Science Progression at Emerson Valley School

National Curriculum

Lower key stage 2 programme of study

Working scientifically

During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- **asking relevant questions and using different types of scientific enquiries to answer them**
- **setting up simple practical enquiries, comparative and fair tests**
- **making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers**
- **gathering, recording, classifying and presenting data in a variety of ways to help in answering questions**
- **recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables**
- **reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions**
- **using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions**
- **identifying differences, similarities or changes related to simple scientific ideas and processes**
- **using straightforward scientific evidence to answer questions or to support their findings.**

Upper key stage 2 programme of study

Working scientifically

During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- **planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary**
- **taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate**
- **recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs**
- **using test results to make predictions to set up further comparative and fair tests**
- **reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations**
- **identifying scientific evidence that has been used to support or refute ideas or arguments**

	Year 3	Year 4	Year 5	Year 6
Working Scientifically	• I know how to ask relevant scientific questions. • I know how to use observations and knowledge to answer scientific questions. • I know how to set up a simple enquiry to explore a scientific question. • I know how to set up a test to compare two things. • I know how to set up a fair test and explain why it is fair. • I make careful and accurate observations, including the use of standard units. • I know how to use equipment, including thermometers and data loggers to make measurements. • I gather, record, classify and present data in different ways to answer scientific questions. • I know how to use diagrams, keys, bar charts and tables; using scientific language. • I know how to use findings to report in different ways, including oral and written explanations, presentation. • I know how to draw conclusions and suggest improvements. • I know how to make a prediction with a reason. • I know how to identify differences, similarities and changes related to an enquiry.	• I know how to ask relevant scientific questions. • I know how to use observations and knowledge to answer scientific questions. • I know how to set up a simple enquiry to explore a scientific question. • I know how to set up a test to compare two things. • I know how to set up a fair test and explain why it is fair. • I make careful and accurate observations, including the use of standard units. • I know how to use equipment, including thermometers and data loggers to make measurements. • I gather, record, classify and present data in different ways to answer scientific questions. • I know how to use diagrams, keys, bar charts and tables; using scientific language. • I know how to use findings to report in different ways, including oral and written explanations, presentation. • I know how to draw conclusions and suggest improvements. • I know how to make a prediction with a reason. • I know how to identify differences, similarities and changes related to an enquiry.	• I know how to plan different types of scientific enquiry. • I know how to control variables in an enquiry. • I measure accurately and precisely using a range of equipment. • I know how to record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. • I use the outcome of test results to make predictions and set up a further comparative and fair tests. • I report findings from enquiries in a range of ways. • I know how to explain a conclusion from an enquiry. • I explain causal relationships in an enquiry. • I know how to relate the outcome from an enquiry to scientific knowledge in order to state whether evidence supports or refutes an argument or theory. • I read, spell and pronounce scientific vocabulary accurately.	• I know how to plan different types of scientific enquiry. • I know how to control variables in an enquiry. • I measure accurately and precisely using a range of equipment. • I know how to record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. • I use the outcome of test results to make predictions and set up a further comparative and fair tests. • I report findings from enquiries in a range of ways. • I know how to explain a conclusion from an enquiry. • I explain causal relationships in an enquiry. • I know how to relate the outcome from an enquiry to scientific knowledge in order to state whether evidence supports or refutes an argument or theory. • I read, spell and pronounce scientific vocabulary accurately.

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Plants	• I know the function of different parts of flowing plants and trees. • I know what different plants need to help them survive. • I know how water is transported within plants. • I know the plant life cycle, especially the importance of flowers.			
Animals, including humans	• I know about the importance of a nutritious, balanced diet. • I know how nutrients, water and oxygen are transported within animals and humans. • I know about the skeletal system of a human. • I know about the muscular system of a human. • I know about the purpose of the skeleton in humans and animals.	• I identify and name the parts of the human digestive system. • I know the functions of the organs in the human digestive system. • I identify and know the different types of teeth in humans. • I know the functions of different human teeth. • I use food chains to identify producers, predators and prey. • I construct food chains to identify producers, predators and prey.	• I create a timeline to indicate stages of growth in humans.	• I identify and name the main parts of the human circulatory system. • I know the function of the heart, blood vessels and blood. • I know the impact of diet, exercise, drugs and life style on health. • I know the ways in which nutrients and water are transported in animals, including humans.
Rocks	• I compare and group rocks based on their appearance and physical properties, giving a reason. • I know how fossils are formed. • I know how soil is made. • I know about and explain the difference between sedimentary, metamorphic and igneous rock.			
Light	• I know what dark is (the absence of light). • I know that light is needed in order to see. • I know that light is reflected from a surface. • I know and demonstrate how a shadow is formed. • I explore shadow size and explain the changes. • I know the danger of direct sunlight and describe how to keep protected.			• I know how light travels. • I know and demonstrate how we see objects. • I know why shadows have the same shape as the object that casts them. • I know how simple optical instruments work, e.g. periscope, telescope, binoculars, mirror, magnifying glass etc.
Forces and Magnets		• I know about and describe how objects move on different surfaces. • I know how some forces require contact and some do not, giving examples. • I know about and explain how objects attract and repel in relation to objects and other magnets. • I predict whether objects will be magnetic and carry out an enquiry to test this out. • I know how magnets work. • I predict whether magnets will attract or repel and give a reason.	• I know what gravity is and its impact on our lives. • I identify and know the effect of air resistance. • I identify and know the effect of water resistance. • I identify and know the effect of friction. • I explain how levers, pulleys and gears allow a smaller force to have a greater effect.	

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Living Things and their habitats		• I group living things in different ways. • I use classification keys to group, identify and name living things. • I create classification keys to group, identify and name living things (for others to use). • I know how changes to an environment could endanger living things.	• I know the life cycle of different living things, e.g. mammal, amphibian, insect bird. • I know the differences between different life cycles. • I know the process of reproduction in plants. • I know the process of reproduction in animals.	• I classify living things into broad groups according to observable characteristics and based on similarities & differences. • I know how living things have been classified. • I give reasons for classifying plants and animals in a specific way.
States of matter		• I group materials based on their state of matter (solid, liquid, gas). • I know how some materials can change state. • I explore how materials change state. • I measure the temperature at which materials change state. • I know about the water cycle. • I know the part played by evaporation and condensation in the water cycle.		
Sound		• I know how sound is made. • I know how sound travels from a source to our ears. • I know how sounds are made, associating some of them with vibrating. • I know the correlation between pitch and the object producing a sound. • I know the correlation between the volume of a sound and the strength of the vibrations that produced it. I know what happens to a sound as it travels away from its source		
Electricity	• I identify and name appliances that require electricity to function. • I construct a series circuit. • I identify and name the components in a series circuit (including cells, wires, bulbs, switches and buzzers). • I know how to draw a circuit diagram. • I predict and test whether a lamp will light within a circuit. • I know the function of a switch in a circuit. • I know the difference between a conductor and an insulator; giving examples of each.			• I know how the number & voltage of cells in a circuit links to the brightness of a lamp or the volume of a buzzer. • I compare and give reasons for why components work and do not work in a circuit. • I draw circuit diagrams using correct symbols.

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Properties and Changes of Materials			• I compare and group materials based on their properties (e.g. hardness, solubility, transparency, conductivity, [electrical & thermal], and response to magnets). • I know how a material dissolves to form a solution; explaining the process of dissolving. • I know and show how to recover a substance from a solution. • I know how some materials can be separated. • I demonstrate how materials can be separated (e.g. through filtering, sieving and evaporating). • I know and can demonstrate that some changes are reversible, and some are not. • I know how some changes result in the formation of a new material and that this is usually irreversible. • I know about reversible and irreversible changes. • I give evidenced reasons why materials should be used for specific purposes.	
Earth and Space			• I know about and explain the movement of the Earth and other planets relative to the Sun. • I know about and explain the movement of the Moon relative to the Earth. • I know and demonstrate how night and day are created. • I describe the Sun, Earth and Moon (using the term spherical).	
Evolution and Inheritance				• I know how the Earth and living things have changed over time. • I know how fossils can be used to find out about the past. • I know about reproduction and offspring (recognising that offspring normally vary and are not identical to their parents). • I know how animals and plants are adapted to suit their environment. • I link adaptation over time to evolution. • I know about evolution and can explain what it is.