve asking further questions based on their developed understanding following an enquiry.<br>• Given a wide range of resources the children decide for themselves how to gather evidence to answer a scientific question. They choose a type of enquiry to carry out and justify their choice. They recognise how secondary sources can be used to answer questions that cannot |
| DOING AND RECORDING | Represent own ideas, thoughts and feelings through design and technology, art, music, dance, role play and stories.<br><br>Select and use technology for particular purposes.<br><br>Explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function.<br><br>Make observations of animals and plants.<br><br>Know about similarities and differences in relation to places, objects, materials and living things. | **Making observations and taking measurements** | | |
| | | Observing closely, using simple equipment<br>• Children explore the world around them. They make careful observations to support identification, comparison and noticing change. They use appropriate senses, aided by equipment such as magnifying glasses or digital microscopes, to make their observations.<br>• They begin to take measurements, initially by comparisons, then using non-standard units. | Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers<br>• The children make systematic and careful observations.<br>• They use a range of equipment for measuring length, time, temperature and capacity. They use standard units for their measurements. | Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate<br>• The children select measuring equipment to give the most precise results e.g. ruler, tape measure or trundle wheel, force meter with a suitable scale.<br>• During an enquiry, they make decisions e.g. whether they need to: take repeat readings (fair testing); increase the sample size (pattern seeking); adjust the observation period and frequency (observing over time); or check further secondary sources (researching); in order to get accurate data (closer to the true value). |
| | | **Engaging in practical enquiry to answer questions** | | |
| | | Performing simple tests<br>• The children use practical resources provided to gather evidence to answer questions generated by themselves or the teacher. They carry out: tests to classify; comparative tests; pattern seeking enquiries; and make observations over time. | Setting up simple practical enquiries, comparative and fair tests<br>• The children select from a range of practical resources to gather evidence to answer questions generated by themselves or the teacher.<br>• They follow their plan to carry out: observations and tests to classify; comparative and simple fair tests; observations over time; and pattern seeking.<br><br>*Explanatory note:* | *Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary*<br>• The children select from a range of practical resources to gather evidence to answer their questions. They carry out fair tests, recognising and controlling variables. They decide what observations or measurements to make over time and for how long. They look for patterns and relationships using a suitable sample. |

# Science Curriculum Knowledge and Working Scientifically Skills Progression Map: Southwold Primary School

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| | | | *A comparative test is performed by changing a variable that is qualitative e.g. the type of material, shape of parachute. This leads to a ranked outcome.*<br>*A fair test is performed by changing a variable that is quantitative e.g. the thickness of the material or the area of the canopy. This leads to establishing a causative relationship.* | |
| | | Identifying and classifying<br>• Children use their observations and testing to compare objects, materials and living things. They sort and group these things, identifying their own criteria for sorting.<br>• They use simple secondary sources (such as identification sheets) to name living things. They describe the characteristics they used to identify a living thing. | | |
| | | Recording and presenting evidence | | |
| | | Gathering and recording data to help in answering questions<br>• The children record their observations e.g. using photographs, videos, drawings, labelled diagrams or in writing.<br>• They record their measurements e.g. using prepared tables, pictograms, tally charts and block graphs.<br>• They classify using simple prepared tables and sorting rings. | Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions<br>Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables<br>• The children sometimes decide how to record and present evidence. They record their observation e.g. using photographs, videos, pictures, labelled diagrams or writing. They record their measurements e.g. using tables, tally charts and bar charts (given templates, if required, to which they can add headings). They record classifications e.g. using tables, Venn diagrams, Carroll diagrams.<br>• Children are supported to present the same data in different ways in order to help with answering the question. | Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs<br>• The children decide how to record and present evidence. They record observations e.g. using annotated photographs, videos, labelled diagrams, observational drawings, labelled scientific diagrams or writing. They record measurements e.g. using tables, tally charts, bar charts, line graphs and scatter graphs. They record classifications e.g. using tables, Venn diagrams, Carroll diagrams and classification keys. Children present the same data in different ways in order to help with answering the question. |
| REVIEWING | Explain why some things occur and talk about changes.<br><br>Talk about the features of the immediate environment and how environments might vary from one another. | Answering questions and concluding | | |
| | | *Using their observations and ideas to suggest answers to questions*<br>• Children use their experiences of the world around them to suggest appropriate answers to questions. They are supported to relate these to their evidence e.g. observations they have made, measurements they have taken or information they have gained from secondary sources. | Using straightforward scientific evidence to answer questions or to support their findings.<br>• Children answer their own and others' questions based on observations they have made, measurements they have taken or information they have gained from secondary sources. The answers are consistent with the evidence. | Identifying scientific evidence that has been used to support or refute ideas or arguments<br>• Children answer their own and others' questions based on observations they have made, measurements they have taken or information they have gained from secondary sources. When doing this, they discuss whether other evidence e.g. from other groups, secondary sources and their scientific understanding, supports or refutes their answer.<br>• They talk about how their scientific ideas change due to new evidence that they have gathered.<br>• They talk about how new discoveries change scientific understanding. |
| | | *Using their observations and ideas to suggest answers to questions*<br>• The children recognise 'biggest and smallest', 'best and worst' etc. from their data. | Identifying differences, similarities or changes related to simple scientific ideas and processes<br>• Children interpret their data to generate simple comparative statements based on their evidence. They begin to identify naturally occurring patterns and causal relationships. | Reporting and presenting 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<br>• In their conclusions, children: identify causal relationships and patterns in the natural world from their evidence; identify results that do not fit the overall pattern; and explain their findings using their subject knowledge. |
| | | | Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions<br>• They draw conclusions based on their evidence and current subject knowledge. | |

# Science Curriculum Knowledge and Working Scientifically Skills Progression Map: Southwold Primary School

| | | | | |
|---|---|---|---|---|
| | | Evaluating and raising further questions and predictions | | |
| | | | *Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions*<br>• They identify ways in which they adapted their method as they progressed or how they would do it differently if they repeated the enquiry. | *Reporting and presenting 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*<br>• They evaluate, for example, the choice of method used, the control of variables, the precision and accuracy of measurements and the credibility of secondary sources used.<br>• They identify any limitations that reduce the trust they have in their data. |

# Science Curriculum Knowledge and Working Scientifically Skills Progression Map: Southwold Primary School

## Substantive knowledge Skills Progression (from ASE matrices)

National Curriculum statements in red are from other linked topics.

### Plants

| | |
|---|---|
| **Early learning goal** | • Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes. |
| **Year 1** | • Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees.<br>• Identify and describe the basic structure of a variety of common flowering plants, including trees. |
| **Year 2** | • Observe and describe how seeds and bulbs grow into mature plants.<br>• Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.<br>• Identify and name a variety of plants and animals in their habitats, including microhabitats. (Y2 - Living things and their habitats) |
| **Year 3** | • Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers.<br>• Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant.<br>• Investigate the way in which water is transported within plants.<br>• Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. |
| **Year 4** | • Recognise that living things can be grouped in a variety of ways. (Y4 - Living things and their habitats)<br>• Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. (Y4 - Living things and their habitats)<br>• Recognise that environments can change and that this can sometimes pose dangers to living things. (Y4 - Living things and their habitats) |
| **Year 5** | • Describe the life process of reproduction in some plants and animals. (Y5 - Living things and their habitats) |
| **Year 6** | • Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals. (Y6 - Living things and their habitats)<br>• Give reasons for classifying plants and animals based on specific characteristics. (Y6 - Living things and their habitats) |
| **KS3** | • Reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms. |

# Science Curriculum Knowledge and Working Scientifically Skills Progression Map: Southwold Primary School

## Living things and their habitats

| | |
|---|---|
| **Early learning goal** | • Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes. |
| **Year 1** | • Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. (Y1 - Plants)<br>• Identify and describe the basic structure of a variety of common flowering plants, including trees. (Y1 - Plants)<br>• Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. (Y1 - Animals including humans)<br>• Identify and name a variety of common animals that are carnivores, herbivores and omnivores. (Y1 - Animals including humans)<br>• Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). (Y1 – Animals, including humans)<br>• Observe changes across the four seasons. (Y1 - Seasonal change) |
| **Year 2** | • Explore and compare the differences between things that are living, dead, and things that have never been alive.<br>• Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other.<br>• Identify and name a variety of plants and animals in their habitats, including microhabitats.<br>• Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.<br>• Notice that animals, including humans, have offspring which grow into adults. (Y2 - Animals including humans) |
| **Year 3** | • Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. (Y3 - Plants) |
| **Year 4** | • Recognise that living things can be grouped in a variety of ways.<br>• Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.<br>• Recognise that environments can change and that this can sometimes pose dangers to living things.<br>• Construct and interpret a variety of food chains, identifying producers, predators and prey. (Y4 - Animals, including humans) |
| **Year 5** | • Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.<br>• Describe the life process of reproduction in some plants and animals. |
| **Year 6** | • Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals.<br>• Give reasons for classifying plants and animals based on specific characteristics.<br>• Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. (Y6 - Evolution and inheritance)<br>• Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. (Y6 - Evolution and inheritance) |
| **KS3** | • Reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems, menstrual cycle (without details of hormones), gametes, fertilisation, gestation and birth, to include the effect of maternal lifestyle on the foetus through the placenta.<br>• Reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms.<br>• Differences between species. |

## Animals, including humans

| | |
|---|---|
| **Early learning goal** | • Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes. |
| **Year 1** | • Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals.<br>• Identify and name a variety of common animals that are carnivores, herbivores and omnivores.<br>• Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets).<br>• Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. |
| **Year 2** | • Notice that animals, including humans, have offspring which grow into adults.<br>• Find out about and describe the basic needs of animals, including humans, for survival (water, food and air).<br>• Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.<br>• Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food. (Y2 - Living things and their habitats) |
| **Year 3** | • Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat.<br>• Identify that humans and some other animals have skeletons and muscles for support, protection and movement. |
| **Year 4** | • Describe the simple functions of the basic parts of the digestive system in humans.<br>• Identify the different types of teeth in humans and their simple functions.<br>• Construct and interpret a variety of food chains, identifying producers, predators and prey. |
| **Year 5** | • Describe the changes as humans develop to old age.<br>• Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. (Y5 - Living things and their habitats)<br>• Describe the life process of reproduction in some plants and animals. (Y5 - Living things and their habitats) |
| **Year 6** | • Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.<br>• Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.<br>• Describe the ways in which nutrients and water are transported within animals, including humans.<br>• Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals. (Y6 - Living things and their habitats)<br>• Give reasons for classifying plants and animals based on specific characteristics. (Y6 - Living things and their habitats) |
| **KS3** | • Reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems, menstrual cycle (without details of hormones), gametes, fertilisation, gestation and birth, to include the effect of maternal lifestyle on the foetus through the placenta.<br>• The consequences of imbalances in the diet, including obesity, starvation and deficiency diseases.<br>• The effects of recreational drugs (including substance misuse) on behaviour, health and life processes.<br>• The structure and functions of the gas exchange system in humans, including adaptations to function.<br>• The mechanism of breathing to move air in and out of the lungs.<br>• The impact of exercise, asthma and smoking on the human gas exchange system. |

## Seasonal changes

| | |
|---|---|
| **Early learning goal** | • Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes. |
| **Year 1** | • Observe changes across the four seasons.<br>• Observe and describe weather associated with the seasons and how day length varies. |
| **Year 2** | |
| **Year 3** | • Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. (Y3 - Light) |
| **Year 4** | |
| **Year 5** | • Use the idea of the Earth's rotation to explain day and night and the apparent movement of the Sun across the sky. (Y5 - Earth and space) |
| **Year 6** | |
| **KS3** | • The seasons and the Earth's tilt, day length at different times of year, in different hemispheres. |

## Evolution and inheritance

| | |
|---|---|
| **Early learning goal** | • Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes. |
| **Year 1** | |
| **Year 2** | • Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other. (Y2 - Living things and their habitats)<br>• Notice that animals, including humans, have offspring which grow into adults. (Y2 - Animals, including humans) |
| **Year 3** | • Describe in simple terms how fossils are formed when things that have lived are trapped within rock. (Y3 - Rocks)<br>• Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. (Y3 - Plants) |
| **Year 4** | • Recognise that environments can change and that this can sometimes pose dangers to living things. (Y4 - Living things and their habitats) |
| **Year 5** | • Describe the life process of reproduction in some plants and animals. (Living things and their habitats - Y5) |
| **Year 6** | • Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.<br>• Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.<br>• Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. |
| **KS3** | • Heredity as the process by which genetic information is transmitted from one generation to the next.<br>• A simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model.<br>• The variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection.<br>• Changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction. |

## Materials

| | |
|---|---|
| **Early learning goal** | • Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes. |
| **Year 1** | • Distinguish between an object and the material from which it is made.<br>• Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock.<br>• Describe the simple physical properties of a variety of everyday materials.<br>• Compare and group together a variety of everyday materials on the basis of their simple physical properties. |
| **Year 2** | • Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.<br>• Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. |
| **Year 3** | • Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. (Y3 - Rocks)<br>• Describe in simple terms how fossils are formed when things that have lived are trapped within rock. (Y3 - Rocks)<br>• Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials. (Y3 - Forces and magnets) |
| **Year 4** | • Compare and group materials together, according to whether they are solids, liquids or gases.<br>• Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C).<br>• Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.<br>• Recognise some common conductors and insulators, and associate metals with being good conductors. (Y4 - Electricity) |
| **Year 5** | • Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets.<br>• Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution.<br>• Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.<br>• Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.<br>• Demonstrate that dissolving, mixing and changes of state are reversible changes.<br>• 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 bicarbonate of soda. |
| **Year 6** | |
| **KS3** | • Chemical reactions as the rearrangement of atoms.<br>• Representing chemical reactions using formulae and using equations.<br>• Combustion, thermal decomposition, oxidation and displacement reactions.<br>• Defining acids and alkalis in terms of neutralisation reactions.<br>• The pH scale for measuring acidity/alkalinity; and indicators. |

## Rocks

| | |
|---|---|
| **Early learning goal** | • Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes. |
| **Year 1** | • Distinguish between an object and the material from which it is made. (Y1 - Everyday materials)<br>• Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. (Y1 - Everyday materials)<br>• Describe the simple physical properties of a variety of everyday materials. (Y1 - Everyday materials)<br>• Compare and group together a variety of everyday materials on the basis of their simple physical properties. (Y1 - Everyday materials) |
| **Year 2** | • Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. (Y2 - Uses of everyday materials) |
| **Year 3** | • Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties.<br>• Describe in simple terms how fossils are formed when things that have lived are trapped within rock.<br>• Recognise that soils are made from rocks and organic matter. |
| **Year 4** | |
| **Year 5** | |
| **Year 6** | • Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. (Y6 - Evolution and inheritance) |
| **KS3** | • The composition of the Earth.<br>• The structure of the Earth.<br>• The rock cycle and the formation of igneous, sedimentary and metamorphic rocks. |

## Sound

| | |
|---|---|
| **Early learning goal** | • Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes. |
| **Year 1** | • Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. (Y1 - Animals, including humans) |
| **Year 2** | |
| **Year 3** | |
| **Year 4** | • Identify how sounds are made, associating some of them with something vibrating.<br>• Recognise that vibrations from sounds travel through a medium to the ear.<br>• Find patterns between the pitch of a sound and features of the object that produced it.<br>• Find patterns between the volume of a sound and the strength of the vibrations that produced it.<br>• Recognise that sounds get fainter as the distance from the sound source increases. |
| **Year 5** | |
| **Year 6** | |
| **KS3** | • Waves on water as undulations which travel through water with transverse motion; these waves can be reflected, and add or cancel – superposition.<br>• Frequencies of sound waves, measured in Hertz (Hz); echoes, reflection and absorption of sound.<br>• Sound needs a medium to travel, the speed of sound in air, in water, in solids.<br>• Sound produced by vibrations of objects, in loud speakers, detected by their effects on microphone diaphragm and the ear drum; sound waves are longitudinal.<br>• Auditory range of humans and animals.<br>• Pressure waves transferring energy; use for cleaning and physiotherapy by ultra-sound.<br>• Waves transferring information for conversion to electrical signals by microphone. |

# Science Curriculum Knowledge and Working Scientifically Skills Progression Map: Southwold Primary School

## Forces

| | |
|---|---|
| **Early learning goal** | • Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes. |
| **Year 1** | |
| **Year 2** | • Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. (Y2 - Uses of everyday materials) |
| **Year 3** | • Compare how things move on different surfaces.<br>• Notice that some forces need contact between two objects, but magnetic forces can act at a distance.<br>• Observe how magnets attract or repel each other and attract some materials and not others.<br>• Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials.<br>• Describe magnets as having two poles.<br>• Predict whether two magnets will attract or repel each other, depending on which poles are facing. |
| **Year 4** | |
| **Year 5** | • Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.<br>• Identify the effects of air resistance, water resistance and friction, that act between moving surfaces.<br>• Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. |
| **Year 6** | |
| **KS3** | • Magnetic fields by plotting with compass, representation by field lines.<br>• Earth's magnetism, compass and navigation.<br>• Forces as pushes or pulls, arising from the interaction between two objects.<br>• Using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces.<br>• Moment as the turning effect of a force.<br>• Forces: associated with deforming objects; stretching and squashing – springs; with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion of air and water.<br>• Forces measured in Newtons, measurements of stretch or compression as force is changed. |

## Earth and space

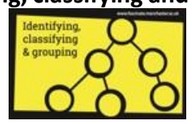
| | |
|---|---|
| **Early learning goal** | • Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes. |
| **Year 1** | • Observe changes across the four seasons. (Y1 - Seasonal changes)<br>• Observe and describe weather associated with the seasons and how day length varies. (Y1 - Seasonal changes) |
| **Year 2** | |
| **Year 3** | |
| **Year 4** | |
| **Year 5** | • Describe the movement of the Earth, and other planets, relative to the Sun in the solar system.<br>• Describe the movement of the Moon relative to the Earth.<br>• Describe the Sun, Earth and Moon as approximately spherical bodies.<br>• Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky. |
| **Year 6** | |
| **KS3** | • Gravity force, weight = mass x gravitational field strength (g), on Earth g=10 N/kg, different on other planets and stars; gravity forces between Earth and Moon, and between Earth and Sun (qualitative only).<br>• Our Sun as a star, other stars in our galaxy, other galaxies.<br>• The seasons and the Earth's tilt, day length at different times of year, in different hemispheres.<br>• The light year as a unit of astronomical distance. |

## Electricity

| | |
|---|---|
| **Early learning goal** | • Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes. |
| **Year 1** | |
| **Year 2** | |
| **Year 3** | |
| **Year 4** | • Identify common appliances that run on electricity.<br>• Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.<br>• Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery.<br>• Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.<br>• Recognise some common conductors and insulators, and associate metals with being good conductors. |
| **Year 5** | |
| **Year 6** | • Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.<br>• Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches.<br>• Use recognised symbols when representing a simple circuit in a diagram. |
| **KS3** | • Electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge.<br>• Potential difference, measured in volts, battery and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current.<br>• Differences in resistance between conducting and insulating components (quantitative).<br>• Static electricity. |

# Science Curriculum Knowledge and Working Scientifically Skills Progression Map: Southwold Primary School

## Working Scientifically Enquiry Types

| Research using secondary sources | Observation over time | Pattern seeking | Identifying, classifying and grouping | Comparative and Fair Testing |
|---|---|---|---|---|
|  |  |  |  |  |
| Using secondary sources of information to answer scientific questions. | Observing changes that occur over a period of time ranging from minutes to months. | Identifying patterns and looping for relationships in enquiries where variables are difficult to control. | Making observations to name, sort and organise items. | Changing one variable to see its effect on another, whilst keeping all others the same. |
| Pupils might use pictures, books, websites or information sheets that have been pre-prepared to help them to find out answers to questions about any area of science. They may visit a museum or talk to a visitor in school or parent about science.<br><br>Examples of research:<br><br>**Why is drinking salt water bad for humans?** Children could watch a film clip showing the effect of a salt solution on living cells.<br><br>**How do some animals manage to live in salty water?** Children could use a website to find out which animals are able to drink salt water and how they are able to do this.<br><br>**Can you explain some notable features of some of the bizarre creatures that can be found in the deep-sea? How do these features help them to survive?** Children could look at pictures in books or images easily obtained from the internet.<br><br>**Can you name all the planets in the Solar System?** Children could watch film clips or read texts in books or on websites to find out the answers. | All sorts of questions can be answered through observation over time. The period of time might be seconds, minutes, days or even months depending on the question asked.<br><br>Examples of observation of time:<br><br>**How do some materials change when they are heated?** Children may investigate what happens to chocolate when it is heated for a few minutes and then cooled.<br><br>**How do shadows change throughout the day?** Pupils might observe the shadow they cast at different times of the school day.<br><br>**Which drinks are bad for your teeth?** Pupils might observe egg shells in different liquids for a few days.<br><br>**What happens to frog spawn?** Children might observe tadpoles developing for a few weeks.<br><br>**What changes happen to a tree?** Pupils might visit the same tree every month for a complete year. | Pattern seeking often starts with a question about a possible link between two events or phenomena (variables).<br><br>You may start by asking the children 'I wonder whether the smallest ...' or 'I wonder if the largest. ..'<br><br>To answer these types of questions, children will need to collect data: observing, measuring and recording events or systems. Or, they could collect data from secondary sources such as images or texts. Pattern-seeking enquiries provide excellent opportunities for children to learn about habitats, adaptation, growth, staying healthy (diet, exercise, disease), the weather, rocks and soils and the the solar system.<br><br>**Examples of pattern seeking:**<br><br>**Where do daisies grow?** Children could count the number of daisies growing inside a hoop in different parts of the school grounds.<br><br>**Do the biggest apples have the most seeds?** Children could measure the mass or circumference of an apple and record the number of seeds inside.<br><br>**Where do we find the most woodlice?** Children could record the number of woodlice they find in different habitats.<br><br>**Can children with the longest legs run fastest?** There is often a child in the class who is smaller than average but can run faster than his/her peers. It is useful to find anomolies to these kinds of patterns and to discuss what other factors might be responsible for the effect. For example, this child may have more efficient muscles, larger lungs, do lots of sports.<br><br>**How do musical instruments produce low notes? Is there a pattern?** Pupils could look at the width of strings on a guitar, the number of holes covered on a recorder, or the volume of water in a glass bottle. | Children begin with this skill by performing simple grouping tasks, sorting items by simple observable features such as colours, shape and size. As children develop their knowledge of plants, animals and materials, they will sort and classify living things and materials using specific criteria. KS2 children may make charts or keys to help identify different animals and plants according to their observable features, and materials according to their properties.<br><br>Examples of identifying, grouping and classifying:<br><br>**Can you sort these materials? Explain how you have grouped them.** KS1 children may identify simple observable properties of materials such as hard/soft, rough/smooth, shiny/dull, whereas KS2 could compare and group materials according to transparency, electrical or thermal conductivity or solubility.<br><br>**How are sounds made by musical instruments?** Pupils could explore sounds made by string and wind instruments and identify and group the ways in which sounds are made. They could identify patterns, such as the thicker strings on a guitar produce the lower notes or shorter strings produce higher-pitched notes.<br><br>**How can we sort animals into groups?** KS1 children may group animals according to their appearance (e.g. number of legs, presence of fur or scales), their habitat (e.g. live in nest or a burrow), or their diet (carnivore, herbivores, omnivores). KS2 children with a greater knowledge of the features of vertebrate and invertebrate groups could identify and classify animals as fish, amphibians reptiles, birds, mammals or snails, slugs, worms, spiders and insects. | Fair test questions make comparisons, often trying to find out which is the 'best' or 'most.' Fair tests allow pupils to explore relationship between variables. A fair test identifies the causal relationship between two variables e.g. does the height of the ramp affect how quickly the toy car rolls down the ramp and everything else remains the same.<br><br>Comparative tests allow pupils to compare one event with another e.g. does the red car go faster than the green car?<br><br>**Example:** Consider a car rolling down a ramp.<br>**Ask:** What will affect how the car travels?<br>Possible variables: the height of the ramp, the surface of the ramp, what the wheels of the car are made from, the shape of the car, the mass of the car, whether the car is pushed.<br><br>**Comparative test:** If I change the car (the independent variable), what will happen to the distance the car travels (the dependent variable)?<br><br>**Fair test:** If I change the surface of the ramp (the independent variable), what will happen to the distance the car travels (the dependent variable)? |