Year 6 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 6 Science Curriculum				
LIVING THINGS AND THEIR HABITATS	**Objective/Milestone**	**Basic**	**Advancing**	**Deep**
	L.O .TBAT relate knowledge of plants to studies of evolution and inheritance.	With the support of a teacher, knowledge of plants is beginning to be related to studies of evolution and inheritance.	Generally, knowledge of plants is related to studies of evolution and inheritance.	Without support, knowledge of plants is related to studies of evolution.
	L.O. TBAT describe how living things are classified into broad groups according to common observable characteristics. [10]	With the support of a teacher, living things are classified into broad groups. There is some awareness of similarities, differences, microorganisms, plants and animals.	Generally, broad groups are identified and used to classify living things. [10] The terminology of similarities, differences, micro-organisms and animals is generally used when describing groups.	Board groups to identify and classify living things are fully understood and used appropriately.
	L.O .TBAT describe how living things are classified into broad groups according to common observable characteristics. [10]	With structured activity, links are made between the classification of plants and animals and the reasons for their groupings.	Generally, suggestions are given as to how to classify plants and animals, with reasons given for the classification.	Reasons for classifying plants and animals are explained and justified.

Notes and guidance (non-statutory)
Pupils should build on their learning about grouping living things in year 4 by looking at the classification system in more detail. They should be introduced to the idea that broad groupings, such as micro-organisms, plants and animals can be subdivided. Through direct observations where possible, they should classify animals into commonly found invertebrates (such as insects, spiders, snails, worms) and vertebrates (fish, amphibians, reptiles, birds and mammals). They should discuss reasons why living things are placed in one group and not another. **Pupils might** find out about the significance of the work of scientists such as Carl Linnaeus, a pioneer of classification. **Pupils might work scientifically by:** using classification systems and keys to identify some animals and plants in the immediate environment. They could research unfamiliar animals and plants from a broad range of other habitats and decide where they belong in the classification system.

Year 6 Science Curriculum				
ANIMALS INCLUDING HUMANS (CIRCULATORY SYSTEM)	**Objective/Milestone**	**Basic**	**Advancing**	**Deep**
	L.O. TBAT identify and name the main parts of the human circulatory system, and explain the functions of the heart, blood vessels and blood.	With the support of a teacher, the main parts of the human circulatory system are identified and the most basic parts, e.g. heart and blood, can be named.	Generally, the main parts of the human circulatory system are identified and named, and the functions of the heart, blood vessels and blood, including the pulse and clotting, are explained. Scientific names are used for some major organs of body systems and the position of these in the human body can be located.	Independently, the main parts of the human circulatory system are identified and named, and the functions of the heart (including the chambers and the valve) and the blood vessels (veins, arteries) and blood (including the pulse and clotting) are explained. The main functions of the organs of the human body are described without support.
	L.O. TBAT recognise the importance of diet, exercise, drugs and lifestyle on the way the human body functions.	With the support of a teacher and structured activities, there is an awareness of how diet, exercise, drugs and lifestyle affect the human body functions.	Generally, there is a good understanding on the impact of diet, exercise, drugs and lifestyle on the body's major organs.	There is a fluent and full understanding that diet, exercise, drugs and lifestyle affects many aspects of how the human body functions. Examples are given related to a number of different scenarios.
	L.O.TBAT describe ways in which nutrients and water are transported within animals, including humans.	With the support of a teacher, there is an awareness that nutrients and water are transported within animals and humans.	Generally, there is a good understanding of water absorption, the circulatory system, sweating and urination.	With some fluency, comparisons of plants, animals and human water and nutrient transportation are made.

Notes and guidance (non-statutory)

Pupils should build on their learning from years 3 and 4 about the main body parts and internal organs (skeletal, muscular and digestive system) to explore and answer questions that help them to understand how the circulatory system enables the body to function.

Pupils should learn how to keep their bodies healthy and how their bodies might be damaged – including how some drugs and other substances can be harmful to the human body.

Pupils might work scientifically by: exploring the work of scientists and scientific research about the relationship between diet, exercise, drugs, lifestyle and health.

Year 6 Science Curriculum				
ELECTRICITY	**Objective/Milestone**	**Basic**	**Advancing**	**Deep**
	L.O. TBAT use recognised symbols when representing a simple circuit in a diagram.	With the support of a teacher, recognised symbols are used.	Generally, most recognised symbols are used appropriately.	Recognised symbols are known and used appropriately.
	L..O. TBAT associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.	With support, the brightness of a lamp or the volume of a buzzer is associated with the number and voltage of cells used in the circuit.	Generally, the brightness of a lamp or the volume of a buzzer is associated with the number and voltage of cells used in the circuit.	Independently, the brightness of a lamp or the volume of a buzzer is associated with the number and voltage of cells used in the circuit.
	L.O. TBAT 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.	Reasons are beginning to be given for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches.	With reminders, comparisons are made and reasons are given for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches.	Without support, comparisons are made and reasons are given for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches.

Notes and guidance (non-statutory)

Building on their work in year 4, pupils should construct simple series circuits, to help them to answer questions about what happens when they try different components, for example, switches, bulbs, buzzers and motors. They should learn how to represent a simple circuit in a diagram using recognised symbols.

Note: Pupils are expected to learn only about series circuits, not parallel circuits. Pupils should be taught to take the necessary precautions for working safely with electricity.

Pupils might work scientifically by: systematically identifying the effect of changing one component at a time in a circuit; designing and making a set of traffic lights, a burglar alarm or some other useful circuit.

Year 6 Science Curriculum

	Objective/Milestone	Basic	Advancing	Deep
EVOLUTION AND INHERITANCE	L.O. TBAT recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.	Generally, it is recognised that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.	It is recognised that living things produce offspring of the same kind, but that normally offspring vary and are not identical to their parents.	It is recognised independently that living things produce offspring of the same kind and explanations are beginning to be given as to why offspring vary and are not identical to their parents.
	L.O. TBAT recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.	With the support of a teacher and structured activities, there is an awareness that living things have changed over time.	Generally, there is an understanding that living things have changed over time. Examples are given and fossil evidence used to describe living things that inhabited the Earth millions of years ago.	A wide range of examples are given to describe how living things have changed over time. Clear, well-structured examples show how fossil evidence can tell us about life on Earth millions of years ago.
	L.O. TBAT identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.	With the support of a teacher, there is an awareness that different animals and plants are suited to different environments.	Generally, good examples of how different animals and plants are suited to different environments are given. There is an awareness of how adaptation may lead to evolution.	Demonstrate many examples that explain how different environments suit different animals and plants. The theory of evolution is explained in basic terms.

Notes and guidance (non-statutory)

Building on what they learned about fossils in the topic on rocks in year 3, pupils should find out more about how living things on earth have changed over time. They should be introduced to the idea that characteristics are passed from parents to their offspring, for instance by considering different breeds of dogs, and what happens when, for example, labradors are crossed with poodles. They should also appreciate that variation in offspring over time can make animals more or less able to survive in particular environments, for example, by exploring how giraffes' necks got longer, or the development of insulating fur on the arctic fox. Pupils might find out about the work of paleontologists such as Mary Anning and about how Charles Darwin and Alfred Wallace developed their ideas on evolution. Note: At this stage, pupils are not expected to understand how genes and chromosomes work.

Pupils might work scientifically by: observing and raising questions about local animals and how they are adapted to their environment; comparing how some living things are adapted to survive in extreme conditions, for example, cactuses, penguins and camels. They might analyse the advantages and disadvantages of specific adaptations, such as being on two feet rather than four, having a long or a short beak, having gills or lungs, tendrils on climbing plants, brightly coloured and scented flowers.

Year 6 Science Curriculum

	Objective/Milestone	Basic	Advancing	Deep
LIGHT	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).