

# Science Progression of Skills

## Working scientifically

	Characteristics of Effective Learning		Having their own ideas (creative thinking)			Making links (building theories)		
	<b>EYFS</b>	Show curiosity about objects, events and people Use senses to explore the world around them Initiate activities Seek challenge Take risks, engaging in new experiences, and learning by trial and error Show a deep drive to know more about people and their world Show high levels of involvement, energy, fascination Pay attention to details Show satisfaction in meeting their own goals		Use the language of thinking and learning: think, know, remember, forget, idea, makes sense, plan, learn, find out, confused, figure out, trying to do. Thinking of ideas that are new and meaningful to the child Playing with possibilities (what if? what else?) Visualising and imagining options Finding new ways to do things			Making links and noticing patterns in their experience Making predictions Testing their ideas Develop ideas of grouping, sequences, cause and effect Planning, making decisions about how to approach a task, solve a problem and reach a goal Flexibly changing strategy as needed Reviewing how well the approach worked	
<b>KS1 &amp; 2</b> ↓	Plan		Do			Review		
	Recognise the best type of enquiry to answer a question	Choose equipment, select tests, use secondary sources to decide how to obtain accurate observations and measurements	Obtain observations and measurements using equipment and/or secondary sources	Record observations and measurements	Present observations and measurements	Draw conclusions and make explanations	Evaluate the data collected	Evaluate the process used (including next steps)
<b>End of Year 1</b>	<i>With help and encouragement, I ask simple questions that begin with why, what if, how or when.</i>	<i>I make suggestions about how to do things when we plan a simple test.</i>	<i>With help, I use simple equipment and non-standard units to find things out.  I observe using my senses.</i>	<i>With help, I can gather and record data to help me answer my questions.</i>		<i>I talk about what happened and/or what I saw.</i>		<i>I talk about what I did.</i>
<b>Expected end of KS1</b>	I ask simple questions and recognise these questions can be answered in different ways.	<i>I decide with help, what to find out, observe or measure.</i>	I observe closely, using simple equipment <i>and non-standard units</i> .  I can identify and classify.  I can perform a simple test.	I gather data and record data to help me answer my questions.  <i>I record what I have found out using e.g. words or pictures, tables or simple prepared formats.</i>		I use my observations and ideas to suggest answers to my questions.		<i>I talk about how I found out what I found out.</i>
<b>End of Year 3</b>	<i>I can ask questions and I recognise that there are different types of enquiry.</i>	<i>I can set up a simple practical enquiry and I am beginning to understand how to make a test fair.  I make suggestions about what observations and measurements to make and what equipment I need.</i>	<i>I am beginning to make systematic and careful observations. I sometimes use standard units.  With help I can use information sources provided to find things out.</i>	<i>I gather data and using a pre-prepared table I can record data.  I record my findings using a drawing and/or words.</i>	<i>With help, I can present my data.</i>	<i>I can use my results when I talk about what happened.</i>		<i>I can talk about what went wrong!  I have ideas about what else I would like to find out.</i>
<b>Expected end of Lower KS2</b>	I ask relevant questions and use different types of scientific enquiries to answer them.	<i>I can set up simple practical enquiries, comparative or fair tests.  I decide what observations and measurements to make and what equipment to use.</i>	I use a range of equipment (including thermometers and dataloggers).  I make systematic and careful observations and take accurate measurements using standard units.  <i>I use information sources provided to find things out.</i>	I gather, record and classify data in a variety of ways to help me answer my questions.  I record my findings using simple scientific language, tables, drawings and labelled diagrams.	I present my data in a variety of ways <i>using e.g. Venn diagrams, bar charts, simple scatter graphs and keys.</i>	I use my results to draw simple conclusions and I make predictions for new values.  I communicate what I have found out using straightforward scientific ideas and I report my findings using oral and written explanations and displays.		I suggest improvements to the way I carried out the enquiry.  I suggest further questions to investigate.
<b>End of Year 5</b>	<i>I ask relevant questions (containing scientific knowledge and understanding) and with help I recognise which type of enquiry is best to answer a question.</i>	<i>I decide what observations and measurements to make (controlling variables with help where necessary) and what equipment to use to make my measurements and observations.</i>	<i>I use a range of equipment independently.  The series of observations and measurements I take are adequate for the task.  I use information sources provided to find things out.  I identify possible risks to myself and others.</i>	<i>I gather and record non-complex results (data and observations) using e.g. tables and scientific diagrams.</i>	<i>I present the results (data and observations) in a range of formats e.g. bar and line graphs, simple scatter graphs, keys and frequency charts.</i>	<i>I draw conclusions from my data and observations.  I begin to use basic scientific evidence to support or refute the ideas or arguments for my conclusion.</i>	<i>I look at my results and decide if any observations or measurements are unsuitable.</i>	<i>I use what I have found out to suggest improvements to my work giving reasons.  I can set up further questions to investigate.</i>
<b>Expected end of KS2</b>	<i>I ask relevant questions (containing scientific knowledge and understanding).  I recognise which type of enquiry is best to answer a question.</i>	I can plan different types of science enquiries to answer questions. I recognise and control variables where necessary.  <i>I decide what observations and measurements to make and what equipment to use (giving reasons) to make my measurements and observations.</i>	I take measurements, using a range of scientific equipment with increasing accuracy and precision.  I take repeat readings when appropriate.  <i>I use relevant information sources to find things out  I identify possible risks to myself and others.</i>	I record data and results of increasing complexity using e.g. scientific diagrams and labels and tables.  <i>I choose a method to suit the results, e.g. a two-column table.</i>	I present the data and results in suitable formats using e.g. line graphs, bar graphs, scatter graphs and classification keys.	From my data and observations, I draw valid conclusions (i.e. consistent with the evidence) including causal relationships.  I identify scientific evidence to support or refute the ideas or arguments for my conclusion.	<i>I look at my results and decide if any observations or measurements are unsuitable and need to be carried out again.  I offer simple explanations for differences in results.</i>	I use my test results to make predictions to set up further enquiries e.g. comparative and fair tests <i>and suggest how my working methods could be improved, with reasons.</i>

Key: National Curriculum *Non-statutory*

## Knowledge & Understanding

N	<b>The Natural World</b> - ask questions about aspects of their familiar world such as the place where they live or the natural world
N	<b>The Natural World</b> - talk about some of the things they have observed such as plants, animals, natural and found objects
N	<b>The Natural World</b> - talk about why things happen and how things work
N	<b>The Natural World</b> - start to develop an understanding of growth, decay and changes over time
N	<b>The Natural World</b> - show care and concern for living things and the environment
R	<b>The Natural World</b> - explore the natural world around them, making observations and drawing pictures of animals and plants
R	<b>The Natural World</b> - 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
R	<b>The Natural World</b> - understand some important processes and changes in the natural world around them, including the seasons and changing states of matter

1	<b>Seasonal changes</b> - observe changes across the four seasons
1	<b>Seasonal changes</b> - observe and describe weather associated with the seasons and how day length varies
1	<b>Plants</b> - identify and name a variety of common wild and garden plants, including deciduous and evergreen trees
1	<b>Plants</b> - identify and describe the basic structure of a variety of common flowering plants, including trees
2	<b>Plants</b> - observe and describe how seeds and bulbs grow into mature plants
2	<b>Plants</b> - find out and describe how plants need water, light and a suitable temperature to grow and stay healthy
1	<b>Animals</b> - identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals
1	<b>Animals</b> - identify and name a variety of common animals that are carnivores, herbivores and omnivores
1	<b>Animals</b> - describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets)
1	<b>Animals</b> - identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense
2	<b>Animals</b> - notice that animals, including humans, have offspring which grow into adults
2	<b>Animals</b> - find out about and describe the basic needs of animals, including humans, for survival (water, food and air)
2	<b>Animals</b> - describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene
1	<b>Everyday materials</b> - distinguish between an object and the material from which it is made
1	<b>Everyday materials</b> - identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock
1	<b>Everyday materials</b> - describe the simple physical properties of a variety of everyday materials
1	<b>Everyday materials</b> - compare and group together a variety of everyday materials on the basis of their simple physical properties
2	<b>Uses of everyday materials</b> - identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses
2	<b>Uses of everyday materials</b> - find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching
2	<b>Living things and their habitats</b> - explore and compare the differences between things that are living, dead, and things that have never been alive
2	<b>Living things and their habitats</b> - 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
2	<b>Living things and their habitats</b> - identify and name a variety of plants and animals in their habitats, including micro-habitats
2	<b>Living things and their habitats</b> - 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

3	<b>Animals, including humans</b> - identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get their nutrition from what they eat
3	<b>Animals, including humans</b> - identify that humans and some other animals have skeletons and muscles for support, protection and movement
3	<b>Plants</b> - identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
3	<b>Plants</b> - explore the requirements of plants for life and growth and how they vary from plant to plant
3	<b>Plants</b> - investigate the way in which water is transported within plants
3	<b>Plants</b> - explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal
3	<b>Rocks</b> - compare and group together different kinds of rocks on the basis of their appearance and simple physical properties
3	<b>Rocks</b> - describe in simple terms how fossils are formed when things that have lived are trapped within rock
3	<b>Rocks</b> - recognise that soils are made from rocks and organic matter
3	<b>Light</b> - recognise that they need light in order to see things and that dark is the absence of light
3	<b>Light</b> - notice that light is reflected from surfaces
3	<b>Light</b> - recognise that light from the Sun can be dangerous and that there are ways to protect their eyes
3	<b>Light</b> - recognise that shadows are formed when the light from a light source is blocked by a solid object
3	<b>Light</b> - find patterns in the way that the size of shadows change
3	<b>Forces</b> - compare how things move on different surfaces
3	<b>Forces</b> - notice that some forces need contact between two objects, but magnetic forces can act at a distance
3	<b>Forces</b> - observe how magnets attract or repel each other and attract some materials and not others
3	<b>Forces</b> - 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
3	<b>Forces</b> - describe magnets as having two poles
3	<b>Forces</b> - predict whether two magnets will attract or repel each other, depending on which poles are facing
4	<b>Living things and their habitats</b> - recognise that living things can be grouped in a variety of ways
4	<b>Living things and their habitats</b> - use classification keys to help group, identify and name a variety of living things in local & wider environment
4	<b>Living things and their habitats</b> - recognise that environments can change and that this can sometimes pose dangers to living things
4	<b>Animals, including humans</b> - describe the simple functions of the basic parts of the digestive system in humans
4	<b>Animals, including humans</b> - identify the different types of teeth in humans and their simple functions
4	<b>Animals, including humans</b> - construct and interpret a variety of food chains, identifying producers, predators and prey
4	<b>States of matter</b> - compare and group materials together, according to whether they are solids, liquids or gases
4	<b>States of matter</b> - 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
4	<b>States of matter</b> - identify part played by evaporation and condensation in water cycle and associate the rate of evaporation with temperature
4	<b>Sound</b> - identify how sounds are made, associating some of them with something vibrating
4	<b>Sound</b> - recognise that vibrations from sounds travel through a medium to the ear
4	<b>Sound</b> - find patterns between the pitch of a sound and features of the object that produced it
4	<b>Sound</b> - find patterns between the volume of a sound and the strength of the vibrations that produced it
4	<b>Sound</b> - recognise that sounds get fainter as the distance from the sound source increases
4	<b>Electricity</b> - identify common appliances that run on electricity
4	<b>Electricity</b> - construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers
4	<b>Electricity</b> - identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a loop with a battery
4	<b>Electricity</b> - recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit
4	<b>Electricity</b> - recognise some common conductors and insulators, and associate metals with being good conductors

5	<b>Living things and their habitats</b> - describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird
5	<b>Living things and their habitats</b> - describe the life process of reproduction in some plants and animals
5	<b>Animals, including humans</b> - describe the changes as humans develop to old age
5	<b>Properties and changes of materials</b> - 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
5	<b>Properties and changes of materials</b> - know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution
5	<b>Properties and changes of materials</b> - use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating
5	<b>Properties and changes of materials</b> - give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic
5	<b>Properties and changes of materials</b> - demonstrate that dissolving, mixing and changes of state are reversible changes
5	<b>Properties and changes of materials</b> - 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
5	<b>Earth and space</b> - describe the movement of the Earth, and other planets, relative to the Sun in the solar system
5	<b>Earth and space</b> - describe the movement of the Moon relative to the Earth
5	<b>Earth and space</b> - describe the Sun, Earth and Moon as approximately spherical bodies
5	<b>Earth and space</b> - use the idea of the Earth's rotation to explain day and night and the apparent movement of the Sun across the sky
5	<b>Forces</b> - explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object
5	<b>Forces</b> - identify the effects of air resistance, water resistance and friction, that act between moving surfaces
5	<b>Forces</b> - recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect
6	<b>Living things and their habitats</b> - 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
6	<b>Living things and their habitats</b> - give reasons for classifying plants and animals based on specific characteristics
6	<b>Animals, including humans</b> - identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood
6	<b>Animals, including humans</b> - recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function
6	<b>Animals, including humans</b> - describe the ways in which nutrients and water are transported within animals, including humans
6	<b>Evolution and inheritance</b> - recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago
6	<b>Evolution and inheritance</b> - recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents
6	<b>Evolution and inheritance</b> - identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution
6	<b>Light</b> - recognise that light appears to travel in straight lines
6	<b>Light</b> - 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
6	<b>Light</b> - 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
6	<b>Light</b> - use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them
6	<b>Electricity</b> - associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuits
6	<b>Electricity</b> - 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
6	<b>Electricity</b> - use recognised symbols when representing a simple circuit in a diagram