Year 5 Science Curriculum

WORKING SCIENTIFICALLY

Objective/Milestone	Basic	Advancing	Deep
L.O. TBAT plan enquiries, including recognising and controlling variables where necessary.	Generally, simple enquiries are planned. With support, variables are recognised and controlled where necessary. Questions to clarify what is being investigated are encouraged by a teacher.	Generally, simple enquiries are planned. Variables are recognised and controlled where necessary. Questions to clarify what is being investigated are encouraged by a teacher.	Enquiries are planned independently, including recognising and controlling variables where necessary. Questions to clarify what is being investigated are asked independently.
L.O. TBAT use appropriate techniques, apparatus, and materials during fieldwork and laboratory work.	Generally, equipment is selected and appropriate techniques, apparatus, and materials are beginning to be used during fieldwork and laboratory work.	Generally, appropriate techniques, apparatus and materials are used during fieldwork and laboratory work.	Appropriate techniques, apparatus and materials are used independently during fieldwork and laboratory work.
L.O. TBAT take measurements, using a range of scientific equipment, with increasing accuracy and precision.	With support, measurements are taken using a range of scientific equipment. With support, decisions are made as to what to measure or observe in order to answer a question.	Generally, measurements are taken, using a range of scientific equipment, with increasing accuracy and precision. Generally, decisions are made as to what to measure or observe in order to answer a question.	Without support, measurements are taken, using a range of scientific equipment, with increasing accuracy and precision. Independently, decisions are made as to what to measure or observe in order to answer a question.
L.O. TBAT record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs, and models.	With support, data is recorded using scientific diagrams and labels. With support, a line graph is used to record data and results.	Generally, data and results of increasing complexity are recorded using scientific diagrams and labels, classification keys, tables, bar and line graphs, and models. Generally, the most appropriate ways to present evidence and findings are selected. Observations, including those for repeat readings, are recorded using tables and bar charts. Points are plotted to make simple line graphs.	Without support, data and results of increasing complexity are recorded using scientific diagrams and labels, classification keys, tables, bar and line graphs, and models. Items
L.O. TBAT report findings from enquiries, including oral and written explanations of results, explanations involving causal relationships, and conclusions.	Observations, comparisons and measurements are recorded using tables, charts, text and labelled diagrams. With support, findings from enquiries are reported, including oral and written explanations of results and explanations. Scientific vocabulary is used to describe observations.	Findings from enquiries are reported, including oral and written explanations of results and explanations involving causal relationships, and conclusions.	Findings from enquiries are reported independently, including oral and written explanations of results and explanations involving causal relationships, and conclusions. Without support, the appropriate way to record and present evidence, including line graphs, is selected.
L.O.TBAT present findings in written form, displays and other presentations.	With support, findings are presented in written form and displays.	Generally, appropriate scientific language is used.	Well chosen scientific language is used without support.
L.O. TBAT use test results to make predictions to set up further comparative and fair tests. .	With prompts, test results are used to make predictions to set up further comparative and fair tests. Predictions of what might happen are made before tests are carried out. With prompts, reasons for predictions are suggested.	Generally, test results are used to make predictions and set up further comparative tests, reasons are suggested for these and previous knowledge is used where appropriate.	Predictions are made and justified by scientific knowledge and understanding. Predictions are presented in appropriate ways, e.g. a line graph can be sketched to show the expected patterns in results. Further predictions are made from results and these are used to test out the patterns found in relationships.

	L.O. TBAT use simple models to describe scientific ideas, identifying scientific evidence that has been used to support or refute ideas or arguments. [	With support, simple models are used to describe scientific ideas. With support, information is found from a variety of sources. With prompts or support, limitations of evidence are talked about.	Generally, simple models are used to describe scientific ideas, identifying scientific evidence that has been used to support or refute ideas or arguments.	Without support, models are used to describe scientific ideas, identifying scientific evidence that has been used to support or refute ideas or arguments. It is recognised that scientific ideas are based on evidence and that this comes from observations or data gathered. Selections from a range of sources of information are made without support. Appropriate scientific language and conventions are used independently to communicate quantitative (numbers and frequencies) and qualitative (observations and surveys) information.

Notes and guidance (non-statutory)

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 or supports 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.

Year 5 Science Curriculum

PROPERTIES AND CHANGES OF MATERIALS

Objective/Milestone	Basic	Advancing	Deep
L.O. TBAT compare and group together everyday materials based on evidence from comparative and fair tests, including their hardness, solubility, conductivity (electrical and thermal) and response to magnets.	With the support of a teacher, everyday materials are grouped together based on evidence from comparative and fair tests.	Generally, everyday materials are grouped together and compared based on evidence from comparative and fair tests.	Everyday materials are grouped together and compared independently and accurately based on evidence from comparative and fair tests.
L.O. TBAT understand how some materials will dissolve in liquid to form a solution and describe how to recover a substance from a solution.	There are the beginnings of an understanding of how some materials dissolve in liquid to form a solution and, with the support of a teacher, the method for recovering a substance from a solution is described.	Generally, it is understood how some materials dissolve in liquid to form a solution, and how to recover a substance from a solution can be described. The terms 'soluble' and 'insoluble' are used accurately. [16]	Without support, it is understood how some materials dissolve in liquid to form a solution and how to recover a substance from a solution is described. The terms 'soluble' and 'insoluble' are used accurately.
L.O. TBAT use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.	With the support of a teacher, knowledge of solids, liquids and gases is used to decide how mixtures might be separated. The processes of filtering, sieving and evaporating are beginning to be used and understood.	Knowledge of solids, liquids and gases is used to decide how mixtures might be separated, including through filtering, sieving and evaporating. [15] Knowledge is used to explain, for example, the water cycle. [15]	Without support, knowledge of solids, liquids and gases is used to decide how mixtures might be separated, including through filtering, sieving and evaporating.
L.O. TBAT give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.	With prompts, reasons are given, based on evidence from tests, for particular uses of everyday materials including metals, wood and plastic.	Generally, reasons are given, based on evidence from tests, for particular uses of everyday materials including metals, wood and plastic.	Without support, reasons are given, based on evidence from tests, for particular uses of everyday materials including metals, wood and plastic.
L.O. TBAT demonstrate that dissolving, mixing and changes of state are reversible changes.	It is beginning to be understood that some changes of state are reversible and, with the support of a teacher, this can be demonstrated through dissolving and mixing.	It is demonstrated that dissolving, mixing and changes of state are reversible changes.	Independently, it is demonstrated that dissolving, mixing and changes of state are reversible changes. Without support, knowledge of how a mixture can be separated is used to suggest ways in which other similar mixtures might be separated, e.g. salt and water, sand and water.
L.O. TBAT 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, oxidisation and the action of acid on bicarbonate of soda.	It is beginning to be understood that some changes result in the formation of new materials and that this kind of change is not usually reversible. Changes are beginning to be classified using the terms 'reversible' and 'nonreversible'.	Knowledge of reversible and nonreversible changes is used to make predictions about whether changes are reversible or not. Generally, it is understood 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, oxidisation and the action of acid on bicarbonate of soda.	Changes are described as reversible or non-reversible. Without support, it is understood 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, oxidisation and the action of acid on bicarbonate of soda.

Notes and guidance (non-statutory)

Pupils should build a more systematic understanding of materials by exploring and comparing the properties of a broad range of materials, including relating these to what they learnt about magnetism in year 3 and about electricity in year 4. They should explore reversible changes, including, evaporating, filtering, sieving, melting and dissolving, recognising that melting and dissolving are different processes. Pupils should explore changes that are difficult to reverse, for example, burning, rusting and other reactions, for example, vinegar with bicarbonate of soda. They should find out about how chemists create new materials, for example, Spencer Silver, who invented the glue for sticky notes or Ruth Benerito, who invented wrinkle-free cotton.

Note: Pupils are not required to make quantitative measurements about conductivity and insulation at this stage. It is sufficient for them to observe that some conductors will produce a brighter bulb in a circuit than others and that some materials will feel hotter than others when a heat source is placed against them. Safety guidelines should be followed when burning materials.

Pupils might work scientifically by: carrying out tests to answer questions, for example, 'Which materials would be the most effective for making a warm jacket, for wrapping ice cream to stop it melting, or for making blackout curtains?' They might compare materials in order to make a switch in a circuit. They could observe and compare the changes that take place, for example, when burning different materials or baking bread or cakes. They might research and discuss how chemical changes have an impact on our lives, for example, cooking, and discuss the creative use of new materials such as polymers, super-sticky and super-thin materials.

Year 5 Science Curriculum				
LIGHT	**Objective/Milestone**	**Basic**	**Advancing**	**Deep**
	L.O. TBAT understand that light appears to travel in straight lines.	With support, the fact that light appears to travel in straight lines is recognised.	Generally, it is recognised that light appears to travel in straight lines.	Without support, it is recognised that light appears to travel in straight lines.
	L.O. TBAT use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eyes.	With the support of a teacher, the idea that light travels in straight lines is used to explain that objects are seen because they give out or reflect light into the eyes.	The idea that light travels in straight lines is used to explain that objects are seen because they give out or reflect light into the eyes.	Independently, the idea that light travels in straight lines is used to explain that objects are seen because they give out or reflect light into the eyes.
	L.O. TBAT use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them, and to predict the size of shadows when the position of the light source changes.	With the support of a teacher, the idea that light travels in straight lines is used to explain why shadows have the same shape as the objects that cast them.	Generally, the idea that light travels in straight lines is used to explain why shadows have the same shape as the objects that cast them. [18] The size of shadows is predicted when the position of the light source changes.	The idea that light travels in straight lines is used to explain why shadows have the same shape as the objects that cast them. Without support, the size of shadows is predicted when the position of the light source changes. The experience of light is beginning to be extended by looking at a range of phenomena, including rainbows, colours on soap bubbles, objects looking bent in water, and coloured filters.
	L.O. TBAT explain that we see things because light travels from light sources to our eyes or from objects and then to our eyes.	With structured activities there is an awareness of how we see.	Generally, there is a good understanding of how we see. Explanations and diagrams are used to describe the process. [18]	Fluent, clear and concise explanations and diagrams describe the process of seeing.

Notes and guidance (non-statutory)

Pupils should build on the work on light in year 3, exploring the way that light behaves, including light sources, reflection and shadows. They should talk about what happens and make predictions.

Pupils might work scientifically by: deciding where to place rear-view mirrors on cars; designing and making a periscope and using the idea that light appears to travel in straight lines to explain how it works. They might investigate the relationship between light sources, objects and shadows by using shadow puppets. They could extend their experience of light by looking a range of phenomena including rainbows, colours on soap bubbles, objects looking bent in water and coloured filters (they do not need to explain why these phenomena occur).

Year 5 Science Curriculum

EARTH AND SPACE

Objective/Milestone	Basic	Advancing	Deep
L.O. TBAT describe the Sun, Earth and Moon as approximately spherical bodies.	The Sun, Earth and Moon are described as approximately spherical bodies.	Generally, the Sun, Earth and Moon are described as approximately spherical bodies.	Independently, the Sun, Earth and Moon are described as approximately spherical bodies.
L.O. TBAT use the idea of the Earth's rotation to explain day and night.	There are the beginnings of an understanding of how day and night are formed.	The idea of the Earth's rotation is used to explain day and night.	Without support, the idea of the Earth's rotation is used to explain day and night.
L.O.TBAT describe the movement of the Earth relative to the Sun in the solar system.	With the support of a teacher, the movement of the Earth relative to the Sun in the solar system is described.	Generally, the movement of the Earth relative to the Sun in the solar system is described.	The movement of the Earth relative to the Sun in the solar system is described independently.
L.O .TBAT describe the movement of the Moon relative to the Earth.	With support, the movement of the Moon relative to the Earth begins to be described.	Generally, the movement of the Moon relative to the Earth is described.	Without support, the movement of the Moon relative to the Earth is described.

Notes and guidance (non-statutory)

Pupils should be introduced to a model of the Sun and Earth that enables them to explain day and night. Pupils should learn that the Sun is a star at the centre of our solar system and that it has eight planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune (Pluto was reclassified as a 'dwarf planet' in 2006). They should understand that a moon is a celestial body that orbits a planet (Earth has one moon; Jupiter has four large moons and numerous smaller ones).
Note: Pupils should be warned that it is not safe to look directly at the Sun, even when wearing dark glasses.

Pupils should find out about the way that ideas about the solar system have developed, understanding how the geocentric model of the solar system gave way to the heliocentric model by considering the work of scientists such as Ptolemy, Alhazen and Copernicus.

Pupils might work scientifically by: comparing the time of day at different places on the Earth through internet links and direct communication; creating simple models of the solar system; constructing simple shadow clocks and sundials, calibrated to show midday and the start and end of the school day; finding out why some people think that structures such as Stonehenge might have been used as astronomical clocks.

Year 5 Science Curriculum				
LIVING THINGS IN THEIR HABITATS	**Objective/Milestone**	**Basic**	**Advancing**	**Deep**
	L.O .TBAT describe the differences in the life cycles of a mammal, amphibian, an insect and a bird.	With the support of a teacher, the life cycles common to a variety of animals including humans (birth, growth, development, reproduction and death) are described.	Generally, the life cycles common to a variety of animals, including humans (birth, growth, development, reproduction and death) are described.	There is a sound understanding and good knowledge of all basic life processes. Without support, the life cycles common to a variety of animals, including humans (birth, growth, development, reproduction and death) are described.
	L.O. TBAT describe the life process of reproduction in some plants and animals.	With support, the life processes of reproduction in some plants and animals are described.	Generally, the life processes of reproduction in some plants and animals are described.	Independently, the life processes of reproduction in some plants and animals are described.

Notes and guidance (non-statutory)

Pupils should study and raise questions about their local environment throughout the year. They should observe life-cycle changes in a variety of living things, for example, plants in the vegetable garden or flower border, and animals in the local environment. They should find out about the work of naturalists and animal behaviourists, for example, David Attenborough and Jane Goodall.

Pupils should find out about different types of reproduction, including sexual and asexual reproduction in plants, and sexual reproduction in animals.

Pupils might work scientifically by: observing and comparing the life cycles of plants and animals in their local environment with other plants and animals around the world (in the rainforest, in the oceans, in desert areas and in prehistoric times), asking pertinent questions and suggesting reasons for similarities and differences. They might try to grow new plants from different parts of the parent plant, for example, seeds, stem and root cuttings, tubers, bulbs. They might observe changes in an animal over a period of time (for example, by hatching and rearing chicks), comparing how different animals reproduce and grow.

Year 5 Science Curriculum				
ANIMALS INCLUDING HUMANS	**Objective/Milestone**	**Basic**	**Advancing**	**Deep**
	L.O. TBAT describe the changes as humans develop from birth to old age.	With support, the changes as humans develop from birth to old age are described.	Generally, the changes as humans develop from birth to old age are explained, using appropriate terminology.	The changes that take place as humans develop from birth to old age are explained in depth with appropriate terminology and examples given.

Notes and guidance (non-statutory)
Pupils should draw a timeline to indicate stages in the growth and development of humans. They should learn about the changes experienced in puberty. **Pupils could** work scientifically by researching the gestation periods of other animals and comparing them with humans; by finding out and recording the length and mass of a baby as it grows.