Key Assessment Criteria

Being a scientist

The key assessment criteria for science have been devised in such a way that they can be applied in all settings, regardless of the agreed programme of study. These criteria allow teachers to assess how well children are developing as scientists.

Teachers may wish to supplement these key assessment criteria with other criteria if they feel that this adds value.

The criteria are linked to the statutory requirements of the programme of study. Teachers should use the non-statutory advice as it helps to broaden and enrich scientific learning and progress.

Coverage within the science National Curriculum

Department for Education

	Biology				Chemistry				Physics					
	Plants	Animals, including humans	Living things & habitats	Evolution & inheritance	Rocks	Everyday materials	Properties & changes of materials	States of matter	Light	Sound	Forces & magnets	Seasonal changes	Earth & space	Electricity
Yr 1	X	X				X						X		
Yr 2	X	X	X			X								
Yr 3	X	X			X				X		X			
Yr 4		X	X					X		X				X
Yr 5		X	X				X				X		X	
Yr 6		X	X	X					X					X

What the National Curriculum requires in science at KS1

Department for Education

Working scientifically

During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- Asking simple questions and recognising that they can be answered in different ways
- Observing closely, using simple equipment
- Performing simple tests
- Identifying and classifying
- Using their observations and ideas to suggest answers to questions
- Gathering and recording data to help in answering questions.

Working scientifically

What the National Curriculum requires in science at Y1

Department for Education

Plants

Pupils should be taught to:

- Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees
- Identify and describe the basic structure of a variety of common flowering plants, including trees.

Animals, including humans

Pupils should be taught to:

- Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals
- Identify and name a variety of common animals that are carnivores, herbivores and omnivores
- describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets)
- Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.

Biology

Everyday materials

Pupils should be taught to:

- Distinguish between an object and the material from which it is made
- Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock
- Describe the simple physical properties of a variety of everyday materials
- Compare and group together a variety of everyday materials on the basis of their simple physical properties.

Chemistry

Seasonal changes

Pupils should be taught to:

- Observe changes across the four seasons
- Observe and describe weather associated with the seasons and how day length varies.

Physics

What the National Curriculum requires in science at Y2

Department for Education

Living things and their habitats
Pupils should be taught to:
- Explore and compare the differences between things that are living, dead, and things that have never been alive
- 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
- Identify and name a variety of plants and animals in their habitats, including micro-habitats
- 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.

Plants
Pupils should be taught to:
- Observe and describe how seeds and bulbs grow into mature plants
- Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.

Animals, including humans
Pupils should be taught to:
- Notice that animals, including humans, have offspring which grow into adults
- Find out about and describe the basic needs of animals, including humans, for survival (water, food and air)
- Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.

Biology

Uses of everyday materials
Pupils should be taught to:
- Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses
- Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.

Chemistry

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.

Working scientifically

What the National Curriculum requires in science at Y3

Department for Education

Plants
Pupils should be taught to:
- Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
- Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant
- Investigate the way in which water is transported within plants
- Explore the part that flowers play in the life cycle

Animals, including humans
Pupils should be taught to:
- Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat
- Identify that humans and some other animals have skeletons and muscles for support, protection and movement

Biology

Rocks
Pupils should be taught to:
- Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties
- Describe in simple terms how fossils are formed when things that have lived are trapped within rock
- Recognise that soils are made from rocks and organic matter.

Chemistry

Light
Pupils should be taught to:
- Recognise that they need light in order to see things and that dark is the absence of light
- Notice that light is reflected from surfaces
- Recognise that light from the sun can be dangerous and that there are ways to protect their eyes
- Recognise that shadows are formed when the light from a light source is blocked by a solid object
- Find patterns in the way that the size of shadows change.

Forces and magnets
Pupils should be taught to:
- Compare how things move on different surfaces
- Notice that some forces need contact between two objects, but magnetic forces can act at a distance
- Observe how magnets attract or repel each other and attract some materials and not others
- 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
- Describe magnets as having two poles
- Predict whether two magnets will attract or repel each other, depending on which poles are facing.

Physics

What the National Curriculum requires in science at Y4

Department for Education

Living things and their habitats
Pupils should be taught to:
- Recognise that living things can be grouped in a variety of ways
- Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment
- Recognise that environments can change and that this can sometimes pose dangers to living things.

Animals, including humans
Pupils should be taught to:
- Describe the simple functions of the basic parts of the digestive system in humans
- Identify the different types of teeth in humans and their simple functions
- Construct and interpret a variety of food chains, identifying producers, predators and prey.

Biology

States of matter
Pupils should be taught to:
- Compare and group materials together, according to whether they are solids, liquids or gases
- 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 (°C)
- Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.

Chemistry

Sound
Pupils should be taught to:
- Identify how sounds are made, associating some of them with something vibrating
- Recognise that vibrations from sounds travel through a medium to the ear
- Find patterns between the pitch of a sound and features of the object that produced it
- Find patterns between the volume of a sound and the strength of the vibrations that produced it
- Recognise that sounds get fainter as the distance from the sound source increases.

Electricity
Pupils should be taught to:
- Identify common appliances that run on electricity
- Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers
- Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery
- Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit
- Recognise some common conductors and insulators, and associate metals with being good conductors.

Physics

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 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.

Working scientifically

What the National Curriculum requires in science at Y5

Department for Education

Living things and their habitats
Pupils should be taught to:
- Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird
- Describe the life process of reproduction in some plants and animals.

Animals, including humans
Pupils should be taught to:
- Describe the changes as humans develop to old age.

Biology

Earth and space
Pupils should be taught to:
- Describe the movement of the Earth, and other planets, relative to the Sun in the solar system
- Describe the movement of the Moon relative to the Earth
- Describe the Sun, Earth and Moon as approximately spherical bodies
- Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky

Forces
Pupils should be taught to:
- Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object
- Identify the effects of air resistance, water resistance and friction, that act between moving surfaces
- Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.

Physics

Properties and changes of materials
Pupils should be taught to:
- 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
- Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution
- Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating
- Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic
- Demonstrate that dissolving, mixing and changes of state are reversible changes
- 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.

Chemistry

What the National Curriculum requires in science at Y6

Department for Education

Living things and their habitats
Pupils should be taught to:
- 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
- Give reasons for classifying plants and animals based on specific characteristics.

Animals, including humans
Pupils should be taught to:
- Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood
- Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function
- Describe the ways in which nutrients and water are transported within animals, including humans.

Evolution and inheritance
Pupils should be taught to:
- Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago
- Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents
- Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.

Biology

Light
Pupils should be taught to:
- Recognise that light appears to travel in straight lines
- 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
- 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
- Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.

Electricity
Pupils should be taught to:
- Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit
- 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
- Use recognised symbols when representing a simple circuit in a diagram.

Physics

Science 2016: The expected standard

2016

In preparing for the new statutory assessment arrangements in 2016, the government has identified the bullet points below as the 'expected standard' in science by the end of Key Stage Two.

Working scientifically

- Recall and use appropriately terminology such as accurate, conclusion, evidence, fair test, method, observe, pattern, prediction, reliable, results, supports (evidence) and variable
- For a given task they can identify the most appropriate approach for answering scientific questions and select the most appropriate equipment and sources of evidence needed for a task
- Plan different types of scientific enquiry, make careful observations, take accurate measurements or readings using the appropriate units as required and identify when to repeat measurements, if necessary, to ensure given results are reliable
- Record, present and interpret data from different sources, using a range of methods, including tables, graphs (bar charts and line graphs), diagrams and keys
- Apply their understanding of scientific concepts to draw valid conclusions from data
- Use data to make predictions for missing values
- Identify or use evidence to support or refute ideas or arguments
- Recognise the validity and reliability of evidence and the difference between fact and opinion.

Science 2016: The expected standard

2016

In preparing for the new statutory assessment arrangements in 2016, the government has identified the bullet points below as the 'expected standard' in science by the end of Key Stage Two.

Biology

- Recall and use appropriately terminology such as adaptation, circulatory system, classification, consumer, evolution, function, germination, invertebrates, nutrients, pollination, predator, prey, producer, reproduction, seed dispersal and vertebrates
- Describe the processes involved in different stages of the flowering plant's life cycle and the function of different parts of flowering plants
- Describe how water and nutrients are transported in plants
- Compare the requirements of plants and animals to live and grow well
- Compare the similarities and differences between the life cycles of different animals (including humans and other mammals, birds, amphibians, and insects)
- Describe the functions of parts of the digestive system in animals
- Describe the functions of the main parts of the circulatory system (including the transport of nutrients and water) in animals
- Describe the functions of the skeleton and muscles in animals
- Describe the effects of diet, exercise, drugs and lifestyle on how our bodies function in the long and short term
- Construct and interpret food chains
- Use keys to group, classify or identify living things, and construct simple dichotomous keys
- Describe the main characteristics used to group plants, animals and micro-organisms according to the main groups (vertebrates, invertebrates, birds, mammals, reptiles, fish and amphibians) in the classification system
- Explain how a change in an environment may have an impact on living things
- Identify that there is variation between offspring and between offspring and their parents because of differences in inherited characteristics
- Describe how plants and animals have adapted to their environment and how this may have led to their evolution
- Describe how living things have changed over time and that fossils provide information about living things in the past.

Science 2016: The expected standard

2016

In preparing for the new statutory assessment arrangements in 2016, the government has identified the bullet points below as the 'expected standard' in science by the end of Key Stage Two.

Chemistry

- Recall and use appropriately terminology such as condensation, °C (degrees Celsius), evaporation, filtering, freezing, insoluble, melting, mixture, non-reversible, properties, reversible, solidifying, soluble and solution
- Compare the characteristics of different states of matter (solids, liquids and gases)
- Describe how materials can change state with reference to temperature, and explain everyday phenomena (including the water cycle) where changes of state occur
- Classify and group materials according to properties such as appearance (for rocks), hardness, solubility, transparency, conductivity and magnetism
- Describe the advantages and disadvantages for the uses of everyday materials based on an understanding of their properties using appropriate terminology
- Identify and recognise everyday phenomena where dissolving occurs
- Describe how to appropriately separate different mixtures of materials, including solutions
- Identify and compare reversible and non-reversible changes
- Describe in simple terms how fossils are formed
- Describe the composition of soil.

Science 2016: The expected standard

2016

In preparing for the new statutory assessment arrangements in 2016, the government has identified the bullet points below as the 'expected standard' in science by the end of Key Stage Two.

Physics

- Recall and use appropriately terminology such as air resistance, attraction, conductor, friction, gravity, insulator, newtons (N), opaque, orbit, pitch, repulsion, sphere, translucent, transparent, vibration, voltage, volume and water resistance
- Explain how we see other objects (from a single reflection) and represent this in simple diagrammatic form
- Explain shadow formation and how the size of shadows may change
- Explain how sounds are made and describe how they require a medium to travel through from the source to the ear
- Describe how volume can be changed with reference to vibration
- Describe how the features of an object determine the pitch of a sound
- Describe the shape of bodies (spheres) in the solar system and the movement of bodies in the solar system relative to each other
- Explain how day and night, including the apparent movement of the sun across the sky, are related to the Earth's rotation
- Draw or complete a simple series circuit diagram using recognised symbols including straight lines for wires
- Explain how changes made to a circuit can affect how it works
- Identify and describe the effects of contact and non-contact forces on moving and stationary objects
- Describe the effects of magnets on magnets and other materials
- Describe how simple pulleys, levers, springs and gears increase the effects of a force.

A Year 1 scientist

Working scientifically (Y1 and Y2)

- I know how to ask simple scientific questions.
- I know how to use simple equipment to make observations.
- I know how to carry out simple tests.
- I know how to identify and classify things.
- I know how to explain to others what I have found out.
- I know how to use simple data to answer questions

Biology

Plants

- I know and name a variety of common wild and garden plants.
- I know and name the petals, stem, leaves and root of a plant.
- I know and name the roots, trunk, branches and leaves of a tree.

Animals, including humans

- I know and name a variety of animals including fish, amphibians, reptiles, birds and mammals.
- I classify and know animals by what they eat (carnivore, herbivore and omnivore).
- I know how to sort animals into categories (including fish, amphibians, reptiles, birds and mammals).
- I know how to sort living and non-living things.
- I know how to name the parts of the human body that I can see.
- I know how to link the correct part of the human body to each sense.

Chemistry

Everyday materials

- I distinguish between an object and the material it is made from.
- I know the materials that an object is made from.
- I know the difference between wood, plastic, glass, metal, water and rock.
- I know about the properties of everyday materials.
- I group objects based on the materials they are made from.

Physics

Seasonal changes

- I observe and know about the changes in the seasons.
- I name the seasons and know about the type of weather in each season.

A Year 2 scientist

Working scientifically (Y1 and Y2)

- I know how to ask simple scientific questions.
- I know how to use simple equipment to make observations.
- I know how to carry out simple tests.
- I know how to identify and classify things.
- I know how to explain to others what I have found out.
- I know how to use simple data to answer questions

Biology

Living things and their habitats
- I identify things that are living, dead and never lived.
- I know how a specific habitat provides for the basic needs of things living there (plants and animals).
- I identify and name plants and animals in a range of habitats.
- I match living things to their habitat.
- I know how animals find their food.
- I name some different sources of food for animals.
- I know and can explain a simple food chain.

Plants
- I know how seeds and bulbs grow into plants.
- I know what plants need in order to grow and stay healthy (water, light & suitable temperature).

Animals, including humans
- I know the basic stages in a life cycle for animals, including humans.
- I know what animals and humans need to survive.
- I know why exercise, a balanced diet and good hygiene are important for humans.

Chemistry

Uses of everyday materials
- I identify and name a range of materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard.
- I know why a material might or might not be used for a specific job.
- I know how materials can be changed by squashing, bending, twisting and stretching.

Physics

No content

A Year 3 scientist

Working scientifically (Y3 and Y4)

- 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.

Biology

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.

Chemistry

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.

Physics

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.

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.

A Year 4 scientist

Working scientifically (Y3 and Y4)

- 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.

Biology

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.

Animals, including humans

- 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.

Chemistry

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.

Physics

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.

A Year 5 scientist

Working scientifically (Y5 and Y6)

- 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.

Biology

Living things and their habitats

- 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.

Animals, including humans

- I create a timeline to indicate stages of growth in humans.

Chemistry

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.

Physics

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).

Forces

- 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.

A Year 6 scientist

Working scientifically (Y5 and Y6)

- 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.

Biology

Living things and their habitats
- 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.

Animals, including 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.

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.

Chemistry

No content

Physics

Light
- 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.

Electricity
- 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.

Explaining Working Scientifically – Year 1

	Examples (Typically Year 1)

• I know how to ask simple scientific questions.	• I ask questions such as:
	  • Why are flowers different colours?
	  • Why do some animals eat meat and others not?

• I know how to use simple equipment to make observations.	• I use a hand lens to see things more clearly. • I use binoculars to help me see animals that are in the distance.
• I know how to carry out simple tests.	• I set up a test to see which materials keeps things warmest. • I know if my test has been successful and can say what I have learned.
• I know how to identify and classify things.	• I group things according to a criteria I have been asked to consider, e.g., animals and plants.
• I know how to explain to others what I have found out.	• I explain to someone what I have learnt from an investigation I have been involved with. • I draw conclusions from the answers to the questions I have asked.
• I know how to use simple data to answer questions.	• I use measures (within Year 1 mathematical limits) to help me find out more about the investigations I am considering.

Explaining Working Scientifically – Year 2

	Examples (Typically Year 2)

• I know how to ask simple scientific questions.	• I ask questions such as:
	  • Why do some trees lose their leaves in Autumn and others do not?
	  • How long are roots of tall trees?
	  • Why do some animals have underground habitats?

• I know how to use simple equipment to make observations.	• I use equipment such as thermometers and rain gauges to help observe changes to my local environment as the year progresses. • I use microscopes that have been created for my age group to find out more about small creatures and plants.
• I know how to carry out simple tests.	• With help, I find out how old a tree is. • I know how to set up a fair test and do so when finding out about how seeds grow best.
• I know how to identify and classify things.	• I group things according to a given criteria, e.g., deciduous and coniferous trees. • I classify items such as toys according to the materials used to make them.
• I know how to explain to others what I have found out.	• I explain to someone why my investigation is fair. • I draw conclusions from my fair tests and can explain what I have found out.
• I know how to use simple data to answer questions.	• I use measures (within Year 2 mathematical limits) to help me find out more about the investigations I am engaged with.

Explaining Working Scientifically – Year 3 (Part 1)

I know how to ask relevant scientific questions.	• I ask questions such as:
	  • Why does the moon appear in different shapes in the night sky?
	  • Why does my shadow change during the day?
	  • Where does a fossil come from?

I Know how to use observations and knowledge to answer scientific questions.	• I observe at what time of day my shadow is likely to be at its longest and shortest. • I observe which type of plants grow in different places, e.g., bluebells in woodland, roses in domestic gardens, etc.
I know how to set up a simple enquiry to explore a scientific question.	• I use research to find out how reflection can help me see things that are around the corner. • I use research to find out what the main differences are between sedimentary and igneous rocks
I know how to set up a test to compare two things.	• I test to see which type of soil is most suitable when growing two similar plants. • I test to see if my right hand is as efficient as my left hand.
I know how to set up a fair test and explain why it is fair.	• I set up a fair test with different variables, e.g., the best conditions for a plant to grow. • I explain to my partner why a test I have set up is a fair one, e.g., lifting weights with my right and left hand.
I know how to make careful and accurate observations, including the use of standard units.	• I measure carefully (taking account of mathematical knowledge up to Year 3) and add to my scientific learning.
I know how to use equipment, including thermometers and data loggers to make measurements.	• I use a data logger to check on the lightness and darkness of a room. • I use a thermometer to measure temperature and know there are two main scales used to measure temperature.

Working Scientifically – Year 3 (Part 2)

I know how to gather, record, classify and present data in different ways to answer scientific questions.	• I gather and record information using a chart, matrix or tally chart, depending on what is most sensible. • I group information according to common factors, e.g., plants that grow in woodlands or plants that grow in our gardens.
I know how to use diagrams, keys, bar charts and tables; using scientific language.	• I use bar charts and other statistical tables (in line with Year 3 mathematics statistics) to record my findings. • I know how to use a key to help me understand information presented on a chart. • I use correct scientific language when presenting information.
I know how to use findings to report in different ways, including oral and written explanations, presentation.	• I am confident enough to stand in front of others and explain what I have found out, for example about how the moon changes shape or how fossils help us to understand more about our planet. • I present my findings using written explanations and include diagrams when needed. • I work with a small group to present findings to others in the class.
I know how to draw conclusions and suggest improvements.	• I make sense of my findings and draw conclusions which helps me understand more about scientific information. • I make suggestions about how things could be improved.
I know how to make a prediction with a reason.	• When I make a prediction there is a plausible reason as to why I have done so. • I am able to amend my prediction according to my findings.
I know how to identify differences, similarities and changes related to an enquiry.	• I understand why the joints in my body need to be different even though they do a similar job. • I understand why the day and night are different lengths at different times of the year. • I am prepared to change my ideas as a result of what I have found out during a scientific enquiry.

Explaining Working Scientifically – Year 4 (Part 1)

I know how to ask relevant scientific questions.	• I ask questions such as:
	  • Why are steam and ice the same thing?
	  • Why is liver important in our digestive systems?
	  • What do we mean by 'pitch' when it comes to sound?

I Know how to use observations and knowledge to answer scientific questions.	• I notice that the further away you are from the source of sound the quieter the sound becomes. • I notice that on sunny days puddles on the playground disappear much quicker than they do on dull days.
I know how to set up a simple enquiry to explore a scientific question.	• I use research to find out how much time it takes to digest most of our food. • I use research to find out which materials make effective conductors and insulators of electricity.
I know how to set up a test to compare two things.	• I test to see which of two instruments make the highest or lowest sounds. • I test to see if a glass of ice weighs the same as a glass of water.
I know how to set up a fair test and explain why it is fair.	• I set up a fair test with more than one variable, e.g., using different materials to cut out sound. • I explain to other in my class why a test I have set up is a fair one, e.g., discover how fast ice melts in different temperatures.
I know how to make careful and accurate observations, including the use of standard units.	• I measure carefully (taking account of mathematical knowledge up to Year 4) and add to my scientific learning.
I know how to use equipment, including thermometers and data loggers to make measurements.	• I use a data logger to check on the time it takes ice to melt to water in different temperatures. • I use a thermometer to measure temperature and know there are two main scales used to measure temperature.

Explaining Working Scientifically – Year 4 (Part 2)

I know how to gather, record, classify and present data in different ways to answer scientific questions.	• I gather and record information using a chart, matrix or tally chart, depending on what is most sensible. • I group information according to common factors, e.g., materials that make goof conductors or insulators.
I know how to use diagrams, keys, bar charts and tables; using scientific language.	• I use bar charts and other statistical tables (in line with Year 4 mathematics statistics) to record my findings. • I know how to use a key to help me understand information presented on a chart. • I use correct scientific language when presenting information.
I know how to use findings to report in different ways, including oral and written explanations, presentation.	• I am confident enough to stand in front of others and explain what I have found out, for example about we digest our food. • I present my findings using written explanations and include diagrams when needed. • I write up my findings using a planning, doing and evaluating process.
I know how to draw conclusions and suggest improvements.	• I make sense of my findings and draw conclusions which helps me understand more about the scientific information I have learned. • I am confident enough to make suggestions about how things could be improved.
I know how to make a prediction with a reason.	• When I make a prediction there is a plausible reason as to why I have done so. • I am able to amend my prediction according to my findings.
I know how to identify differences, similarities and changes related to an enquiry.	• I understand why the digestive systems needs various organs. • I understand why the sound we hear travels on vibrations. • I am prepared to change my ideas as a result of what I have found out during a scientific enquiry.

Explaining Working Scientifically – Year 5 (Part 1)

I know how to plan different types of scientific enquiry.	• I set up an investigation when it is appropriate, e.g., finding out which materials dissolve or not. • I set up a fair test when needed, e.g., which surfaces create most friction? • I set up an enquiry based investigation, e.g., find out what we can do now that we couldn't do as a baby.
I know how to control variables in an enquiry.	• I know what the variables are in a given enquiry and can isolate each one when investigating, e.g., finding out how effective parachutes with different materials are.
I know how to measure accurately and precisely using a range of equipment.	• I use all measurements as set out in Year 5 mathematics (measurement), this includes capacity and mass. • I use other scientific instruments as needed, e.g., thermometer, rain gauge, spring scales (for measuring newtons)
I know how to record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.	• During my investigations, I am able to record data and present them in a range of ways including, diagrams, labels, classification keys, tables, scatter graphs and bar and line graphs. • I appreciate which format to use for different systems.
I know how to use the outcome of test results to make predictions and set up a further comparative and fair tests.	• I am confident using data which I have generated to help make sense of my investigations. • I make predictions based on information gleaned from my investigations. • I create new investigations which take account of what I have learned previously.

Explaining Working Scientifically – Year 5 (Part 2)

I know how to report findings from enquiries in a range of ways.	• I am able to present information related to my scientific enquiries in a range of ways including using IT such as power-point and iMovie. • I use a range of written methods to report my findings. • I use diagrams, as and when necessary, to support my writing. • I am confident enough to present my findings orally in front of the class.
I know how to explain a conclusion from an enquiry.	• I am evaluative when explaining my findings from my scientific enquiry. • I am clear about what I have found out from my enquiry and can relate this to others.
I know how to explain causal relationships in an enquiry.	• My explanations set out clearly why something has happened and its possible impact on other things. • I am able to relate causal relationships when studying life cycles.
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 am aware of the need to support my conclusions with evidence. • I am able to give an example of something I have focused on when supporting a scientific theory, e.g., how much easier it is to lift a heavy object using pulleys.
I know how to read, spell and pronounce scientific vocabulary accurately.	• I keep an on-going record of new scientific words that I have come across for the first time. • I frequently carry out research when investigating a scientific principle or theory.

Explaining Working Scientifically – Year 6 (Part 1)

I know how to plan different types of scientific enquiry.	• I know which type of investigation is needed to suit my scientific enquiry, e.g., looking at the relationship between my pulse and exercise. • I set up a fair test when needed, e.g., does light travel in straight lines? • I know how to set up an enquiry based investigation, e.g., what is the relationship between oxygen and blood?.
I know how to control variables in an enquiry.	• I know what the variables are in a given enquiry and can isolate each one when investigating. • I justify which variable I have isolated in my scientific investigation.
I know how to measure accurately and precisely using a range of equipment.	• I use all measurements as set out in Year 6 mathematics (measurement), this includes capacity, mass, ratio and proportion. • I use other scientific instruments as needed, e.g., thermometer, rain gauge,
I know how to record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.	• During my investigations, I am able to record data and present them in a range of ways including, diagrams, labels, classification keys, tables, scatter graphs and bar and line graphs. • I appreciate which format to use for different systems.
I know how to use the outcome of test results to make predictions and set up a further comparative and fair tests.	• I am confident using data which I have generated to help make sense of my investigations. • I make accurate predictions based on information gleaned from my investigations. • I create new investigations which take account of what I have found out previously.

Explaining Working Scientifically – Year 6 (Part 2)

I know how to report findings from enquiries in a range of ways.	• I am able to present information related to my scientific enquiries in a range of ways including using IT such as power-point, animoto and iMovie. • I use a range of written methods to report my findings, including focusing on the planning, doing and evaluating phases. • I use diagrams, as and when necessary, to support my writing and I am confident enough to present my findings orally in front of the class.
I know how to explain a conclusion from an enquiry.	• I am evaluative when explaining my findings from my scientific enquiry. • I am clear about what I have found out from my enquiry and can relate this to others in my class.
I know how to explain causal relationships in an enquiry.	• My explanations set out clearly why something has happened and its possible impact on other things. • I am able to relate causal relationships when studying life cycles.
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 am aware of the need to support my conclusions with evidence. • I am able to give an example of something I have focused on when supporting a scientific theory, e.g., classifying vertebrate and invertebrate creatures or why certain creatures choose their unique habitats.
I know how to read, spell and pronounce scientific vocabulary accurately.	• I keep an on-going record of new scientific words that I have come across for the first time and use these regularly in my scientific write ups. • I frequently carry out research when investigating a scientific principle or theory.