

# B.A.D thinking

Cognitive Domain	Type of thinking	Types of activities
<b>Basic</b>	Low level cognitive demand. Involves following instructions.	Name, describe, follow instructions or methods, complete tasks, recall information, ask basic questions, observe, use, match, report, measure, list, illustrate, label, recognise, tell, repeat, arrange, define, memorise, calculate, recite, draw, recall.
<b>Advancing</b>	Higher-level cognitive demand beyond recall. Requires application involving some degree of decision making.	Apply skills to solve problems, explain methods, classify, infer, categorise, identify patterns, organise, modify, predict, interpret, summarise, estimate, compare, use, experiment, demonstrate, practise, show, arrange, point out, graph, separate.
<b>Deep</b>	Cognitive demand involves non-standard, non-routine, inter-connected, multi-step thinking in problems with more than one possible solution. Requires reasoning and justification.	Solve non-routine problems, appraise, explain concepts, hypothesise, investigate, cite evidence, design, create, prove, judge, recommend, justify, generalise, propose, discover, arrange, rate, evaluate, revise, conclude, formulate, construct, develop, connect, prioritise.

# Milestone 2 - Biology - To understand plants

Milestone indicator	Basic	Advancing	Deep
Identify and describe the functions of different parts of flowering plants: roots, stem, leaves and flowers.	<b>Describe and Illustrate</b> the functions of different parts of flowering plants.	<b>Explain</b> how leaves are important in creating food for a plant.	<b>Prove or disprove</b> that roots act like straws sucking up water for the plant.
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.	Grow, <b>observe</b> and <b>record</b> the growth of a range of different plants.	<b>Compare</b> and <b>contrast</b> the conditions for growth for a range of different plants.  <b>Explain</b> why these differences may exist.	<b>Create</b> a planting plan for a 1 metre square bed of flowers that will look its best three years from planting.  <b>Justify</b> your choice of plants.
Investigate the way in which water is transported within plants.	<b>Observe (or read about)</b> and <b>answer questions</b> about how water is transported in plants.	<b>Experiment</b> with food colouring to <b>demonstrate</b> how water is transported through a plant.  <b>Explain</b> the experiment and <b>summarise</b> your observations.  <b>Compare</b> and <b>contrast</b> your observations with those of others.	Can you change the colour of celery? <b>Prove it</b> and draw some scientific <b>conclusions</b> .
Explore the role of flowers in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.	<b>Label</b> the parts of a flower.  <b>Describe</b> the process of pollination.  <b>List</b> ways in which plants are pollinated.  <b>Describe</b> how seeds are formed.  <b>List</b> ways in which seeds are dispersed.	Using a range of (real) flowering plants, locate and name the parts of the flower. ( <b>apply</b> )  <b>Compare</b> different flowers and explain the differences in the size and shape of the parts of the flower.  <b>Explain</b> why a flower that is not pollinated will not reproduce.	<b>Suggest</b> reasons why some people are worried about a fall in the number of bees in the British Isles.  <b>Why might</b> flowering plants grow in high up rooftops or gutters even if humans did not put them there?  Animals are a flowering plant's best friend. Do you agree? ( <b>reason</b> )

# Milestone 2 - Biology - To understand animals and humans

Milestone indicator	Basic	Advancing	Deep
Identify that animals, including humans, need the right types and amounts of nutrition, that they cannot make their own food and they get nutrition from what they eat.	<p><b>Name</b> the seven different types of nutrition that humans (and named animals) need.</p> <p><b>Describe</b> a healthy fraction of the main nutrients for humans (and named animals).</p> <p><b>Illustrate</b> how humans (and named animals) get nutrition from the food they eat.</p> <p><b>Name</b> the (natural, i.e. not the shops!) sources of humans food.</p>	<p><b>Compare</b> and <b>contrast</b> how humans and flowering plants obtain their food.</p> <p><b>Summarise</b> the main nutritional differences between carbohydrates, fibres, fats, proteins and water.</p> <p><b>Point out</b> the effects of various vitamins and minerals on human health.</p>	<p><b>Investigate</b> malnutrition.</p> <p><b>True or false?</b> some illnesses are caused by malnutrition.</p> <p><b>Suggest</b> a range of foods for someone suffering from a vitamin C deficiency?</p> <p>Why <b>might (suggest)</b> children in countries affected by war become ill?</p>
Construct and interpret a variety of food chains, identifying producers, predators and prey.	<p><b>Name</b> producers, predators and prey in a food chain.</p> <p><b>Describe</b> producers, predators and prey as herbivores, carnivores or omnivores.</p> <p><b>Describe</b> energy flow in a food chain.</p> <p><b>Draw</b> a food chain involving a mouse.</p>	<p><b>Identify patterns</b> in the flow of energy in a food chain.</p> <p><b>Demonstrate</b> how food chains always begin with sunlight.</p> <p><b>Explain</b> how water is essential in a food chain.</p>	<p><b>Suggest</b> reasons why a growth in sparrow hawks might lead to a reduction in songbirds and too many insects, snails and slugs in gardens.</p> <p>How are predators affected by changes in the natural environment? (<b>Generalise</b>)</p>
Identify that humans and some animals have skeletons and muscles for support, protection and movement.	<p><b>Label</b> the main bones and joints in the human (and some animals) skeleton.</p> <p><b>Name</b> the main muscles in the human (and some animals) body.</p> <p>Describe the role of the skeleton and muscles in support, protection and movement.</p> <p><b>Observe</b> and <b>describe</b> the role of muscles in human movement.</p>	<p><b>Categorise</b> muscle movement as relaxing or contracting.</p> <p><b>Explain</b> the <b>relationship</b> between muscle groups as they relax and contract.</p>	<p><b>Recommend</b> exercises that use each main muscle group in the human body.</p>
Describe the simple functions of the basic parts of the digestive system in humans.	<p><b>Label</b> the parts of the human digestive system.</p> <p><b>Describe</b> the functions of the human digestive system.</p>	<p><b>Relate</b> the human digestive system to the way humans get nutrition.</p> <p><b>Contrast</b> this with how plants get nutrition.</p>	<p><b>Suggest</b> reasons why humans may suffer from digestion problems.</p>
Identify the different types of teeth in humans and their simple functions.	<p><b>Label</b> the types of adult human teeth.</p> <p><b>Describe</b> the functions of the different types of teeth.</p> <p><b>Describe</b> good care of teeth.</p>	<p><b>Compare</b> and <b>contrast</b> human teeth with those of a carnivore animal.</p>	<p><b>Cite evidence</b> of how diet is linked to the health of human teeth.</p>

# Milestone 2 - Biology - To investigate living things

Milestone indicator	Basic	Advancing	Deep
Recognise that living things can be grouped in a variety of ways.	<p><b>Name</b> groups of animals (and plants).</p> <p><b>Describe</b> the features of animals (and plants) in particular groups.</p> <p><b>Match</b> animals (and plants) to groups.</p>	<p><b>Compare</b> and <b>contrast</b> the features of animals (and plants) in different groups.</p> <p><b>Summarise</b> the key similarities and differences of animals (and plants) in different groups.</p> <p><b>Explain</b> why you have chosen the key similarities and differences to summarise.</p>	<p>Are there any ways in which you could classify animals (and plants) so that they may be in more than one group? (<b>suggest, reason, propose, arrange</b>)</p>
Explore and use classification keys.	<p><b>Complete</b> a classification key from a list of animals (and plants).</p>	<p><b>Identify</b> animals (and plants) using a classification key (<b>apply</b>).</p> <p><b>Adapt</b> a classification key to include different criteria.</p>	<p><b>Construct</b> classification keys for animals (and plants).</p>
Recognise that environments can change and that this can sometimes pose dangers to specific habitats.	<p><b>Name</b> and <b>describe</b> a range of different habitats.</p> <p><b>Identify</b> and <b>label</b> specific plants and animals in these habitats.</p> <p><b>Describe</b> how (for example, deforestation in rainforests) is a danger to specific habitats.</p>	<p><b>Compare</b> changes in two or more habitats and <b>categorise</b> the effects of the changes.</p>	<p><b>Explain the concept</b> of conservation and how groups are trying to preserve habitats.</p>

# Milestone 2 - Biology - To understand evolution and inheritance

Milestone indicator	Basic	Advancing	Deep
Identify how plants and animals, including humans, resemble their parents in many features.	<p><b>Match</b> pictures of (human and animal) offspring to their parents.</p> <p><b>Notice</b> and <b>describe</b> how they sometimes resemble each other.</p> <p><b>Notice</b> that and <b>describe</b> how this may not be the case for all humans.</p> <p><b>Notice</b> and <b>label</b> the resemblance between plants and those that grow from their seeds.</p> <p><i>NOTE: sensitivity required. Our advice is to use well known public figures, e.g. the Royal Family, to avoid insensitivity to individual pupils.</i></p>	<p><b>Categorise</b> resemblances between humans (and plants and animals) and <b>organise</b> your findings.</p>	<p><b>Explain the concept of</b> inheritance.</p> <p><b>Investigate</b> how scientists and doctors are researching conditions that are inherited from a parent.</p>
Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.	<p><b>Name</b> a variety of animal and plant fossils.</p> <p><b>Describe</b> the conditions in which the fossils once lived.</p> <p><b>Note, name</b> and <b>describe</b> plants and animals that inhabited the Earth millions of years ago.</p>	<p><b>Categorise</b> fossils in a number of ways.</p> <p><b>Compare</b> and <b>contrast</b> different fossils.</p> <p><b>Explain</b> the process of the formation of fossils.</p>	<p><b>Investigate</b> the conditions in which life on Earth survived millions of years ago.</p> <p>Burning fossil fuels is widely thought by scientists to contribute to a rise in worldwide temperature.</p> <p><b>Investigate</b> this and <b>cite evidence</b> that supports or questions this view.</p>
Identify how animals and plants are suited to and adapt to their environment in different ways.	<p><b>Match</b> a range of animals and plants to the environments in which they are found.</p> <p><b>Describe</b> how animals and plants are suited to the environments in which they are found.</p> <p><b>Illustrate</b> how animals and plants adapt to environments in different ways.</p>	<p><b>Explain</b> and give examples of the idea of adaptation.</p> <p><b>Compare</b> and <b>contrast</b> different types of adaptation.</p>	<p><b>True or false:</b> plants and animals would not survive if they could not adapt?</p> <p>Which do you think are the best examples (<b>suggest</b>) of an animal and plant that shows adaptation ?</p>

# Milestone 2 - Chemistry - To investigate materials

Milestone indicator	Basic	Advancing	Deep
Compare and group together different kinds of rocks on the basis of their simple, physical properties.	<p><b>Name</b> different types of rock.</p> <p><b>Describe</b> the properties (including hardness) of a variety of different rocks.</p> <p><b>Label</b> some of the minerals found in rocks.</p>	<p><b>Compare</b> and <b>contrast</b> the properties of different rocks.</p> <p><b>Group</b> rocks on the basis of their properties. (rather than their origins)</p> <p><b>Infer</b> the names and types of rocks based on their observable properties or descriptions of their minerals.</p>	<p><b>True or false:</b> The colour of a rock is a good clue that helps to identify it?</p> <p><b>Always, sometimes or never:</b> Rocks that sparkle have a high quartz content?</p>
Relate the simple physical properties of some rocks to their formation (igneous or sedimentary).	<p><b>Observe</b> and <b>describe</b> the properties of igneous and sedimentary rocks.</p> <p><b>Describe</b> rocks as igneous or sedimentary.</p> <p><b>Describe</b> the properties of igneous and sedimentary rocks.</p> <p><b>Illustrate</b> how igneous and sedimentary rocks are formed.</p>	<p><b>Explain</b> the main differences between igneous and sedimentary rocks.</p> <p><b>Compare</b> the origins of different types of rocks and <b>identify patterns</b> that would help one to <b>infer</b> the type of rock.</p>	<p><b>Generalise:</b> how can the hardness of a rock be <b>related</b> to its origins?</p>
Describe in simple terms how fossils are formed when things that have lived are trapped within sedimentary rock.	<p><b>Describe</b> the formation of fossils.</p> <p><b>Illustrate</b> the formation of fossils.</p>	<p>Identify the types of fossils (<b>identify patterns</b>) that are not likely to be found in different types of sedimentary rocks [e.g. in shale, limestone, sandstone etc.]</p>	<p><b>Is it possible</b> that fossils could be found within igneous rocks? <b>Cite evidence.</b></p>
Recognise that soils are made from rocks and organic matter.	<p><b>Observe</b> and <b>describe</b> the properties of soils.</p> <p><b>Observe</b> and <b>name</b> different types of soils.</p> <p><b>Find out about</b> and <b>describe</b> how soil is formed from rocks and organic matter.</p> <p><b>Name</b> the 'parent' materials of different types of soils.</p>	<p><b>Explain</b> how weathering contributes to the formation of soils.</p> <p><b>Compare</b> and <b>contrast</b> different types of soils.</p> <p><b>Categorise</b> soils using a range of different criteria.</p> <p><b>Test</b> soils in various ways in order to <b>identify</b> them.</p>	<p><b>Recommend</b> plants for different soil conditions.</p> <p><b>True or false:</b> Alluvial soils are richer in nutrients than most other soils?</p> <p><b>Investigate</b> the flooding of the river Nile in ancient Egyptian times and <b>relate</b> this to your knowledge of soils.</p>
Compare and group materials together, according to whether they are solids, liquids or gases.	<p><b>Name</b> materials as solids, liquids or gases.</p> <p><b>Observe</b> and <b>describe</b> the typical properties of solids, liquids and gases.</p> <p><b>Complete</b> tables to show information about solids, liquids and gases.</p>	<p><b>Compare</b> and <b>contrast</b> solids, liquids and gases.</p> <p><b>Classify</b> liquids in different ways.</p> <p><b>Classify</b> solids in different ways.</p> <p><b>Classify</b> gases in different ways.</p> <p><b>Explain</b> why a helium filled balloon will float in air.</p>	<p><b>True or false:</b> liquids take the form of the container they are in?</p> <p><b>True or false:</b> solids keep their shape unless it is altered by a force?</p> <p><b>Always, sometimes or never:</b> gases are lighter than solids?</p>
Observe that some materials change state when they are heated or cooled, and measure the temperature at which this happens in degrees Celsius (°C), building on their teaching in mathematics.	<p><b>Observe</b> and <b>describe</b> the effect of heating and cooling water, chocolate, butter and other everyday materials.</p> <p><b>Measure</b> the changing temperature of materials as they are heated and cooled and <b>complete</b> tables and graphs to show the effects.</p>	<p><b>Summarise</b>, using scientific terminology the relationship between temperature and states of matter.</p> <p><b>Explain</b> the three states of matter of water and how temperature affects its state.</p>	<p><b>Create</b> a testable <b>hypothesis</b> about states of matter, carry out tests and <b>prove</b> or <b>disprove</b> your hypothesis.</p>
Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.	<p><b>Describe</b> the water cycle.</p> <p><b>Observe</b> evaporation.</p> <p><b>Observe</b> and <b>describe</b> the different rates of evaporation in different temperatures.</p>	<p><b>Graph</b> the relationship between temperature and evaporation.</p> <p><b>Summarise</b> your results.</p>	<p><b>Suggest</b> practical uses for the relationship between temperature and evaporation.</p>

# Milestone 2 - Physics - To understand movement, forces and magnets

Milestone indicator	Basic	Advancing	Deep
Compare how things move on different surfaces.	<p><b>Observe</b> and <b>describe</b> the movement of objects on surfaces that are smooth and rough, flat and inclined to different degrees.</p> <p><b>Compete</b> tables to record observations.</p> <p><b>Use</b> the word friction appropriately.</p>	<p><b>Identify patterns</b> in the type of surface and how this affects movement.</p> <p><b>Explain</b> why these patterns may exist.</p> <p><b>Experiment with</b> practical applications of this relationship.</p>	<p><b>Investigate</b> the design of car tyres and <b>connect</b> this to your understanding of friction.</p>
Notice that some forces need contact between two objects, but magnetic forces can act at a distance.	<p><b>Observe</b> and <b>illustrate</b> how objects need a contact force for them to move.</p> <p><b>Name</b> the contact forces that move objects.</p> <p><b>Observe</b> and <b>illustrate</b> how magnetic forces act at a distance.</p>	<p><b>Experiment with</b> magnets to explore whether the force of magnetism can act through materials (such as placing magnets in ice, etc.) <b>Identify any patterns</b> in the type and amount of material the force is acting through.</p>	<p><b>Investigate</b> practical applications of magnetism in everyday life.</p>
Observe how magnets attract or repel each other and attract some materials and not others.	<p><b>Observe</b> and <b>describe</b> how magnets attract or repel each other.</p> <p><b>Observe</b> and <b>describe</b> that magnets attracts some (<b>name</b>) materials and not others.</p>	<p><b>Experiment with</b> iron filings to see how they act when magnets attract and repel each other. <b>Record</b> your findings and <b>explain</b> what is happening.</p>	<p><b>Explain the concept</b> of magnetic fields and how magnets attract or repel one another when placed near each other.</p> <p><b>Prove</b> that there are magnetic fields by making them 'visible'</p>
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.	<p><b>Observe</b> then <b>complete</b> tables that <b>describe</b> everyday materials as 'attracted' or 'not attracted' to magnets.</p>	<p><b>Explain</b> why some materials are attracted to magnets and others are not.</p>	<p><b>Investigate</b> practical applications of the understanding of which materials are or are not attracted to magnets.</p> <p><b>Suggest</b> some uses for this in school.</p>
Describe magnets as having two poles.	<p><b>label</b> the north and south poles of magnets.</p>	<p><b>Explain</b> why magnets have poles.</p> <p><b>Experiment with</b> cutting magnets in two. <b>Observe</b> and <b>explain</b> what happens.</p>	<p>Why (<b>explain concept</b>) do we call parts of Earth the North and South poles?</p> <p><b>Investigate</b> the Aurora Borealis and explain (<b>the concept</b>) how this is linked to magnetism.</p>
Predict whether two magnets will attract or repel each other, depending on which poles are facing.	<p><b>Observe</b> and describe the effect of placing like and different poles of a magnet next to each other.</p> <p><b>Complete</b> tables that show what you expect to happen when different combinations of poles are facing each other.</p>	<p><b>Apply</b> your knowledge of magnetic poles to create a game that uses the idea that magnets attract or repel each other.</p>	<p>Is it possible (<b>suggest</b>) to make a magnet? <b>Prove</b> or <b>disprove</b> this.</p>

# Milestone 2 - Physics - To understand light and seeing

Milestone indicator	Basic	Advancing	Deep
Recognise that light is required in order to see things and that dark is the absence of light.	<p><b>Observe</b> and <b>record</b> the effect of light in seeing things.</p> <p><b>Answer questions</b> about the effect of light on seeing.</p> <p><b>Describe</b> darkness.</p>	<p><b>Explain</b> the relationship between light and seeing.</p> <p><b>Experiment</b> with different levels of light on the visibility of different coloured objects.</p> <p><b>Explain</b> why it is important to dress in high visibility clothing in some situations.</p>	<p><b>Relate</b> your knowledge of the Earth's rotation in space to your understanding of light and dark.</p> <p><b>True or false:</b> The Sun is the only natural source of light in our solar system?</p>
Notice that light is reflected from surfaces.	<p><b>Observe</b> light reflected from surfaces.</p> <p><b>Describe</b> the effect of light reflecting from surfaces.</p> <p><b>Label</b> a number of effects of reflection.</p>	<p><b>Experiment with</b> light reflecting from a variety of different surfaces.</p> <p><b>Categorise</b> surfaces in terms of their reflective properties.</p>	<p><b>Always, sometimes or never:</b> Dark surfaces do not reflect light as well as those that are light?</p>
Recognise that light from the sun can be dangerous and that there are ways to protect ones eyes.	<p><b>Name</b> some safety rules to avoid damaging ones eyes with light from the sun.</p>	<p><b>Apply</b> your knowledge of safety rules to <b>explain</b> how to safely view a solar eclipse.</p>	<p><b>Investigate</b> different types of sunglasses and <b>recommend</b> the best type to protect ones eyes from day to day sunlight. (teacher: reinforcing the point that it is still not safe to look at the sun even through sunglasses)</p>
Recognise that shadows are formed when the light from a light source is blocked by a solid object.	<p><b>Observe</b> and <b>record</b> the effect of blocking light with solid objects.</p> <p><b>Name</b> the effect and <b>describe</b> what is happening.</p>	<p><b>Explain</b> why an umbrella is a useful practical example (<b>apply</b>) of shadows.</p> <p><b>Give examples</b> of other practical uses (<b>apply</b>) for shadows.</p>	<p><b>True or false:</b> night time is a shadow?</p>
Find patterns in the way that the size of shadows change.	<p><b>Observe</b> and <b>record</b> the length of shadows at different times of the day.</p> <p><b>Observe</b> and <b>record</b> how the size of shadows change when the source of light is moved closer or further away from the object causing the shadow.</p>	<p><b>Explain</b> why shadows change size.</p> <p><b>Predict</b> when shadows will take a particular shape. e.g. what will the shadow of a tree look like on a bright summer evening with the sun in a particular position?</p>	<p>What is the <b>relationship</b> between the height of a light source in relation to the object that is causing a shadow?</p>

# Milestone 2 - Physics - To investigate sound and hearing

Milestone indicator	Basic	Advancing	Deep
Identify how sounds are made, associating some of them with something vibrating.	<p><b>Listen</b> to and <b>describe</b> a range of sounds from different sources.</p> <p><b>Identify</b> the source of sounds.</p> <p><b>Complete</b> experiments and <b>record</b> findings that <b>demonstrate</b> how a tuning fork is vibrating when it makes a sound.</p>	<p><b>Compare</b> and <b>contrast</b> how loud and quiet sounds are made.</p> <p><b>Experiment</b> with stringed musical instruments to discover how high and low notes are made and <b>explain</b> your findings.</p> <p><b>Explain</b> the role of vibration in creating sounds.</p>	<p><b>Suggest</b> a way to <b>prove</b> the <b>relationship</b> between vibration and pitch.</p> <p><b>True or false:</b> Higher notes are louder than lower notes?</p>
Recognise that vibrations from sounds travel through a medium to the ear.	<p><b>Listen</b> to and <b>describe</b> sounds through a variety of mediums.</p> <p><b>Draw</b> a <b>labelled</b> diagram that shows how vibrations travel through a medium to the ear.</p>	<p><b>Compare</b> and <b>contrast</b> the effectiveness of different mediums in transmitting sounds.</p>	<p><b>Suggest</b> reasons why whales and dolphins can communicate over long distances.</p> <p><b>Do you agree:</b> air is not a very good medium for transmitting sounds?</p>

# Milestone 2 - Physics - To understand electrical circuits

Milestone indicator	Basic	Advancing	Deep
Identify common appliances that run on electricity.	<p><b>Identify</b> and <b>name</b> common appliances that run on electricity.</p> <p><b>Label</b> appliances that run on high and low voltage electricity.</p> <p><b>Identify</b> and <b>describe</b> sources of electricity for appliances, including mains, battery, solar and others.</p>	<p><b>Explain</b> the <b>similarities</b> and <b>differences</b> between a 240 volt 40 watt halogen light bulb and a 12 volt, 6 watt L.E.D light bulb.</p> <p><b>Explain</b> the <b>similarities</b> and <b>differences</b> between a 240 volt mains powered vacuum cleaner and a 12 volt battery vacuum cleaner.</p>	<p><b>Investigate</b> battery powered road cars and draw some <b>conclusions</b> about their benefits and problems.</p>
Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.	<p><b>Follow instructions</b> to create a series circuit.</p> <p><b>Label</b> the components of the circuit.</p>	<p>Make a number of series circuits containing different components.</p> <p><b>Explain</b> the <b>similarities</b> between the circuits despite the different components.</p>	<p><b>Explain the concept</b> of a series circuit and <b>recommend</b> some <b>general</b> rules.</p>
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.	<p><b>Complete</b> incomplete circuits by adding the correct components.</p> <p><b>Answer questions</b> about the completeness of various circuits.</p>	<p><b>Predict</b> the effect of changing the arrangement of the components of a circuit (some of which maintain a circuit and other that do not).</p> <p><b>Experiment</b> with the effect of placing more than one bulb in a series circuit and <b>summarise</b> your findings.</p>	<p>Find and rectify faults (<b>solve non-routine problems</b>) for a range of incomplete circuits.</p>
Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.	<p><b>Observe</b> and <b>describe</b> the effect of using switches in a circuit.</p> <p><b>Complete</b> circuit diagrams showing and <b>labelling</b> switches.</p>	<p><b>Explain</b> why opening and closing switches affects a series circuit.</p>	<p><b>True or false:</b> If there are five switches in a row in a series circuit, only one needs to be 'on' for the circuit to be complete?</p> <p><b>Relate</b> the idea of switches to the creation and sending of 'morse code'.</p>
Recognise some common conductors and insulators, and associate metals with being good conductors.	<p><b>Observe</b> and <b>record</b> how different materials act as conductors or insulators of electricity.</p> <p><b>Observe</b> the effect of some poor and good conductors and <b>label</b> materials as poor or good conductors.</p>	<p><b>Categorise</b> materials on the basis of their conductivity.</p> <p><b>Experiment</b> with materials that conduct but also resist the flow of electricity. <b>Summarise</b> your findings.</p>	<p><b>True or false:</b> Everything on Earth either conducts or doesn't conduct electricity, including humans?</p>

# Milestone 2 - Physics - To understand the Earth's movement in space

Milestone indicator	Basic	Advancing	Deep
Describe the movement of the Earth relative to the Sun in the solar system.	<p><b>Describe</b> the movement of the Earth relative to the Sun.</p> <p><b>Label</b> and <b>describe</b> our solar system.</p> <p><b>Answer questions</b> about the scientists who first observed the Earth's movement around the Sun.</p> <p><b>Describe</b> how the movement of the Earth gives rise to seasonal changes.</p>	<p><b>Explain why</b> the Earth's movement gives rise to the seasons.</p> <p><b>Explain why</b> the effect of the Earth's movement on seasons is more acute further away from the equator.</p>	<p><b>True or false:</b> A year is always 365 days, no matter where one is in our solar system?</p> <p><b>Relate</b> your knowledge of the Earth's movement relative to the Sun to time zones. Assess the <b>significance</b> of this to our daily lives.</p> <p><b>Do you agree:</b> At any time of day it is always 5 O' Clock somewhere on Earth.</p>
Describe the movement of the Moon relative to the Earth.	<p><b>Identify</b> and <b>label</b> the Moon and Earth.</p> <p><b>Describe</b> the Moon's movement relative to the Earth.</p> <p><b>Answer questions</b> about the Moon's movement relative to the earth.</p> <p><b>Observe, name</b> and <b>record</b> the phases of the Moon.</p>	<p><b>Explain</b> why the moon's movement affects the tides of oceans and seas on Earth.</p> <p><b>Explain</b> how we can predict the times of high and low tides.</p>	<p><b>Could this be true:</b> the shape of the moon's phases is a natural calendar?</p> <p><b>Is it possible (prove or disprove)</b> to calculate how long until a particular moon shape will appear again?</p> <p><b>Explain the concept</b> of a leap year.</p>