

Early Years Foundation Stage

Nursery

30 – 50 months:

Can talk about some of the things they have observed such as plants, animals, natural and found objects

Talks about why things happen and how things work

Developing an awareness of growth, decay and changes over time

Shows care and concern for living things and the environment

Reception

40 – 60 months+:

Looks closely at similarities, differences, patterns and change

ELG:

Children know about similarities and differences in relation to objects, materials and living things. They make observations of animals and plants and explain why some things occur, and talk about changes.

Exceeding:

Children know that the environment and living things are influenced by human activity. They know the properties of some materials and can suggest some of the purposes they are used for. They are familiar with basic scientific concepts such as floating, sinking, experimentation.

Nursery

- Bubble making – how they are made and what we need.
- Volcanoes.
- Sinking and floating experimentation.
- Differences between items.
- Textures.
- Colour mixing.
- Water and sand and their properties.
- Plant and grow things in their own planting area.

Reception

- Ourselves – identifying the changes from baby, to toddler, to now using mirrors.
- Senses.
- Naming parts of the body.
- Colour investigation using colour paddles.
- Light and dark investigation – shadows.
- Floating and sinking

- Forces – the Huff and Puff and cars and ramps.
- Spring walk.
- Habitats – zoo visit, mini-beasts.
- Chicks.

- Caterpillars.
- Investigation conditions?
- Growing seeds and investigating conditions.
- Planting strawberries, tomatoes and peas.

Key Stage 1

Working Scientifically

Ask simple questions and recognising that they can be answered in different ways

Question examples Year 1:

- Why are flowers different colours?
- Why do some animals eat meat and others do not?

Question examples Year 2:

- 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?

Observe closely, using simple equipment

Year 1 and Year 2:

- Measures (within Year 1 mathematical limits) to help find out more about the investigations undertaken

Year 2:

- Use equipment such as thermometers and rain gauges to help observe changes to local environment as the year progresses
- Use microscopes to find out more about small creatures and plants

Perform simple tests

Year 1:

- Set up a test to see which materials keeps things warmest,

Year 2:

- Know how to set up a fair test and do so when finding out about how seeds grow best

Identify and classify

Year 2:

Classify or group things according to a given criteria, e.g. deciduous and coniferous trees

Use their observations and ideas to suggest answers to questions

Year 1:

- Know if the test has been successful and can say what has been learned
- Explain to someone what has been learned from an investigation they have been involved with

Gather and record data to help in answering questions.

Year 1:

- Draw conclusions from the answers to the questions asked

Year 2:

- Draw conclusions from fair tests and explain what has been found out

Key Stage 1 - Working Scientifically (Notes and Guidance)

Pupils in years 1 and 2 should explore the world around them and raise their own questions. They should experience different types of scientific enquiries, including practical activities, and begin to recognise ways in which they might answer scientific questions. They should use simple features to compare objects, materials and living things and, with help, decide how to sort and group them, observe changes over time, and, with guidance, they should begin to notice patterns and relationships. They should ask people questions and use simple secondary sources to find answers. They should use simple measurements and equipment (for example, hand lenses, egg timers) to gather data, carry out simple tests, record simple data, and talk about what they have found out and how they found it out. With help, they should record and communicate their findings in a range of ways and begin to use simple scientific language. These opportunities for working scientifically should be provided across years 1 and 2 so that the expectations in the programme of study can be met by the end of year 2. Pupils are not expected to cover each aspect for every area of study.

Year 1

Biology

Chemistry

Physics

Animals, including Humans

Animals, including Humans

Plants

Everyday Materials

Seasonal Change

- Name common animals
- Carnivores, etc

- Human body and senses

- Common plants
- Plant structure

- Properties of materials
- Grouping materials

- The four seasons
- Seasonal weather

- Know how to classify a range of animals by amphibian, reptile, mammal, fish and birds
- Know and classify animals by what they eat (carnivore, herbivore and omnivore)
- Know how to sort by living and non living things

- Know the name of parts of the human body that can be seen

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

- Know the name of the materials an object is made from
- Know about the properties of everyday materials

- Name the seasons and know about the type of weather in each season

Year 1 Notes and Guidance

Plants

Pupils should use the local environment throughout the year to explore and answer questions about plants growing in their habitat. Where possible, they should observe the growth of flowers and vegetables that they have planted. They should become familiar with common names of flowers, examples of deciduous and evergreen trees, and plant structures (including leaves, flowers (blossom), petals, fruit, roots, bulb, seed, trunk, branches, stem). Pupils might work scientifically by: observing closely, perhaps using magnifying glasses, and comparing and contrasting familiar plants; describing how they were able to identify and group them, and drawing diagrams showing the parts of different plants including trees. Pupils might keep records of how plants have changed over time, for example the leaves falling off trees and buds opening; and compare and contrast what they have found out about different plants

Animals including Humans

Pupils should use the local environment throughout the year to explore and answer questions about animals in their habitat. They should understand how to take care of animals taken from their local environment and the need to return them safely after study. Pupils should become familiar with the common names of some fish, amphibians, reptiles, birds and mammals, including those that are kept as pets. Pupils should have plenty of opportunities to learn the names of the main body parts (including head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth) through games, actions, songs and rhymes. Pupils might work scientifically by: using their observations to compare and contrast animals at first hand or through videos and photographs, describing how they identify and group them; grouping animals according to what they eat; and using their senses to compare different textures, sounds and smells.

Everyday Materials

Pupils should explore, name, discuss and raise and answer questions about everyday materials so that they become familiar with the names of materials and properties such as: hard/soft; stretchy/stiff; shiny/dull; rough/smooth; bendy/not bendy; waterproof/not waterproof; absorbent/not absorbent; opaque/transparent. Pupils should explore and experiment with a wide variety of materials, not only those listed in the programme of study, but including for example: brick, paper, fabrics, elastic, foil. Pupils might work scientifically by: performing simple tests to explore questions, for example: 'What is the best material for an umbrella? ...for lining a dog basket? ...for curtains? ...for a bookshelf? ...for a gymnast's leotard?'

Seasonal Changes

Pupils should observe and talk about changes in the weather and the seasons. Note: Pupils should be warned that it is not safe to look directly at the Sun, even when wearing dark glasses. Pupils might work scientifically by: making tables and charts about the weather; and making displays of what happens in the world around them, including day length, as the seasons change.

Year 2

Biology			Chemistry	
All living things and their habitats	Animals, including Humans	Plants	Everyday Materials	
<ul style="list-style-type: none"> • <i>Alive or dead</i> • <i>Habitats</i> • <i>Adaptations</i> • <i>Food chains</i> 	<ul style="list-style-type: none"> • <i>Animal reproduction</i> • <i>Healthy living</i> • <i>Basic needs</i> 	<ul style="list-style-type: none"> • <i>Plant and seed growth</i> • <i>Plant reproduction</i> • <i>Keeping plants healthy</i> 	<ul style="list-style-type: none"> • <i>Identify different materials</i> • <i>Name everyday materials</i> • <i>Properties of materials</i> 	<ul style="list-style-type: none"> • <i>Compare the use of different materials</i> • <i>Compare movement on different surfaces</i>
<ul style="list-style-type: none"> • Classify things by living, dead or never lived • Know how a specific habitat provides for the basic needs of things living there (plants and animals) • Match living things to their habitat • Name some different sources of food for animals • Know about and explain a simple food chain 	<ul style="list-style-type: none"> • Know the basic stages in a life cycle for animals, (including humans) • Know why exercise, a balanced diet and good hygiene are important for humans 	<ul style="list-style-type: none"> • Know and explain how seeds and bulbs grow into plants • Know what plants need in order to grow and stay healthy (water, light & suitable temperature) 	<ul style="list-style-type: none"> • Know how materials can be changed by squashing, bending, twisting and stretching 	<ul style="list-style-type: none"> • Know why a material might or might not be used for a specific job

Year 2 Notes and Guidance (part 1)

Living Things and their Habitats

Pupils should be introduced to the idea that all living things have certain characteristics that are essential for keeping them alive and healthy. They should raise and answer questions that help them to become familiar with the life processes that are common to all living things. Pupils should be introduced to the terms 'habitat' (a natural environment or home of a variety of plants and animals) and 'micro-habitat' (a very small habitat, for example for woodlice under stones, logs or leaf litter). They should raise and answer questions about the local environment that help them to identify and study a variety of plants and animals within their habitat and observe how living things depend on each other, for example, plants serving as a source of food and shelter for animals. Pupils should compare animals in familiar habitats with animals found in less familiar habitats, for example, on the seashore, in woodland, in the ocean, in the rainforest. Pupils might work scientifically by: sorting and classifying things according to whether they are living, dead or were never alive, and recording their findings using charts. They should describe how they decided where to place things, exploring questions for example: 'Is a flame alive? Is a deciduous tree dead in winter?' and talk about ways of answering their questions. They could construct a simple food chain that includes humans (e.g. grass, cow, human). They could describe the conditions in different habitats and micro-habitats (under log, on stony path, under bushes) and find out how the conditions affect the number and type(s) of plants and animals that live there

Plants

Pupils should use the local environment throughout the year to observe how different plants grow. Pupils should be introduced to the requirements of plants for germination, growth and survival, as well as to the processes of reproduction and growth in plants. Note: Seeds and bulbs need water to grow but most do not need light; seeds and bulbs have a store of food inside them. Pupils might work scientifically by: observing and recording, with some accuracy, the growth of a variety of plants as they change over time from a seed or bulb, or observing similar plants at different stages of growth; setting up a comparative test to show that plants need light and water to stay healthy.

Animals including Humans

Pupils should be introduced to the basic needs of animals for survival, as well as the importance of exercise and nutrition for humans. They should also be introduced to the processes of reproduction and growth in animals. The focus at this stage should be on questions that help pupils to recognise growth; they should not be expected to understand how reproduction occurs. The following examples might be used: egg, chick, chicken; egg, caterpillar, pupa, butterfly; spawn, tadpole, frog; lamb, sheep. Growing into adults can include reference to baby, toddler, child, teenager, adult. Pupils might work scientifically by: observing, through video or first-hand observation and measurement, how different animals, including humans, grow; asking questions about what things animals need for survival and what humans need to stay healthy; and suggesting ways to find answers to their questions

Year 2 Notes and Guidance (part 2)

Use of Everyday Materials

Pupils should identify and discuss the uses of different everyday materials so that they become familiar with how some materials are used for more than one thing (metal can be used for coins, cans, cars and table legs; wood can be used for matches, floors, and telegraph poles) or different materials are used for the same thing (spoons can be made from plastic, wood, metal, but not normally from glass). They should think about the properties of materials that make them suitable or unsuitable for particular purposes and they should be encouraged to think about unusual and creative uses for everyday materials. Pupils might find out about people who have developed useful new materials, for example John Dunlop, Charles Macintosh or John McAdam. Pupils might work scientifically by: comparing the uses of everyday materials in and around the school with materials found in other places (at home, the journey to school, on visits, and in stories, rhymes and songs); observing closely, identifying and classifying the uses of different materials, and recording their observations.

Lower Key Stage 2

Working Scientifically (part 1)

- ❑ **Ask relevant questions and using different types of scientific enquiries to answer them.**

Relevant question examples Year 3:

- Why does the moon appear as different shapes in the night sky?
- Why do shadows change during the day?
- Where does a fossil come from?

Relevant question examples Year 4:

- Why are steam and ice the same thing?
- Why is the liver important in the digestive systems?
- What do we mean by 'pitch' when it comes to sound?

Types of scientific enquiry(Year 3):

- Observe at what time of day a shadow is likely to be at its longest and shortest
- Observe which type of plants grow in different places e.g. bluebells in woodland, roses in domestic gardens, etc.
- Use research to find out how reflection can help us see things that are around the corner
- Use research to find out what the main differences are between sedimentary and igneous rocks

Types of scientific enquiry(Year 4):

- Use research to find out how much time it takes to digest most of our food
- Use research to find out which materials make effective conductors and insulators of electricity

- ❑ **Setting up practical enquiries, comparative and fair tests**

Year 3 examples:

- Test to see which type of soil is most suitable when growing two similar plants
- Test to see if their right hand is as efficient as their left hand
- Set up a fair test with different variables e.g. the best conditions for a plant to grow
- Explain to a partner why a test is a fair one e.g. lifting weights with right and left hand, etc.

Year 4 examples:

- Carry out tests to see, for example, which of two instruments make the highest or lowest sounds and to see if a glass of ice weighs the same as a glass of water
- Set up a fair test with more than one variable e.g. using different materials to cut out sound
- Explain to others why a test that has been set up is a fair one e.g. discover how fast ice melts in different temperatures

- ❑ **Make systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.**

Years 3/4

- Measure carefully (taking account of mathematical knowledge up to that year group and add to scientific learning)

Year 3 must include:

- Use a thermometer to measure temperature and know there are two main scales used to measure temperature

Year 4 must include:

- Use a data logger to check on the time it takes ice to melt to water in different temperatures
- Use a thermometer to measure temperature and know there are two main scales used to measure temperature

Lower Key Stage 2

Working Scientifically (part 2)

- ❑ **Gathering, recording, classifying and presenting data is a variety of ways to help when answering questions.**

Year 3 examples:

- Gather and record information using a chart, matrix or tally chart, depending on what is most sensible
- Group information according to common factors e.g. plants that grow in woodlands or plants that grow in gardens

Year 4 examples:

- Gather and record information using a chart, matrix or tally chart, depending on what is most sensible
- Group information according to common factors e.g. materials that make good conductors or insulators

- ❑ **Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables**

Year 3 examples:

- Use bar charts and other statistical tables (in line with Year 3 mathematics statistics) to record findings
- Know how to use a key to help understand information presented on a chart

Year 4 examples:

- Use bar charts and other statistical tables (in line with Year 4 mathematics statistics) to record findings

- ❑ **Reporting on finding from enquiries, including oral and written explanations, displays or presentations of results and conclusions**

Year 3 examples:

- Be confident to stand in front of others and explain what has been found out, for example about how the moon changes shape
- Present findings using written explanations and include diagrams when needed

Year 4 examples:

- Present findings using written explanations and include diagrams, when needed
- Write up findings using a planning, doing and evaluating process (not all at same time)

- ❑ **Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions**

Year 3 examples:

- Make sense of findings and draw conclusions which help them to understand more about scientific information

Year 4 examples:

- Make sense of findings and draw conclusions which helps them understand more about the scientific information that has been learned

- ❑ **Identifying differences, similarities or changes related to simple scientific ideas and processes**

- ❑ **Using straightforward scientific evidence to answer questions or to support their findings**

Year 3 and 4:

- Amend predictions according to findings
- Be prepared to change ideas as a result of what has been found out during a scientific enquiry

Plus Year 4:

- When making predictions there are plausible reasons as to why they have done so

Lower Key Stage 2 - Working Scientifically (Notes and Guidance)

Pupils in years 3 and 4 should be given a range of scientific experiences to enable them to raise their own questions about the world around them.

They should start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions; recognise when a simple fair test is necessary and help to decide how to set it up; talk about criteria for grouping, sorting and classifying; and use simple keys. They should begin to look for naturally occurring patterns and relationships and decide what data to collect to identify them. They should help to make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used.

They should learn how to use new equipment, such as data loggers, appropriately. They should collect data from their own observations and measurements, using notes, simple tables and standard units, and help to make decisions about how to record and analyse this data. With help, pupils should look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions. With support, they should identify new questions arising from the data, making predictions for new values within or beyond the data they have collected and finding ways of improving what they have already done. They should also recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations. Pupils should use relevant scientific language to discuss their ideas and communicate their findings in ways that are appropriate for different audiences. These opportunities for working scientifically should be provided across years 3 and 4 so that the expectations in the programme of study can be met by the end of year 4. Pupils are not expected to cover each aspect for every area of study.

Year 3

Year 3					
Biology			Chemistry	Physics	
Animals, including humans	Plants	Plants	Rocks	Forces	Light
<ul style="list-style-type: none"> • <i>Skeleton and muscles</i> • <i>Nutrition</i> • <i>Exercise & health</i> 	<ul style="list-style-type: none"> • <i>Plant life</i> • <i>Basic structure and functions</i> 	<ul style="list-style-type: none"> • <i>Life cycle</i> • <i>Water transportation</i> 	<ul style="list-style-type: none"> • <i>Fossil formation</i> • <i>Compare and group rocks</i> • <i>Soil</i> 	<ul style="list-style-type: none"> • <i>Different Forces</i> • <i>Magnets</i> 	<ul style="list-style-type: none"> • <i>Reflections</i> • <i>Shadows</i>
<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • investigate the way in which water is transported within plants • explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. 	<ul style="list-style-type: none"> • compare and group rocks based on their appearance and physical properties, giving reasons • know how soil is made and how fossils are formed • recognise that soils are made from rocks and organic matter • <i>know about and explain the difference between sedimentary, metamorphic and igneous rock</i> 	<ul style="list-style-type: none"> • know about and describe how objects move on different surfaces • know how some forces require contact and others work at a distance (such as magnets) observe how magnets attract and repel (and other materials) • predict whether magnets will attract or repel based on direction of poles • compare & group together everyday materials based on whether they are attracted to magnet&identify some magnetic materials. • describe magnets as having two different poles. 	<ul style="list-style-type: none"> • 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 an opaque object • find patterns in the way that the size of shadows change.

Year 3 Notes and Guidance (part 1)

Plants

Notes and guidance (non-statutory) Pupils should be introduced to the relationship between structure and function: the idea that every part has a job to do. They should explore questions that focus on the role of the roots and stem in nutrition and support, leaves for nutrition and flowers for reproduction. Note: Pupils can be introduced to the idea that plants can make their own food, but at this stage they do not need to understand how this happens. Pupils might work scientifically by: comparing the effect of different factors on plant growth, for example, the amount of light, the amount of fertiliser; discovering how seeds are formed by observing the different stages of plant life cycles over a period of time; looking for patterns in the structure of fruits that relate to how the seeds are dispersed. They might observe how water is transported in plants, for example, by putting cut, white carnations into coloured water and observing how water travels up the stem to the flowers

Animals including Humans

Notes and guidance (non-statutory) Pupils should continue to learn about the importance of nutrition and should be introduced to the main body parts associated with the skeleton and muscles, finding out how different parts of the body have special functions. Pupils might work scientifically by: identifying and grouping animals with and without skeletons and observing and comparing their movement; exploring ideas about what would happen if humans did not have skeletons. They might compare and contrast the diets of different animals (including their pets) and decide ways of grouping them according to what they eat. They might research different food groups and how they keep us healthy and design meals based on what they find out.

Rocks

Notes and guidance (non-statutory) Linked with work in geography, pupils should explore different kinds of rocks and soils, including those in the local environment. Pupils might work scientifically by: observing rocks, including those used in buildings and gravestones, and exploring how and why they might have changed over time; using a hand lens or microscope to help them to identify and classify rocks according to whether they have grains or crystals, and whether they have fossils in them. Pupils might research and discuss the different kinds of living things whose fossils are found in sedimentary rock and explore how fossils are formed. Pupils could explore different soils and identify similarities and differences between them and investigate what happens when rocks are rubbed together or what changes occur when they are in water. They can raise and answer questions about the way soils are formed.

Year 3 Notes and Guidance (part 2)

Lights

Notes and guidance (non-statutory) Pupils should explore what happens when light reflects off a mirror or other reflective surfaces, including playing mirror games to help them to answer questions about how light behaves. They should think about why it is important to protect their eyes from bright lights. They should look for, and measure, shadows, and find out how they are formed and what might cause the shadows to change. Note: Pupils should be warned that it is not safe to look directly at the Sun, even when wearing dark glasses. Pupils might work scientifically by: looking for patterns in what happens to shadows when the light source moves or the distance between the light source and the object changes.

Forces and Magnets

Notes and guidance (non-statutory) Pupils should observe that magnetic forces can act without direct contact, unlike most forces, where direct contact is necessary (for example, opening a door, pushing a swing). They should explore the behaviour and everyday uses of different magnets (for example, bar, ring, button and horseshoe). Pupils might work scientifically by: comparing how different things move and grouping them; raising questions and carrying out tests to find out how far things move on different surfaces and gathering and recording data to find answers their questions; exploring the strengths of different magnets and finding a fair way to compare them; sorting materials into those that are magnetic and those that are not; looking for patterns in the way that magnets behave in relation to each other and what might affect this, for example, the strength of the magnet or which pole faces another; identifying how these properties make magnets useful in everyday items and suggesting creative uses for different magnets.

Year 4

Biology		Chemistry	Physics	
Animals, including humans	All living things and their habitats	States of Matter	Electricity	Sound
<ul style="list-style-type: none"> • Digestive system • Teeth • Food chains 	<ul style="list-style-type: none"> • Grouping living things • Classification keys • Adaptation of living things 	<ul style="list-style-type: none"> • Compare and group materials • Solids, liquids and gases • Changing state • Water cycle 	<ul style="list-style-type: none"> • Uses of electricity • Simple circuits and switches • Conductors and insulators 	<ul style="list-style-type: none"> • How sounds are made • Sound vibrations • Pitch and Volume
<ul style="list-style-type: none"> • Identify and name the parts of the human digestive system • Know the simple functions of the organs in the human digestive system • Identify and know the different types of human teeth • Know the functions of different human teeth • Use and construct food chains to identify producers, predators and prey 	<ul style="list-style-type: none"> • Use classification keys to group, identify and name living things in their local and wider environment • Recognise that living things can be grouped in a variety of ways • Know that environment can change and that this can sometimes endanger living things 	<ul style="list-style-type: none"> • 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 happened in degrees Celsius. • Know the part played by evaporation and condensation in the water cycle and associate evaporation with temperature. 	<ul style="list-style-type: none"> • Identify and name appliances that require electricity to function • Construct a simple series circuit • Identify and name the components in a series circuit (including cells, wires, bulbs, switches and buzzers) • Predict and test whether a lamp will light within a circuit (is it complete?) • Know the function of a switch and therefore whether a lamp lights in a simple circuit. • Know the difference between a conductor and an insulator; recognise metals as good conductors 	<ul style="list-style-type: none"> • Know how sound is made, associating some of them with vibrating • Know how sound travels from a source to our ears • Find the patterns between pitch and the feature of the object producing a sound • Find the patterns between the volume of a sound and the strength of the vibrations that produced it • Know the link between how loud a sound is and the distance from the object making that sound

Year 4 Notes and Guidance (part 1)

Living things and their habitats

Notes and guidance (non-statutory) Pupils should use the local environment throughout the year to raise and answer questions that help them to identify and study plants and animals in their habitat. They should identify how the habitat changes throughout the year. Pupils should explore possible ways of grouping a wide selection of living things that include animals and flowering plants and non-flowering plants. Pupils could begin to put vertebrate animals into groups such as fish, amphibians, reptiles, birds, and mammals; and invertebrates into snails and slugs, worms, spiders, and insects. Note: Plants can be grouped into categories such as flowering plants (including grasses) and non-flowering plants, such as ferns and mosses. Pupils should explore examples of human impact (both positive and negative) on environments, for example, the positive effects of nature reserves, ecologically planned parks, or garden ponds, and the negative effects of population and development, litter or deforestation. Pupils might work scientifically by: using and making simple guides or keys to explore and identify local plants and animals; making a guide to local living things; raising and answering questions based on their observations of animals and what they have found out about other animals that they have researched.

Animals including Humans

Notes and guidance (non-statutory) Pupils should be introduced to the main body parts associated with the digestive system, for example, mouth, tongue, teeth, oesophagus, stomach and small and large intestine and explore questions that help them to understand their special functions. Pupils might work scientifically by: comparing the teeth of carnivores and herbivores, and suggesting reasons for differences; finding out what damages teeth and how to look after them. They might draw and discuss their ideas about the digestive system and compare them with models or images.

States of Matter

Notes and guidance (non-statutory) Pupils should explore a variety of everyday materials and develop simple descriptions of the states of matter (solids hold their shape; liquids form a pool not a pile; gases escape from an unsealed container). Pupils should observe water as a solid, a liquid and a gas and should note the changes to water when it is heated or cooled.

Note: Teachers should avoid using materials where heating is associated with chemical change, for example, through baking or burning. Pupils might work scientifically by: grouping and classifying a variety of different materials; exploring the effect of temperature on substances such as chocolate, butter, cream (for example, to make food such as chocolate crispy cakes and ice-cream for a party). They could research the temperature at which materials change state, for example, when iron melts or when oxygen condenses into a liquid. They might observe and record evaporation over a period of time, for example, a puddle in the playground or washing on a line, and investigate the effect of temperature on washing drying or snowmen melting.

Year 4 Notes and Guidance (part 2)

Sound

Notes and guidance (non-statutory) Pupils should explore and identify the way sound is made through vibration in a range of different musical instruments from around the world; and find out how the pitch and volume of sounds can be changed in a variety of ways. Pupils might work scientifically by: finding patterns in the sounds that are made by different objects such as saucepan lids of different sizes or elastic bands of different thicknesses. They might make earmuffs from a variety of different materials to investigate which provides the best insulation against sound. They could make and play their own instruments by using what they have found out about pitch and volume.

Electricity

Notes and guidance (non-statutory) Pupils should construct simple series circuits, trying different components, for example, bulbs, buzzers and motors, and including switches, and use their circuits to create simple devices. Pupils should draw the circuit as a pictorial representation, not necessarily using conventional circuit symbols at this stage; these will be introduced in year 6. Note: Pupils might use the terms current and voltage, but these should not be introduced or defined formally at this stage. Pupils should be taught about precautions for working safely with electricity. Pupils might work scientifically by: observing patterns, for example, that bulbs get brighter if more cells are added, that metals tend to be conductors of electricity, and that some materials can and some cannot be used to connect across a gap in a circuit.

Upper Key Stage 2

Working Scientifically (part 1)

- ❑ **Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary**

Year 5:

- Set up an investigation when it is appropriate e.g. finding out which materials dissolve or not
- Set up a fair test when needed e.g. which surfaces create most friction?
- Set up an enquiry based investigation e.g. find out what adults / children can do now that they couldn't when a baby
- Know what the variables are in a given enquiry and can isolate each one when investigating e.g. finding out how effective parachutes are when made with different materials
- Frequently carry out research when investigating a scientific principle or theory

Year 6:

- Know which type of investigation is needed to suit particular scientific enquiry e.g. looking at the relationship between pulse and exercise
- Set up a fair test when needed e.g. does light travel in straight lines?
- Know how to set up an enquiry based investigation e.g. what is the relationship between oxygen and blood?
- Know what the variables are in a given enquiry and can isolate each one when investigating
- Justify which variable has been isolated in scientific investigation
- Frequently carry out research when investigating a scientific principle or theory

- ❑ **Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when necessary**

Year 5 examples:

- Use all measurements as set out in Year 5 mathematics (measurement), including capacity and mass
- Use other scientific instruments as needed e.g. thermometer, rain gauge, spring scales (for measuring Newtons)

Year 6 examples:

- Use all measurements as set out in Year 6 mathematics (measurement), including capacity, mass, ratio and proportion

- ❑ **Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs**

Year 5 and Year 6:

- 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

Upper Key Stage 2

Working Scientifically (part 2)

❑ Using test results to make predictions to set up further comparative and fair tests

Year 5 examples:

- Make predictions based on information gleaned from investigations
- Create new investigations which take account of what has been learned previously

Year 6 examples:

- Make accurate predictions based on information gleaned from their investigations and create new investigations as a result
- Able to present information related to scientific enquiries in a range of ways including using IT

❑ 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

Year 5 examples:

- Use diagrams, as and when necessary, to support writing

Year 6 examples:

- Present findings using written explanations and include diagrams, when needed
- Use a range of written methods to report findings, including focusing on the planning, doing and evaluating phases (not all at same time)

❑ Identifying scientific evidence that has been used to support or refute ideas of arguments

Year 5 examples:

- Is evaluative when explaining findings from scientific enquiry
- Clear about what has been found out from recent enquiry and can relate this to other enquiries, where appropriate
- Their explanations set out clearly why something has happened and its possible impact on other things
- Able to give an example of something focused on when supporting a scientific theory e.g. how much easier it is to lift a heavy object using pulleys
- Keep an on-going record of new scientific words that they have come across for the first time
- Able to relate causal relationships when, for example, studying life cycles

Year 6 examples:

- Make sense of findings and draw conclusions which helps them understand more about the scientific information that has been learned
- Clear about what has been found out from their enquiry and can relate this to others in class
- Explanations set out clearly why something has happened and its possible impact on other things
- Aware of the need to support conclusions with evidence
- Keep an on-going record of new scientific words that they have come across for the first time and use these regularly in future scientific write ups
- Use diagrams, as and when necessary, to support writing and be confident enough to present findings orally in front of the class
- Able to give an example of something they have focused on when supporting a scientific theory e.g. classifying vertebrate and invertebrate creatures or why certain creatures choose their unique habitats

Upper Key Stage 2 - Working Scientifically (Notes and Guidance)

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. These opportunities for working scientifically should be provided across years 5 and 6 so that the expectations in the programme of study can be met by the end of year 6. Pupils are not expected to cover each aspect for every area of study.

Year 5

Biology

Chemistry

Physics

All living things and their habitats

Animals, including humans

Properties and changes in materials

Forces

Earth and Space

- Life cycles – plants and animals
- Reproductive processes
- Famous naturalists

- Changes as humans develop from birth to old age

- Compare properties of everyday materials
- Soluble/ dissolving
- Reversible and irreversible substances

- Gravity
- Friction
- Forces and motion of mechanical devices

- Movement of the Earth and the planets
- Movement of the Moon
- Night and day

- Know the differences between life cycles of a mammal, an amphibian, an insect and a bird
- Know the life process of reproduction in some plants
- Know the life process of reproduction in some animals

- Describe the changes as a human develops towards old age.

- Compare and group materials based on their properties (e.g. hardness, solubility, transparency, conductivity, [electrical & thermal], and response to magnets
- Give reasons, based on evidence from comparative and fair tests for the particular uses of everyday materials, including metals, wood and plastic.
- Know and explain how a material dissolves to form a solution
- Know and show how to recover a substance from a solution
- Use knowledge of solids, liquids and gases to decide how materials can be separated (e.g. through filtering, sieving and evaporating)
- Demonstrate that dissolving, mixing and changes of state are reversible changes
- Explain how some changes result in the formation of a new material and that this is usually irreversible – include burning and acid on bicarbonate of soda.

- Know what gravity is and the fact that it acts between things on Earth and the falling object
- Identify the effect of air and water resistance between moving surfaces
- Identify the effect of friction between moving surfaces
- Recognise that some mechanisms, including levers, pulleys and gears allow a smaller force to have a greater effect

- Know about and explain the movement of the Earth and other planets relative to the Sun
- Know about and explain the movement of the Moon relative to the Earth
- Know and demonstrate how night and day are created using terms such as rotation
- Explain why the sun looks like it moves across the sky
- Describe the Sun, Earth and Moon (using the term spherical)

Year 5 Notes and Guidance (part 1)

Living things and their habitats

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.

Animals including Humans

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.

Properties and Changes of Materials

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 Notes and Guidance (part 2)

Earth and Space

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.

Forces

Pupils should explore falling objects and raise questions about the effects of air resistance. They should explore the effects of air resistance by observing how different objects such as parachutes and sycamore seeds fall. They should experience forces that make things begin to move, get faster or slow down. Pupils should explore the effects of friction on movement and find out how it slows or stops moving objects, for example, by observing the effects of a brake on a bicycle wheel. Pupils should explore the effects of levers, pulleys and simple machines on movement. Pupils might find out how scientists, for example, Galileo Galilei and Isaac Newton helped to develop the theory of gravitation. Pupils might work scientifically by: exploring falling paper cones or cup-cake cases, and designing and making a variety of parachutes and carrying out fair tests to determine which designs are the most effective. They might explore resistance in water by making and testing boats of different shapes. They might design and make products that use levers, pulleys, gears and/or springs and explore their effects.

Year 6

Biology

Physics

Animals, including humans

All living things and their habitats

Evolution and Inheritance

Electricity

Light

- *The circulatory system*
- *Water transportation*
- *Impact of exercise on body*

- *Classification of living things and the reasons for it*

- *Identical and non identical off-spring*
- *Fossil evidence and evolution*
- *Adaptation and evolution*

- *Electrical components*
- *Simple circuits*
- *Fuses and voltage*

- *How light travels*
- *Reflection*
- *Ray models of light*

- Identify and name the main parts of the human circulatory system
- Describe the function 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

- Classify living things into broad groups according to observable characteristics and based on similarities and differences including micro-organisms, plants and animals
- Give reasons for classifying plants and animals based on a specific characteristic

- Recognise that living things have changed over time
- Recognise that fossils can be used to find out 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
- Link adaptation over time to evolution

- Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and on/off position of switches
- Draw circuit diagrams using correct symbols
- Know how the number and voltage of cells in a circuit links to the brightness of a lamp or the volume of a buzzer

- Recognise that light appears to travel in straight lines
- Use the idea of light travelling in straight lines to explain why shadows have the same shape as the objects that cast them
- 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

Year 6 Notes and Guidance (part 1)

Living things and their habitats

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.

Animals including Humans

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.

Evolution and Inheritance

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 palaeontologists 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 Notes and Guidance (part 2)

Light

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).

Electricity

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.

Sticky Knowledge: Science

Year 1

Science Knowledge

- Know how to classify a range of animals by amphibian, reptile, mammal, fish and birds
- Know and classify animals by what they eat (carnivore, herbivore and omnivore)
- Know how to sort by living and non living things
- Know the name of parts of the human body that can be seen
- Know the name of the materials an object is made from
- Know about the properties of everyday materials
- Name the seasons and know about the type of weather in each season

Sticky Knowledge: Science

Year 2

Science Knowledge

- Classify things by living, dead or never lived
- Know how a specific habitat provides for the basic needs of things living there (plants and animals).
- Match living things to their habitat
- Name some different sources of food for animals
- Know about and explain a simple food chain
- Know the basic stages in a life cycle for animals, including humans
- Know why exercise, a balanced diet and good hygiene are important for humans
- Know why a material might or might not be used for a specific job
- Know how materials can be changed by squashing, bending, twisting and stretching

Sticky Knowledge: Science

Year 3

Science Knowledge

	<input type="checkbox"/> Know what dark is the absence of light
	<input type="checkbox"/> Know that light is needed in order to see and is reflected from a surface
	<input type="checkbox"/> Know and demonstrate how a shadow is formed and explain how a shadow changes shape
<input type="checkbox"/> Know about the importance of a nutritious, balanced diet	<input type="checkbox"/> Know about the danger of direct sunlight and describe how to keep protected
<input type="checkbox"/> Know how nutrients, water and oxygen are transported within animals and humans	<input type="checkbox"/> Know about and describe how objects move on different surfaces
<input type="checkbox"/> Know about the skeletal and muscular system of a human	<input type="checkbox"/> Know how a simple pulley works and use making lifting an object simpler
<input type="checkbox"/> Compare and group rocks based on their appearance and physical properties, giving a reason	<input type="checkbox"/> Know how some forces require contact and some do not, giving examples
<input type="checkbox"/> Know how soil is made and fossils formed	<input type="checkbox"/> Know about and explain how objects attract and repel in relation to objects and other magnets
<input type="checkbox"/> Know about and explain the difference between sedimentary, metamorphic and igneous rock	<input type="checkbox"/> Predict whether magnets will attract or repel and give a reason

Sticky Knowledge: Science

Year 4

Science Knowledge

<input type="checkbox"/> Use classification keys to group, identify and name living things	<input type="checkbox"/> Know how sound is made associating some of them with vibrating
<input type="checkbox"/> Know how changes to an environment could endanger living things	<input type="checkbox"/> Know how sound travels from a source to our ears
<input type="checkbox"/> Identify and name the parts of the human digestive system	<input type="checkbox"/> Know the correlation between pitch and the object producing a sound
<input type="checkbox"/> Know the functions of the organs in the human digestive system	<input type="checkbox"/> Know the correlation between the volume of a sound and the strength of the vibrations that produced it
<input type="checkbox"/> Identify and know the different types of teeth that humans have	<input type="checkbox"/> Know what happens to a sound as it travels away from its source
<input type="checkbox"/> Know the functions of different human teeth	<input type="checkbox"/> Identify and name appliances that require electricity to function
<input type="checkbox"/> Use and construct food chains to identify producers, predators and prey	<input type="checkbox"/> Construct a series circuit
<input type="checkbox"/> Group materials based on their state of matter (solid, liquid, gas)	<input type="checkbox"/> Identify and name the components in a series circuit (including cells, wires, bulbs, switches and buzzers)
<input type="checkbox"/> Know about and explore how some materials can change state	<input type="checkbox"/> Predict and test whether a lamp will light within a circuit
<input type="checkbox"/> Know the temperature at which materials change state	<input type="checkbox"/> Know the function of a switch in a circuit
<input type="checkbox"/> Know the part played by evaporation and condensation in the water cycle	<input type="checkbox"/> Know the difference between a conductor and an insulator; giving examples of each

Sticky Knowledge: Science

Year 5

Science Knowledge

<input type="checkbox"/> Know the life cycle of different living things, e.g. mammal, amphibian, insect bird	<input type="checkbox"/> Know and can demonstrate that some changes are reversible and some are not
<input type="checkbox"/> Know the differences between different life cycles	<input type="checkbox"/> Know how some changes result in the formation of a new material and that this is usually irreversible
	<input type="checkbox"/> Know about and explain the movement of the Earth and other planets relative to the Sun
<input type="checkbox"/> Know the process of reproduction in animals	<input type="checkbox"/> Know about and explain the movement of the Moon relative to the Earth
<input type="checkbox"/> Create a timeline to indicate stages of growth in humans	<input type="checkbox"/> Know and demonstrate how night and day are created
<input type="checkbox"/> Compare and group materials based on their properties (e.g. hardness, solubility, transparency, conductivity, [electrical & thermal], and response to magnets	<input type="checkbox"/> Describe the Sun, Earth and Moon (using the term spherical).
	<input type="checkbox"/> Know what gravity is and its impact on our lives
<input type="checkbox"/> Know how a material dissolves to form a solution; explaining the process of dissolving	<input type="checkbox"/> Identify and know the effect of air and water resistance
<input type="checkbox"/> Know and show how to recover a substance from a solution	<input type="checkbox"/> Identify and know the effect of friction
<input type="checkbox"/> Know and demonstrate how some materials can be separated (e.g. through filtering, sieving and evaporating)	<input type="checkbox"/> Explain how levers, pulleys and gears allow a smaller force to have a greater effect

Sticky Knowledge: Science

Year 6

Science Knowledge

<input type="checkbox"/> Classify living things into broad groups according to observable characteristics and based on similarities and differences	<input type="checkbox"/> Know how animals and plants are adapted to suit their environment
<input type="checkbox"/> Know how living things have been classified	<input type="checkbox"/> Link adaptation over time to evolution
<input type="checkbox"/> Give reasons for classifying plants and animals in a specific way	<input type="checkbox"/> Know about evolution and can explain what it is
<input type="checkbox"/> Identify and name the main parts of the human circulatory system	<input type="checkbox"/> Know how light travels
<input type="checkbox"/> Know the function of the heart, blood vessels and blood	<input type="checkbox"/> Know and demonstrate how we see objects
<input type="checkbox"/> Know the impact of diet, exercise, drugs and life style on health	<input type="checkbox"/> Know why shadows have the same shape as the object that casts them
<input type="checkbox"/> Know the ways in which nutrients and water are transported in animals, including humans	<input type="checkbox"/> Know how simple optical instruments work, e.g. periscope, telescope, binoculars, mirror, magnifying glass etc
<input type="checkbox"/> Know how the Earth and living things have changed over time	<input type="checkbox"/> Compare and give reasons for why components work and do not work in a circuit
<input type="checkbox"/> Know how fossils can be used to find out about the past	<input type="checkbox"/> Draw circuit diagrams using correct symbols
<input type="checkbox"/> Know about reproduction and offspring (recognising that offspring normally vary and are not identical to their parents)	<input type="checkbox"/> Know how the number and voltage of cells in a circuit links to the brightness of a lamp or the volume of a buzzer