

Year 1 Skills Progression for Science

Year 2 Skills Progression for Science

INTENT: At George Mitchell Primary we fully recognise the importance of science in every aspect of daily life. A high-quality science education gives our children the foundations to understand the world around us through scientific disciplines. This sense of awe and wonder built on first-hand experiences opens doors for a future in STEM careers and a life-long love of asking questions and seeking answers.

Our children develop the essential scientific enquiry skills to deepen their scientific knowledge, using a range of methods to communicate their scientific information, understanding the cross-curricular links science as a subject has to offer. They develop a respect for the materials and equipment they handle with regard to their own and other children's safety. Science learning at George Mitchell goes hand in hand with a growth mindset and a resilient attitude. Our children have a natural curiosity and feel confident trying different methods to get the desired result or to answer a question.

We pride ourselves on raising children's science capital, making sure they leave with a variety of first-hand practical experiences, a wide range of enrichment activities and quality factual and investigative learning both inside and outside of the classroom.

Breadth of Study	End Points	Breadth of Study	End Points
A1 plants/seasonal changes (seasonal changes should be spoken about and studied through-out the year)	<ul style="list-style-type: none"> Pupils can name over 10 common plants/trees with confidence and certainty. Understand the difference between deciduous and evergreen trees and how the Seasons affect the weather and plants/trees. Pupils can identify seasonal change as trances across the year and can identify general characteristics of seasons change. "it's hot in summer, it's cold in winter". Pupils can associate the changing seasons with a number of indicators. Children can name the 4 seasons and describe their characteristics in detail. Pupils can relate the weather typically associated with each season across a year and can give a numerical equivalence to the temperature of the seasons. Pupils can Explain how daylight hours may vary between mid-winter and mid-summer. Pupils describe appropriate clothing for the season. 	A1 everyday materials	<ul style="list-style-type: none"> Use knowledge to identify and group a range of everyday materials. Use their knowledge and understanding of materials to distinguish materials from objects. Pupils identify that materials can be used to make a number of different things. Pupils can give suggestions as to why a material would be suitable/unsuitable drawing on their prior knowledge of the properties of materials. Pupils can clearly explain the relationship between the properties of the materials and the function of the objects in scientific terms. Pupils could invent new material which has a number of useful properties and describe what purposes it could be used for.
A2 everyday materials	<ul style="list-style-type: none"> Pupils can identify a wide range of materials and their properties with certainty. Pupils can use this information to group a range of materials in different ways and describe the uses and suitability's of materials and can gather data and answer questions on this. 	A2 Animals including humans	<ul style="list-style-type: none"> Pupils match some parents and offspring, including human babies and adults and animals where parents and offspring look similar Pupils match a wider range of parents and offspring, including examples where parents and offspring look dissimilar Pupils demonstrate awareness of the lifecycles of a wider range of animals including examples where parents and offspring look dissimilar e.g. butterfly Pupils identify that animals, including humans, need water, food and air for survival . Pupils can identify and explain the signals they experience where feeling thirsty, hungry and out of breath. Pupils can give a

			<p>suggestion as to the health implications of a lack of food, water of air</p> <ul style="list-style-type: none"> • Pupils know that different animals require different amounts of food and water to survive. Pupils can describe why humans eat different types and amounts of food at different stages of development. • Describe the importance of exercise, balanced diet and hygiene for humans.
S1 animals inc humans	<ul style="list-style-type: none"> • Pupils can identify and classify up to 20 animals with certainty and identify the characteristics of those animals. • Pupils can describe the different types of things that animals eat and give an example of a meat-eater, a plant eater and a plant and meat eater. • Pupils can group common animals into groups by what they eat e.g. all cats are carnivores. • Pupils can accurately ascribe the terms carnivore, omnivore, or herbivore to most animals. Pupils can describe all common chordate animals as having an internal skeleton of bones covered by flesh with visible sense organs, eyes, ears, nose, tongue etc. • Pupils can correctly describe mammals and birds as warm blooded covered in fur and feathers, and fish, reptiles and amphibians as cold blooded and their skin type. • Using their observations pupils can describe most mammals, reptiles, amphibians as having four limbs and suggest animals that do not. • Pupils can identify all body parts accurately drawing and labelling pictures – associating the correct parts with one of the 5 senses. 	S1 living things and their Habitats	<ul style="list-style-type: none"> • Pupils can identify living/dead/things that have never been alive - identify 2-3 of the processes used to inform their sorting with prompting questions • Pupils match a range of animals and plants to the most appropriate habitats and give reasons with prompt questions • Match a range of animals and plants to the most appropriate habitat and give reasons with prompting questions • Draw and label a diagram of a simple food chain for a carnivorous animal and for a human meal • Draw and label a diagram of a simple food chain for a carnivorous animal and for a human meal
S2 -Plants	<ul style="list-style-type: none"> • Name up to 10 common plants/trees with little prompting • Name over 10 common plants/trees with confidence and certainty • Understand how plants relate to food stuffs • Name all common plants and trees via verbal/written labelling or pictures and diagrams. Ask simple questions and suggest labels for tricky examples. 	S2 -Plants	<ul style="list-style-type: none"> • Pupils give simple explanations why the plants in different conditions grow differently. • name, locate and describe the functions of the main parts of plants, including those involved in reproduction and transporting water and nutrients • use the observable features of plants, animals and micro-organisms to group, classify and identify them into broad groups, using keys or in other ways. • Pupils give simple explanations why the plants in different conditions grow differently

			<ul style="list-style-type: none"> name, locate and describe the functions of the main parts of plants, including those involved in reproduction and transporting water and nutrients Pupils can draw and label diagrams to record observations, record simple measurements of how seeds and bulbs grow. use the observable features of plants, animals and micro-organisms to group, classify and identify them into broad groups, using keys or in other ways
Questioning	Begin to form questions using a question stem.	With support suggest own questions for investigation	
Vocabulary	Use simple, limited vocabulary to discuss what they see and do.	Use a wide range of vocabulary to describe what they see and do and to name i.e. Plants, animals, materials.	
Planning	Suggest next steps or sequence of steps in a plan. With support, they can decide which questions can be answered practically and which cannot.	Can decide independently which questions can be answered practically and which cannot. With support can suggest the observations/measurements. They may need to make and spot when a plan may lead to an unfair test.	
Predicting	Suggest what they think might happen in a specific context in response to a prompt question	With support, they can sometimes predict what might happen during an investigation.	
Equipment	Being to choose appropriate equipment from a limited selection with support from an adult. Follow instructions for using equipment and correctly sometimes working with an adult.	Choose appropriate equipment, follow instructions for using the equipment correctly and safely sometimes working with an adult.	
Observing	Make simple observations of what happens as they explore and investigate. With the support that can take non-standard measurements.	With support can make relevant observations, take non-standard measurements. Link cause and effect while they are observing 'When they get hot, they melt.'	
Recording	Use drawings and labels to present evidence in different ways. With support using prepared simple tables and charts.	Use drawings and labels to present evidence. Use prepared tables and charts and block graphs	
Concluding	With support say if what had happened was what they expected, making simple comparisons. Describe simple observations of an object/objects or an event with support.	Say if what happened is what they expected. Describe what happened, making comparisons where appropriate.	
Explaining	When prompted to think further about what and why, they can sometimes give a simple explanation of what has happened, making links between cause and effect.	Sometimes explain why they think things have happened, sometimes linking their explanations to subject knowledge and reference to the real world. Begin to recognise the relationship between cause and effect in similar situations.	
Evaluating	With support, they can review their work recognising some of the difficulties they can encounter.	Review their work and recognise some of the difficulties they encountered.	
Mastery Achieved (date)			

Year 3 Skills Progression for Science

Year 4 Skills Progression for Science

INTENT: At George Mitchell Primary we fully recognise the importance of science in every aspect of daily life. A high-quality science education gives our children the foundations to understand the world around us through scientific disciplines. This sense of awe and wonder built on first-hand experiences opens doors for a future in STEM careers and a life-long love of asking questions and seeking answers.

Our children develop the essential scientific enquiry skills to deepen their scientific knowledge, using a range of methods to communicate their scientific information, understanding the cross-curricular links science as a subject has to offer. They develop a respect for the materials and equipment they handle with regard to their own and other children's safety. Science learning at George Mitchell goes hand in hand with a growth mindset and a resilient attitude. Our children have a natural curiosity and feel confident trying different methods to get the desired result or to answer a question.

We pride ourselves on raising children's science capital, making sure they leave with a variety of first-hand practical experiences, a wide range of enrichment activities and quality factual and investigative learning both inside and outside of the classroom.

Breadth of Study	End Points	Breadth of Study	End Points
A1 Rocks	<ul style="list-style-type: none"> Using own observations, pupils can compare and group rocks using a range of plausible criteria, not necessarily with accurate scientific vocabulary. Using own observations, pupils can compare and group rocks using a range of plausible criteria, not necessarily with accurate scientific vocabulary. Pupils know fossils only form in sedimentary rocks and can be describe in simple terms the chronology of the stages of fossilisation being. E.g initial entrapment. Pupils can describe that soils are a mixture of tiny particles of rock, dead plants and animals, air and water; the amount of which can vary. 	A1 Animals inc Humans	<ul style="list-style-type: none"> Describe the functions of the organs of the digestive system in terms of ingestion as taking in food; digestion as physically or chemically breaking food down into soluble nutrients; absorption as taking nutrients into the blood for transport and egestion as getting rid of undigested waste. Accurately ascribe the function of the four types of human teeth explaining how the structure and shape is adapted to the job it has. Pupils consistently and accurately construct food chains within a defined habitat, correctly identifying: the producer, specific predator/prey relationships and the top predator. Pupils add arrows to show energy flow within the food chain.
A2 Animals Inc humans	<ul style="list-style-type: none"> Pupils show an increased awareness of the adaptations of invertebrates and how they might be protected. E.g. exoskeletons, shells etc. and how not having a skeleton enables different movement. Pupils can identify the main food groups and explain the role of each food group in keeping the body healthy. Pupils apply their knowledge of the different food groups to planning a healthy menu and can explain the consequences for human health of not eating a balanced diet. 	A2 Sound	<ul style="list-style-type: none"> Pupils identify which part of a musical instrument 'make' noise, describing it as vibrating. Using a particle model can give reasons why little or no sound is heard when a bell is placed in a vacuum jar. Pupils use their knowledge and understanding of the patterns of pitch linked to physical properties of objects to design and or construct their own variable pitch musical instruments. Using particle model; pupils can give reasons why a bell that is muffled and then hit will not be as loud as a bell that is hit without a muffler. Pupils can suggest reasons why a car exhaust silencer works and what materials might be insides the silencer.

S1 Forces	<ul style="list-style-type: none"> • Pupils use their knowledge and understanding of magnets acting at a distance to explain the 'hanging paperclip' and then relate that to everyday situation like self-closing wardrobe doors. • Apply understanding to grips on tyres and shoes; skiing and ice-skating, etc. • can describe magnetism using correct scientific vocabulary and recognise that not just iron but steel, nickel and cobalt can be magnetic and will attract. • Question why and determine how to test to find out which metals are magnetic • Investigate a range of different shaped magnets identifying the correct pole when referred to a norm – explain when a bar magnet is halved it makes 2 magnets. • Pupils can accurately and consistently predict the outcome of placing the poles of know magnets together. 	S1 States of Matter	<ul style="list-style-type: none"> • Pupils can use knowledge of the physical properties of solids, liquids and gases to determine whether tricky substances such as mist, foams, gels pastes are solids, liquids and gases. • Pupils can use knowledge of the physical properties of solids, liquids and gases to determine whether tricky substances such as mist, foams, gels pastes are solids, liquids and gases. • From practical investigation and secondary research pupils construct a temperature scale mapping the melting the boiling points of a wide range of substances e.g. alcohol, mercury, water etc. • Pupils research or construct models to show how water is constantly evaporation and condensing in different local and geographical areas to set up the water cycle and weather patterns. Peoples can identify that: snow, sleet, hail and rain are all forms of condensed water.
S2 Light	<ul style="list-style-type: none"> • Recognise that the blocking of light by a solid object is what make a shadow and link this to the eclipses and other natural and everyday phenomena. • Use secondary sources to explore the consequences to eyesight and general health or prolonged exposure to sunlight. • Apply understanding to the use of reflectivity in everyday usage; bicycle reflectors, car mirrors, high –vis etc. • Recognise that translucent objects can also make a shadow but this might indistinct and less clear. • Apply this to statement such as, The higher the sun in the sky the shorter the shadow. 	S2 Living Things and Their Habitats	<ul style="list-style-type: none"> • Pupils can routinely and accurately ascribe plants and animals according to their taxonomic group e.g. chordate animals as mammals, reptiles, amphibian birds or fish. • pupils use interconnecting Venn diagrams or Carroll diagrams with two criteria to construct branched or number identification keys to sort animals and plants. • Pupils can explain that a number of different factors can affect the diversity or abundance of plants or animals growth and can ascribe these factors to the positive or negative influence of human activity.
S1 Plants	<ul style="list-style-type: none"> • Pupils can apply functions to more unusual plants such as cactus, deciduous trees etc. They can consider adaptations of a function such as leaves on a Venus fly trap. • Pupils recognise that plants globally have essential requirements for growth but these might be specially adapted. • Pupils link the transportation of water through a plant to the transportation of minerals. Pupils use the correct scientific vocabulary for the processes: germination, pollination, fertilisation and seed dispersal. 	S1 electricity	<ul style="list-style-type: none"> • Pupils can construct a comprehensive list of electrical appliances found in a wide range of situations; they can make comparative judgements into advantages and disadvantage using mains of battery power. • Pupils can independently, problem solve as necessary to consistently construct circuits that work carrying out simple investigations accurately recording and reporting their findings using correct scientific vocabulary. • pupils accurately and consistently predict the outcome using a wide variety of representations of series circuits. • Pupils can predict the electrical conductivity of a number of different materials including composite materials and use their knowledge and understand of conductivity to explain the structure of electrical component such as wires of switches.

Questioning	Suggest questions for own investigation	Ask questions independently and generate independent ideas to explore through scientific enquiry	
Vocabulary	Use more complex vocabulary to communicate their thinking about what they see and do, they sometimes link emerging ideas.	Use a variety of specific sentence vocabulary to communicate their thinking and explain knowledge	
Planning	With support can decide which questions can be answered using a comparative test and which need other methods. In investigation suggest what should be kept the same, suggest main steps for the enquiry	Begin to identify which questions can be answered using comparative tests and which need other methods, suggesting what these methods could be, In investigations identify what to keep the same, other variables and steps of the investigation	
Predicting	Begin to independently predict what may happen during an investigation.	Predict what will happen in an investigation and begin to suggest reasons why	
Equipment	Select appropriate equipment from a wider range, use basic equipment safely and accurately	Select appropriate equipment from a wider range, consider the degree of accuracy needed. Use equipment safely and accurately. Begin to deal with equipment failures independently	
Observing	Link cause and effect when making observations, make relevant observations through an enquiry and use standard measuring equipment for quantities.	Make accurate observations using scientific equipment. Link cause and effect when observing and making further predictions based on this. 'It melted because it is hot, if we put it back in the fridge it will freeze'	
Recording	Sometimes create their tables and charts, use diagrams and labels to present their findings.	More frequently independently create tables and graphs. Draw clear labelled diagrams to demonstrate observations.	
Concluding	Make general statements about patterns they have observed and from results. With support make further predictions from results.	Based on scientific results, independently make general statements about what they show and observations. Make further predictions from simple results.	
Explaining	Sometimes explain why they think things have happened which are linked to subject knowledge, referencing to the world around them. Provide explanations for simple patterns in results.	Explain why they think some has happened using subject knowledge or technical terms. Explanations will often link to specific examples.	
Evaluating	With support suggest how their enquiry could have been improved.	Suggest how their enquiries might be improved and begin to identify where inaccuracies can be in results.	
Mastery Achieved (date)			

Year 5 Skills Progression for Science	Year 6 Skills Progression for Science
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Breadth of Study	End Points	Breadth of Study	End Points
A1-Living Thing and Their Habitats	<ul style="list-style-type: none"> Pupils can accurately detail the life cycles of all types of animals comparing similarities and differences and making conclusions to the advantages and disadvantages of these differences. Pupils can accurately describe the processes of plant and animal sexual reproduction (also covered in jigsaw changing me) using the correct scientific vocab. Identify sexual components of flowering plants. 	A1-Evolution and Inheritance	<ul style="list-style-type: none"> Pupils can describe varying characteristics within breeds. Pupils compare fossils of different species within a genus supporting how the families have changed over time. Pupils consider a number of different adaptations and make links to them being essential for survival over rivals thus leading to evolution. Pupils consider a number of different adaptations and make links to them being essential for survival over rivals thus leading to evolution. Pupils consider a number of different adaptations and make links to them being essential for survival over rivals thus leading to evolution.
A2- Properties and Changing Materials	<ul style="list-style-type: none"> Pupils demonstrate a greater awareness that some properties will be categorised by intended use e.g a plastic ruler can be transparent and flexible but durable whereas glass is durable but brittle Pupils know that not all materials will dissolve whilst others do even if a discoloured solution is the result. Pupils can name examples of common materials that dissolve including such as things specifically designed to. Pupils can explain the process of evaporation to separate them and know that with addition heat the process can be accelerated. Explain using for example that separate sugar strands from chickpeas could be accomplished in 2 ways. 1) by sieving a dry mixture 2) adding water and filtering them using their knowledge of evaporation to recover sugar Pupils can relate reversible change to the water cycle and relate this to removal of salt from a solution created in a classroom using correct scientific vocabulary. Pupils can explain the processes of cooking in terms of mixing solids, liquids then heating to effect a permanent change. If bread is baked explain the effect of proving the dough prior to baking: bread mouldering or other food decay as chemical change. Pupils use a range of criteria justify choices of materials for particular uses, accurately and consistently explaining in terms of material properties. 	A2- All Living Things	<ul style="list-style-type: none"> Pupils write multi-step identification keys to classify an appropriate range of plants and animals Pupils explain their own methodologies of classification of animals or plants using more than one factor.

S1-Forces	<ul style="list-style-type: none"> • Explain with aid diagrams of observations, that objects that have mass will fall to the earth's surface once released. Explain the effect of gravitational force in terms of how it effects natural phenomena. • describe the effect of simple forces that involve contact (air and water resistance, friction), and others that act at a distance (magnetic forces, including those between like and unlike magnetic poles; and gravity • explain with reference to investigations that frictional force opposes motion in the form of either air, water or between two surfaces in contact. Explain with reference to annotated sketches and graphs of data that surfaces area has an effect on force due to friction. • describe the effect of simple forces that involve contact (air and water resistance, friction), and others that act at a distance (magnetic forces, including those between like and unlike magnetic poles; and gravity) • identify simple mechanisms, including levers, gears and pulleys that increase the effect of a force 	S1-Animals Inc Humans	<ul style="list-style-type: none"> • Pupils identify that materials carried by the blood using correct vocabulary • Pupils identify that materials carried by the blood using correct vocabulary • Pupils detail in scientific terms what is meant by a balanced diet and what the outcomes of having too much or too little of one particular food group might be.
S2-Earth and Space	<ul style="list-style-type: none"> • Describe the sun and moon as approximately spherical and the earth as an oblate spheroid. • Explain that looking directly at the sun is harmful and can damage the eye permanently. Using models or suitable secondary sources, demonstrate planetary motion with anticlockwise motion complete with an explanation of earth's axial spin. The Earth along with other planets orbit the sun with approximate concentric paths. • Describe the shapes and relative movements of the Sun, Moon, Earth and other planets in the solar system; and explain the apparent movement of the Sun across the sky in terms of the Earth's rotation and that this results in day and night. • Explain times of sunrise and sunset in graphs, and how shadows can assist in demonstrating the Sun's apparent movement. 	Summer 1-Light	<ul style="list-style-type: none"> • Pupils build/use more complex arguments with evidence from a number of sources to explain how light appears to travel in straight lines. • Pupils can use the idea that light travels in straight lines. • Pupils can suggest or devise demonstrations to show proof that light appears to travel in straight lines. • Pupils can use the idea that light from light sources or reflected like travels in straight lines and enters our eyes to explain how we see objects. • Pupils can adjust the relative positions of objects and light sources including placing them at different angles from the perpendicular to change the size and dimensions of shadows at will as in a puppet theatre. • Pupils can use the idea that light from light sources or reflected light to explain the formation of the shape and size of shadows.
S1 -Animals Including Humans	<ul style="list-style-type: none"> • Pupils construct a detailed timeline ascribing significant processes to the thresholds between one phase of development and another ie. The boundary between infant and child being the ability to walk. • Pupils construct a detailed timeline ascribing significant processes to the thresholds between one phase of development and another 	Summer 2 - Electricity	<ul style="list-style-type: none"> • Pupils accurately and consistently use standard symbols. Wires connecting components are drawn with straight lines • Pupils work systematically to design and investigate a circuit to fulfil a specific task by changing the position of components the total voltage of the switches or cells used in the circuit noting the

	ie. The boundary between infant and child being the ability to walk.		brightness of lamps or the loudness of buzzers. Recording and reporting their findings. <ul style="list-style-type: none"> Pupils work systematically to investigate the quantitative results of increasing the total voltage of the cells used in the circuit on the brightness of lamps or the loudness of buzzers, producing reliable and repeatable results.
Questioning	Ask questions and offer own ideas of a range of scientific enquiry. With support improve the focus of questions to clarify the scientific purpose	Ask questions and independently offer ideas for 'scientific' enquiry which have a clear scientific purpose Recognise scientific questions that do not yet have a definitive answer.	
Vocabulary	Choose the most appropriate scientific language to use to communicate their ideas about processes, phenomena	Use appropriate and mathematical and scientific conventions and terminology to communicate more abstract ideas in science.	
Planning	Know when to answer a question using a comparative test and when evidence should be generated in other ways i.e., research, log etc. Set up comparative tests controlling variables. With support consider whether to take repeat readings. Plan what to do in other types of enquiry	Independently identify appropriate methods to use to generate evidence. Recognise the significant variables in an investigation selecting the most suitable to investigate.	
Predicting	Predict outcomes, where appropriate sketch a graph showing expected patterns. Justify predictions with scientific knowledge.	Justify predictions using scientific knowledge and understanding.	
Equipment	Select the most appropriate equipment from a wide range, considering the degree of accuracy needed. Use equipment accurately and solve most equipment failures independently.	Choose appropriate equipment and explain why particular pieces of equipment or sources appropriate for questions or ideas been investigated.	
Observing	Make sets of observations or measurements as necessary. Make a series of observations that will add to the evidence collecting while investigating.	Describe what they are observing, including complicated sequences. Repeat sets of observations where suitable independently.	
Recording	Select the most appropriate way to present evidence, create own tables, bar charts and graphs including those for repeat readings.	Decide the most appropriate format to present scientific data, explaining why this is the most appropriate.	
Concluding	Make comparative statements about results, describe relationships between what has been observed and influencing factors, use scientific language effectively to demonstrate.	Interpret data in a variety of formats, recognising obvious inconsistencies. Draw valid conclusions that use more than one piece of evidence including numerical data.	
Explaining	Relate their explanations of patterns in results to scientific knowledge and make generalisations about what the evidence they have gathered may indicate.	Provide detailed explanations, clearly referencing their subject knowledge and understanding. Make suggestions for reasons behind anomalies in data.	

Evaluating	Suggest how much to trust their results. Explain why similar enquiries can give different results. Consider limitations to their evidence.	Identify how much to trust results and justify decisions. Evaluate the effectiveness of their methods making suggestions on how to improve them.
Mastery Achieved (date)		