Milestone 1 Curriculum Map Organisation

Year 1& 2

Week	Autumn	Spring	Summer	Continuous Provision
	Introduce the names (and images of) **Wild and garden plants** **(link to seasons)** **(x 1 lessons)**	***INVESTIGATION*** Describe the simple **properties** of a variety **of everyday materials.**	***INVESTIGATION*** Investigate and compare the differences between things that are **living, that are dead and have never been alive.**	**By growing seeds, bulbs and vegetables throughout the year:** Observe and describe how seeds and bulbs grow into mature plants. Find out and describe how plants need water, light, a suitable temperature to grow and stay healthy. **In PE sessions:** Describe the importance for humans of exercise, eating the right amounts of different types of food and hygiene. **Through experimental tables set up at various points throughout the year:** Notice how things move, using simple comparisons such as faster and slower. Compare how different things move. **Through a daily discussion, looking at weather and the signs of the season:** Observe changes across the four seasons. Observe the apparent movement of the Sun throughout the day.
	Introduce the names (and images of) **Evergreen and deciduous trees.** **(link to seasons)** **(x2 lessons)**	***INVESTIGATION*** **Compare** and **group** together a variety of **everyday materials** on the basis of their simple physical properties.	Investigate the **basic needs of animals and humans. (water, food and air)** **Describe the importance for humans of exercise, eating the right amount of different types of food and hygiene.** **(link to needs of plants from Spring investigation)** **(x 2 lessons - Lesson 1 on basic needs Lesson 2 on food pyramid)**	
	Introduce the names (and images of) **Birds, fish, amphibians, reptiles, mammals and invertebrates** **(x 2 lessons)**	Introduce the **groups** **Carnivore, herbivore and omnivore.** **Name animals belonging to these groups.** Describe and compare the **structure** of: Birds, fish, amphibians, reptiles, mammals and invertebrates. (include pets)	Identify that most living things live in **habitats** to which they are suited and describe how different habitats provide for the **basic needs** of different kinds of **animals and plants and how** they **depend on each other.** **Identify and name a variety of plants and animals in their habitats including micro-habitats.** **(x 2 lessons)**	
	INVESTIGATION Introduce **parts of the human body, name and draw/label** and associate parts of the body with the **five senses. (use senses to investigate)** **(x 2 lessons)** Y1 SCIENTIST - Linda B Buck	Describe the **offspring and growth** of animals and humans into adulthood. Identify how **humans resemble their parents** in many features. **(x 2 lessons)**	**Describe** how animals obtain their food from plants and other animals, using the idea of a simple food chain, and **identify** and **name** different sources of food. Y2 SCIENTIST - David Attenborough	
	INVESTIGATION Introduce a range of **everyday materials,** including wood, plastic glass metal, water and rock. **Distinguish between an object and the material from which it is made.** (and in doing so, identify and compare the uses of a variety of everyday materials)	Introduce the **structure of flowering plants.** Introduce the **structure of trees.** **(x 2 lessons)**	***INVESTIGATION*** Find out how the shapes of solid objects made from some **materials** can be **changed by squashing, bending, twisting and stretching.** **Y1 SCIENTIST - Ole Kirk Christiansen**	
	Observe and name a variety of sources of **light.**	***INVESTIGATION*** Set up investigations for observing how seeds and bulbs grow into mature plants. Describe how plants need water, light and a good	***INVESTIGATION*** Experiment with ways to block light and make **shadows.**	

Milestone 1 Curriculum Map Organisation

		temp to grow and stay healthy		
	INVESTIGATION Observe and name a variety of sources of **sound**, noticing we hear with our ears.	***INVESTIGATION*** Explain that we **see** sources of light because the **light travels** from the source to our eyes.	***INVESTIGATION*** Discriminate between similar **sounds** (quiz).	
	Identify common appliances that run on **electricity.** Y2 SCIENTIST - Alessandro Volta	***INVESTIGATION*** **Discriminate** between different **sounds.** (quiz).	***INVESTIGATION*** Experiment with simple series-**circuits**.	
	INVESTIGATION Construct a simple series-**circuit.**	***INVESTIGATION*** **Experiment** with simple series-**circuits**.	Quiz: **all of the year's work so far**	

Science- EYFS and Milestone 1

	3 & 4-year-olds will be learning to:	Children in Reception will be learning to:	ELG
Expressive Arts and Design	• Explore different materials freely, in order to develop their ideas about how to use them and what to make. • Develop their own ideas and then decide which materials to use to express them. • Join different materials and explore different textures.		**Creating with Materials** • Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function.
Understanding the World	• Explore how things work. • Plant seeds and care for growing plants. • Understand the key features of the life cycle of a plant and an animal. • Begin to understand the need to respect and care for the natural environment and all living things. • Explore and talk about different forces they can feel. • Talk about the differences between materials and changes they notice.	• Explore the natural world around them. • Describe what they see, hear and feel whilst outside. • Recognise some environments that are different to the one in which they live. • Understand the effect of changing seasons on the natural world around them.	**The Natural World** • Explore the natural world around them, making observations and drawing pictures of animals and plants. • Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class. • Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.
KS1 readiness objectives	**Working scientifically** To feel confident to answer simple questions about observable properties of objects and people, animals and plants around them To compare objects in their environment and talk about similarities and differences To ask questions about the world around them, and seek to find their own answers	**Plants** To know what a plant is To know what a flower is To know where you see plants To describe different plants and flowers **Animals** To know what an animal is To recognise and name a variety of different animals To know the names of different body parts of humans and animals they have experience of	**Everyday materials** To recognise that different everyday objects are made from different materials To describe how different objects look and feel **Seasonal Change** To know about different types of weather To observe changes in trees and plants as the seasons progress

Activities and experiences to support learning in Science in the EYFS:	**Science:** Animals including humans Body parts and senses (Y1), how are the senses used? (Y2) Everyday materials and physical properties Y1/2, forces and magnets Y3/4 and Y5/6 Animal groups Y1/2, Living things and habitats Y1/2, habitats Y3, categorisation, classification and lifestyles of animals (Y5 and 6). Healthy lifestyles (Y1), teeth and good hygiene (Y3/ 4), diet and lifestyle (Y5/ 6) foundation for scientific enquiry
• Explore their own bodies and their senses • Know that we live on planet Earth and can name some other planets • Talks about differences between materials and changes they notice. • Explores the natural world around them - Describe what they see, hear and feel whilst outside. • Investigations of materials- floating and sinking, magnetic and non magnetic, waterproof. • Learn to name the parts of the body and what we use them for. • Learn about animals and their homes, including pets, farm animals and wild animals. • Observe changes such as chicks hatching and caterpillars turning into butterflies (life cycles), the seasons changing, plants and flowers growing. Children are supported to notice and talk about what is happening and why. • Understand the effect of seasons on the natural world, discussing when and how things grow - Can say what plants need to survive. • Understands that the weather changes and that in different countries you have different weather Can identify what you need to wear for each season and why. • Learn about being healthy, including eating a range of foods, taking part in exercise and good oral hygiene. • Develop a sense of curiosity and exploration through a range of resources relating to our topics, e.g magnets, magnifying glasses, colour paddles, things to smell and taste etc, and through the continuous provision areas such as sand, water, small world, construction etc.	

Milestone 1 - Biology - To understand plants

	Year One	Year Two	
Milestone indicator	Basic	Advancing	Deep
Identify and name a variety of common plants, including garden plants, wild plants and trees and those classified as deciduous and evergreen.	What are the names of common wild plants? What are the names of some common garden plants? What are the names of common trees? Which trees are evergreen and which are deciduous? (name)	What are the similarities and differences between deciduous and evergreen trees? Think of some ways to categorise plants.	Could you suggest a garden design for someone who likes privacy and bright autumn colours?
Identify and describe the basic structure of a variety of common flowering plants, including roots, stem/trunk, leaves and flowers.	• What are the names of the parts of flowering plants? What is the structure (names) of each part of a flowering plant?	Taking a selection of (real) different flowering plants, what are the structural features? (apply)	Are roots always at the bottom of plants (generalise)? Why do you think that is? (explain concept)
Observe and describe how seeds and bulbs grow into mature plants.	Describe the growth of seeds and bulbs.	• What are the similarities and differences in the growth of seeds and bulbs?	• What might a scientist need to keep in mind when recording information about the growth of seeds and bulbs? (propose)
Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.	• What do plants need to stay healthy? (describe, list)	• How could you try to revive these plants? (apply) [Give pupils a dried out plant, one that's been in a fridge, one that's been kept in the dark etc?]	• How could you devise a way of proving that plants need certain conditions for growth?

Milestone 1 - Biology - To understand animals and humans

	Year One	Year Two	
Milestone indicator	Basic	Advancing	Deep
Identify and name a variety of common animals that are birds, fish, amphibians, reptiles, mammals and invertebrates.	Name some common animals. Match the animals to the labels birds, fish, amphibian, reptile, mammal and invertebrate.	Point out and explain the main differences between birds, fish, amphibians, reptiles, mammals and invertebrates.	Create a guide to recognising different types of animals.
Identify and name a variety of common animals that are carnivores, herbivores and omnivores.	Name some common animals. Label animals as carnivore, herbivores or omnivore.	Show how carnivores, herbivores and omnivores are similar and different.	True or false? (prove) Carnivores are not hunted by other carnivores.
Describe and compare the structure of a variety of common animals. (birds, fish, amphibians, reptiles, mammals and invertebrates, including pets)	Name and label the structures of common animals. Complete tables that compare the structures of common animals.	Compare and contrast mammals with amphibians.	What evidence would you show to prove that a reptile could not be confused with a mammal?
Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.	Label the main parts of the human body. Illustrate the parts of the body associated with the five senses.	Explain why the sense of touch may be important to a blind person.	Suggest some adjustments that could be made around school for a blind or deaf person.
Notice that animals, including humans, have offspring which grow into adults.	Name the offspring of animals and humans. (e.g. babies for humans, puppies for dogs) Match the offspring to the adult.	Explain the main differences between adult animals and humans and their offspring.	Suggest some ways that an animal's offspring (including humans) are dependent, for some time, on adults.
Investigate and describe the basic needs of animals, including humans, for survival. (water, food and air)	List the basic needs of animals, including humans, for survival.	Compare the types of food that different animals require.	Explain the concept of humans' need for clean water and why this is not so important for other animals.
Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.	Describe a healthy diet. Describe a healthy lifestyle. Observe and describe the effect of exercise.	Categorise food types and explain why each group is important to humans.	Create a weekly menu and exercise programme for someone your age.

Milestone 1 - Biology - To investigate living things

	Year One	Year Two	
Milestone indicator	Basic	Advancing	Deep
Explore and compare the differences between things that are living, that are dead and that have never been alive.	Observe and list the key features of things that are living, dead and that have never been alive. Describe things as living, dead or never been alive.	Organise things of your choice into groups: living, dead and never been alive.	Give evidence to show that a glass bottle has never been alive.
Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants and how they depend on each other.	Observe animals/plants in their natural habitats. Match the animal/plant to its habitat. Describe why the animal/plant is suited to its environment.	Categorise animals/plants according to the conditions they require. Explain your categories.	Suggest reasons why a cactus may find it difficult to survive in cold, wet conditions. Create an ideal environment for woodlice and prove that this is a successful habitat.
Identify and name a variety of plants and animals in their habitats, including micro-habitats.	Match common animals/plants to their habitats.	Explain why a habitat for a plant or animal is suitable.	Design an ideal habitat for a hamster (or other animal that is kept as a pet. Create a bottle garden for plants that require warm, dry conditions.
Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.	What does a (name of animal) like to eat? (name) Draw a food chain that ends with a sparrow hawk. Name sources of food.	Explain the differences in a food chain for a herbivore and a carnivore.	Always, sometimes or never? All food chains end with a carnivore.

Milestone 1 - Biology - To understand evolution and inheritance

	Year One	Year Two	
Milestone indicator	Basic	Advancing	Deep
Identify how humans resemble their parents in many features.	List the ways that humans may resemble their parents. Match pictures of parents to their children.	Present similarities and differences between parents and their children.	Devise a ‘guess who’ game to deduce the child of a set of parents.

Milestone 1 - Chemistry - To investigate materials

	Year One	Year Two	
Milestone indicator	Basic	Advancing	Deep
Distinguish between an object and the material from which it is made.	Match an object to its original material. Name the object and its original material.	Explain how a bottle is made from sand. Choose some objects and explain how they were made from their original material.	True or false? Some fleece jackets start as plastic bottles.
Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock.	Observe and name everyday materials. Arrange objects made of the same materials and label the materials.	Group objects based on the materials they are made from. Explain your groupings.	Investigate which objects started off as a plant.
Describe the simple physical properties of a variety of everyday materials.	Observe and name the properties of everyday materials. Complete tables that describe the properties of materials.	Explain why the properties of materials are useful for deciding which materials to use for an object. Give examples.	Design an item of clothing to keep one dry.
Compare and group together a variety of everyday materials on the basis of their simple physical properties.	Place materials into groups under the headings given to you. Describe the different properties of materials.	Decide how to group materials on the basis of their properties. Explain your reasons for your groups. Compare and contrast the different properties of materials.	Create a ‘guess the material’ game based on the properties of materials.

Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.	Observe and describe changes to the shape of of solid objects when they are squashed, bent, twisted or stretched.	Experiment with changing the shape of solid objects. Organise and summarise your findings.	Always, sometimes or never? The shape of wood can be changed through squashing, bending, twisting or stretching.
Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick/rock, and paper/cardboard for particular uses.	List different uses for everyday materials. List reasons for the suitability of materials for particular uses.	Compare and contrast the properties of materials and use this to explain why certain materials are used for particular purposes.	Paper is unsuitable for a model boat. Do you agree or disagree (reason, justify) Devise other hypotheses like this and test them.

Milestone 1 - Physics - To understand movement, forces and magnets

	Year One	Year Two	
Milestone indicator	Basic	Advancing	Deep
Notice and describe how things move, using simple comparisons such as faster and slower.	What happens to objects when they are pushed? What happens to objects when they are pulled?	Experiment with pushing objects gently and hard. Record and explain what happens. Experiment with a slope and record how this changes the speed at which an object rolls.	Devise ways to slow down a toy car rolling down a slope. True or false? The surface on which a toy car rolls affects its speed?
Compare how different things move.	Observe and describe the movement of a range of things including things that move with magnets.	Compare the movement of remote control cars and a helicopter drone. Explain the differences in movement.	Do heavy and light things move differently? Is there a pattern?

Milestone 1 - Physics - To understand light and seeing

	Year One	Year Two	
Milestone indicator	Basic	Advancing	Deep
Observe and name a variety of sources of light, including electric lights, flames and the Sun, explaining that we see things because light travels from them to our eyes.	Name a variety of sources of light. Illustrate how light travels from light sources to our eyes.	Experiment with ways to block light from reaching our eyes. Point out how this demonstrates that light travels from a source to our eyes.	True or false? The brighter the source of light the easier it is to see.

Milestone 1 - Physics - To investigate sound and hearing

	Year One	Year Two	
Milestone indicator	Basic	Advancing	Deep
Observe and name a variety of sources of sound, noticing that we hear with our ears.	Name a variety of sources of sound. Recognise a variety of sounds. Observe how we hear sounds with our ears. Illustrate that ears allow us to hear sounds.	Categorise sounds. Compare and contrast sounds based on your own criteria. (choose)	Suggest ways to protect our ears from loud sounds.

Milestone 1 - Physics - To understand electrical circuits

	Year One	Year Two	
Milestone indicator	Basic	Advancing	Deep
Identify common appliances that run on electricity.	Observe and name some sources of electricity. (mains, battery) List common appliances that run on electricity.	Categorise electrical appliances. Explain the reasons for your categories. Compare and contrast some appliances in each of your categories.	Always, sometimes or never? Electrical appliances need batteries or mains electricity to power them.

Construct a simple series electrical circuit.	Follow instructions to construct an electrical circuit. Describe the circuit, naming each component.	Modify a circuit to add more components. Experiment with and categorise the effect that adding more components has.	Diagnose and repair a broken circuit. (solve non routine problems)

Milestone 1 - Physics - To understand the Earth's movement in space

	Year One	**Year Two**	
Milestone indicator	Basic	Advancing	Deep
Observe the apparent movement of the Sun during the day.	Name times of the day. Observe and describe the sun's position in the sky at different times of the school day.	Show how might you know (apply) roughly what time it is in a day by looking at the position of the sun.	Think of a way to prove that it is lunch time using the sun.
Observe changes across the four seasons.	Name the four seasons. Notice and name the key features of each season.	Organise images or objects from each season into categories. Explain your categories.	Always sometimes or never? It is warm and dry during Summer
Observe and describe weather associated with the seasons and how day length varies.	Observe and record weather over four seasons. Describe weather in a named season. Describe how daylight length varies in each season.	Compare and contrast weather and day length across the four seasons. Identify patterns in day length across the four seasons.	Plan some activities that would be suited to each season.

Milestone 2 Curriculum Map Organisation

Year 3&4

Week	Autumn	Spring	Summer	Continuous Provision
1	**Compare** and **group** together different kinds of rocks on the basis of their simple, physical properties	**Recognise** that soils are made from rocks and organic matter.	**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 the teaching in mathematics.	• Grow, observe and record the growth of a range of different plants. (investigate over time) • Skeletons • Teeth • Health display • Rock and fossil display • Electricity components • Moon chart **Outdoor Learning** Applying learning... • Explore and use classification keys on field trips WORKING SCIENTIFICALLY
2	**Relate** the simple physical properties of some rocks to their formation (igneous or sedimentary). IDENTIFYING CLASSIFYING AND GROUPING	**Compare** and **group** materials together, according to whether they are solids, liquids or gases.	**Identify** the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. OBSERVING OVER TIME	
3	**Describe** in simple terms how fossils are formed when things that have lived are trapped within sedimentary rocks.	**Describe** the movement of the Moon relative to the Earth. SECONDARY RESOURCES	**Recognise** that shadows are formed when the light from a light source is blocked by a solid object. **Find patterns** in the way that the size of a shadow changes.	
4	**Identify** how sounds are made, associating some of them with something vibrating. **Recognise** that vibrations from sounds travel through a medium to the ear. PATTERN SEEKING	**Describe** the movement of the Earth relative to the Sun in the solar system.		
5	**Recognise** that light is required in order to see things and that dark is the absence of light. Fair test	**Take one scientist** **Year 3 - Stephen Hawking** **Year 4 - Alexander G. Bell**	**Recognise** that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. **Recognise** some common conductors and insulators, and associate metals with being good conductors. **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. COMPARATIVE AND FAIR TESTS	
6	**Notice** that light is reflected from surfaces. **Recognise** that light from the Sun can be dangerous and that there are ways to protect your eyes.	**Observe** patterns between the pitch of a sound and features of the object that produces it.	**Compare** how things move on different surfaces. Fair test	

Milestone 2 Curriculum Map Organisation

		Observe patterns between the volume of a sound and the strength of the vibrations that produced it. **Recognise t**hat sounds get fainter as the distance from the sound source increases. PATTERN SEEKING		
7	**Identify** common appliances that run on electricity. **Construct** a simple series electrical circuit, **identifying** and **naming** its basic parts, including cells, wires, bulbs, switches and buzzers.	**Observe** how magnets attract or repel each other and attract some materials and not others as well as how they can act at a distance. **Compare** and **group** together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials.	**Describe** magnets as having two poles. **Predict** whether two magnets will attract or repel each other, depending on which poles are facing.	
8	**Take one scientist:** **Year 3 Wk 4 Mary Anning** **Year 4 Wk 12 Pierre Fauchard**	**Explore** the role of flowers in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.	**Recognise** that environments can change and that this can sometimes pose dangers to specific habitats.	
9	**Identify** and **describe** the functions of different parts of flowering plants: roots, stem, leaves and flowers. Investigate the way in which water is transported within plants.	**Identify** that humans and some animals have skeletons and muscles for support, protection and movement. Fair test	**Recognise** that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago**.** **Mary Anning retrieval /Stephen Hawking retrieval.**	
10	**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.	**Describe** the simple functions of the basic parts of the digestive system in humans.	**Identify** how animals and plants are suited to and adapt to their environment in different ways. **Pierre Fauchard /Alexander G Bell retrieval**	
11	**Construct** and **interpret** a variety of food chains, identifying producers, predators and prey.	**Recognise** that living things can be grouped in a variety of ways. **Explore** and use classification keys. (Forestry	*Follow up session from continuous provision.*	
12	**Identify** the different types of teeth in humans and their simple functions. Fair test	**Identify** how plants and animals, including humans, resemble their parents in many features.		

Milestone 2 Curriculum Map Organisation

Milestone 2 - Biology - To understand plants

	Year 3	Year 4	
Milestone indicator	Basic	Advancing	Deep
Identify and describe the functions of different parts of flowering plants: roots, stem, leaves and flowers.	Describe and Illustrate the functions of different parts of flowering plants.	Explain how leaves are important in creating food for a plant.	Prove or disprove 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, observe and record the growth of a range of different plants.	Compare and contrast the conditions for growth for a range of different plants. Explain why these differences may exist.	Create a planting plan for a 1 metre square bed of flowers that will look its best three years from planting. Justify your choice of plants.
Investigate the way in which water is transported within plants.	Observe (or read about) and answer questions about how water is transported in plants.	Experiment with food colouring to demonstrate how water is transported through a plant. Explain the experiment and summarise your observations. Compare and contrast your observations with those of others.	Can you change the colour of celery? Prove it and draw some scientific conclusions.
Explore the role of flowers in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.	Label the parts of a flower. Describe the process of pollination. List ways in which plants are pollinated. Describe how seeds are formed. List ways in which seeds are dispersed.	Using a range of (real) flowering plants, locate and name the parts of the flower. (apply) Compare different flowers and explain the differences in the size and shape of the parts of the flower. Explain why a flower that is not pollinated will not reproduce.	Suggest reasons why some people are worried about a fall in the number of bees in the British Isles. Why might 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? (reason)

Milestone 2 - Biology - To understand animals and humans

	Year 3	Year 4	
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.	Name the seven different types of nutrition that humans (and named animals) need. Describe a healthy fraction of the main nutrients for humans (and named animals). Illustrate how humans (and named animals) get nutrition from the food they eat. Name the (natural, i.e. not the shops!) sources of humans food.	Compare and contrast how humans and flowering plants obtain their food. Summarise the main nutritional differences between carbohydrates, fibres, fats, proteins and water. Point out the effects of various vitamins and minerals on human health.	Investigate malnutrition. True or false? Some illnesses are caused by malnutrition. Suggest a range of foods for someone suffering from a vitamin C deficiency? Why might (suggest) children in countries affected by war become ill?
Construct and interpret a variety of food chains, identifying producers, predators and prey.	Name producers, predators and prey in a food chain. Describe producers, predators and prey as herbivores, carnivores or omnivores. Describe energy flow in a food chain. Draw a food chain involving a mouse.	Identify patterns in the flow of energy in a food chain. Demonstrate how food chains always begin with sunlight. Explain how water is essential in a food chain.	Suggest reasons why a growth in sparrow hawks might lead to a reduction in songbirds and too many insects, snails and slugs in gardens. How are predators affected by changes in the natural environment? (Generalise)
Identify that humans and some animals have skeletons and muscles for support, protection and movement.	Label the main bones and joints in the human (and some animals) skeleton. Name the main muscles in the human (and some animals) body. Describe the role of the skeleton and muscles in support, protection and movement. Observe and describe the role of muscles in human movement.	Categorise muscle movement as relaxing or contracting. Explain the relationship between muscle groups as they relax and contract.	Recommend exercises that use each main muscle group in the human body.

Describe the simple functions of the basic parts of the digestive system in humans.	Label the parts of the human digestive system. Describe the functions of the human digestive system.	Relate the human digestive system to the way humans get nutrition. Contrast this with how plants get nutrition.	Suggest reasons why humans may suffer from digestion problems.
Identify the different types of teeth in humans and their simple functions.	Label the types of adult human teeth. Describe the functions of the different types of teeth. Describe good care of teeth.	Compare and contrast human teeth with those of a carnivore animal.	Cite evidence of how diet is linked to the health of human teeth.

Milestone 2 - Biology - To investigate living things

	Year 3	Year 4	
Milestone indicator	Basic	Advancing	Deep
Recognise that living things can be grouped in a variety of ways.	Name groups of animals (and plants). Describe the features of animals (and plants) in particular groups. Match animals (and plants) to groups.	Compare and contrast the features of animals (and plants) in different groups. Summarise the key similarities and differences of animals (and plants) in different groups. Explain why you have chosen the key similarities and differences to summarise.	Are there any ways in which you could classify animals (and plants) so that they may be in more than one group? (suggest, reason, propose, arrange)
Explore and use classification keys.	Complete a classification key from a list of animals (and plants).	Identify animals (and plants) using a classification key (apply). Adapt a classification key to include different criteria.	Construct classification keys for animals (and plants).
Recognise that environments can change and that this can sometimes pose dangers to specific habitats.	Name and describe a range of different habitats. Identify and label specific plants and animals in these habitats. Describe how (for example, deforestation in rainforests) is a danger to specific habitats.	Compare changes in two or more habitats and categorise the effects of the changes.	Explain the concept of conservation and how groups are trying to preserve habitats.

Milestone 2 - Biology - To understand evolution and inheritance

	Year 3	Year 4	
Milestone indicator	Basic	Advancing	Deep
Identify how plants and animals, including humans, resemble their parents in many features.	Match pictures of (human and animal) offspring to their parents. Notice and describe how they sometimes resemble each other. Notice that and describe how this may not be the case for all humans. Notice and label the resemblance between plants and those that grow from their seeds. NOTE: sensitivity required. Our advice is to use well known public figures, e.g. the Royal Family, to avoid insensitivity to individual pupils.	Categorise resemblances between humans (and plants and animals) and organise your findings.	Explain the concept of inheritance. Investigate how scientists and doctors are researching conditions that are inherited from a parent.
Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.	Name a variety of animal and plant fossils. Describe the conditions in which the fossils once lived. Note, name and describe plants and animals that inhabited the Earth millions of years ago.	Categorise fossils in a number of ways. Compare and contrast different fossils. Explain the process of the formation of fossils.	Investigate the conditions in which life on Earth survived millions of years ago. Burning fossil fuels is widely thought by scientists to contribute to a rise in worldwide temperature. Investigate this and cite evidence that supports or questions this view.
Identify how animals and plants are suited to and adapt to their environment in different ways.	Match a range of animals and plants to the environments in which they are found. Describe how animals and plants are suited to the environments in which they are found. Illustrate how animals and plants adapt to environments in different ways.	Explain and give examples of the idea of adaptation. Compare and contrast different types of adaptation.	True or false: plants and animals would not survive if they could not adapt? Which do you think are the best examples (suggest) of an animal and plant that shows adaptation ?

Milestone 2 - Chemistry - To investigate materials

	Year 3	Year 4	
Milestone indicator	Basic	Advancing	Deep
Compare and group together different kinds of rocks on the basis of their simple, physical properties.	Name different types of rock. Describe the properties (including hardness) of a variety of different rocks. Label some of the minerals found in rocks.	Compare and contrast the properties of different rocks. Group rocks on the basis of their properties. (rather than their origins) Infer the names and types of rocks based on their observable properties or descriptions of their minerals.	True or false: The colour of a rock is a good clue that helps to identify it? Always, sometimes or never: Rocks that sparkle have a high quartz content?
Relate the simple physical properties of some rocks to their formation (igneous or sedimentary).	Observe and describe the properties of igneous and sedimentary rocks. Describe rocks as igneous or sedimentary. Describe the properties of igneous and sedimentary rocks. Illustrate how igneous and sedimentary rocks are formed.	Explain the main differences between igneous and sedimentary rocks. Compare the origins of different types of rocks and identify patterns that would help one to infer the type of rock.	Generalise: how can the hardness of a rock be related to its origins?
Describe in simple terms how fossils are formed when things that have lived are trapped within sedimentary rock.	Describe the formation of fossils. Illustrate the formation of fossils.	Identify the types of fossils (identify patterns) that are not likely to be found in different types of sedimentary rocks [e.g. in shale, limestone, sandstone etc.	Is it possible that fossils could be found within igneous rocks? Cite evidence.
Recognise that soils are made from rocks and organic matter.	Observe and describe the properties of soils. Observe and name different types of soils. Find out about and describe how soil is formed from rocks and organic matter. Name the ‘parent’ materials of different types of soils.	Explain how weathering contributes to the formation of soils. Compare and contrast different types of soils. Categorise soils using a range of different criteria. Test soils in various ways in order to identify them.	Recommend plants for different soil conditions. True or false: Alluvial soils are richer in nutrients than most other soils? Investigate the flooding of the river Nile in ancient Egyptian times and relate this to your knowledge of soils.

Compare and group materials together, according to whether they are solids, liquids or gases.	Name materials as solids, liquids or gases. Observe and describe the typical properties of solids, liquids and gases. Complete tables to show information about solids, liquids and gases.	Compare and contrast solids, liquids and gases. Classify liquids in different ways. Classify solids in different ways. Classify gases in different ways. Explain why a helium filled balloon will float in air.	True or false: liquids take the form of the container they are in? True or false: solids keep their shape unless it is altered by a force? Always, sometimes or never: gases are lighter than solids?
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.	Observe and describe the effect of heating and cooling water, chocolate, butter and other everyday materials. Measure the changing temperature of materials as they are heated and cooled and complete tables and graphs to show the effects.	Summarise, using scientific terminology, the relationship between temperature and states of matter. Explain the three states of matter of water and how temperature affects its state.	Create a testable hypothesis about states of matter, carry out tests and prove or disprove your hypothesis.
Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.	Describe the water cycle. Observe evaporation. Observe and describe the different rates of evaporation in different temperatures.	Graph the relationship between temperature and evaporation. Summarise your results.	Suggest practical uses for the relationship between temperature and evaporation.

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

	Year 3	Year 4	
Milestone indicator	Basic	Advancing	Deep
Compare how things move on different surfaces.	Observe and describe the movement of objects on surfaces that are smooth and rough, flat and inclined to different degrees. Compete tables to record observations. Use the word friction appropriately.	Identify patterns in the type of surface and how this affects movement. Explain why these patterns may exist. Experiment with practical applications of this relationship.	Investigate the design of car tyres and connect this to your understanding of friction.

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

Milestone 2 - Physics - To understand light and seeing

	Year 3	Year 4	
Milestone indicator	Basic	Advancing	Deep
Recognise that light is required in order to see things and that dark is the absence of light.	Observe and record the effect of light in seeing things. Answer questions about the effect of light on seeing. Describe darkness.	Explain the relationship between light and seeing. Experiment with different levels of light on the visibility of different coloured objects. Explain why it is important to dress in high visibility clothing in some situations.	Relate your knowledge of the Earth's rotation in space to your understanding of light and dark. True or false: The Sun is the only natural source of light in our solar system?
Notice that light is reflected from surfaces.	Observe light reflected from surfaces. Describe the effect of light reflecting from surfaces. Label a number of effects of reflection.	Experiment with light reflecting from a variety of different surfaces. Categorise surfaces in terms of their reflective properties.	Always, sometimes or never: Dark surfaces do not reflect light as well as those that are light?
Recognise that light from the sun can be dangerous and that there are ways to protect ones eyes.	Name some safety rules to avoid damaging ones eyes with light from the sun.	Apply your knowledge of safety rules to explain how to safely view a solar eclipse.	Investigate different types of sunglasses and recommend 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)
Recognise that shadows are formed when the light from a light source is blocked by a solid object.	Observe and record the effect of blocking light with solid objects. Name the effect and describe what is happening.	Explain why an umbrella is a useful practical example (apply) of shadows. Give examples of other practical uses (apply) for shadows.	True or false: night time is a shadow?
Find patterns in the way that the size of shadows change.	Observe and record the length of shadows at different times of the day. Observe and record how the size of shadows change when the source of light is moved closer or further away from the object causing the shadow.	Explain why shadows change size. Predict 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?	What is the relationship between the height of a light source in relation to the object that is causing a shadow?

Milestone 2 - Physics - To investigate sound and hearing

	Year 3	Year 4	
Milestone indicator	Basic	Advancing	Deep
Identify how sounds are made, associating some of them with something vibrating.	Listen to and describe a range of sounds from different sources. Identify the source of sounds. Complete experiments and record findings that demonstrate how a tuning fork is vibrating when it makes a sound.	Compare and contrast how loud and quiet sounds are made. Experiment with stringed musical instruments to discover how high and low notes are made and explain your findings. Explain the role of vibration in creating sounds.	Suggest a way to prove the relationship between vibration and pitch. True or false: Higher notes are louder than lower notes?
Recognise that vibrations from sounds travel through a medium to the ear.	Listen to and describe sounds through a variety of mediums. Draw a labelled diagram that shows how vibrations travel through a medium to the ear.	Compare and contrast the effectiveness of different mediums in transmitting sounds.	Suggest reasons why whales and dolphins can communicate over long distances. Do you agree: air is not a very good medium for transmitting sounds?

Milestone 2 - Physics - To understand electrical circuits

	Year 3	Year 4	
Milestone indicator	Basic	Advancing	Deep
Identify common appliances that run on electricity.	Identify and name common appliances that run on electricity. Label appliances that run on high and low voltage electricity. Identify and describe sources of electricity for appliances, including mains, battery, solar and others.	Explain the similarities and differences between a 240 volt 40 watt halogen light bulb and a 12 volt, 6 watt L.E.D light bulb. Explain the similarities and differences between a 240 volt mains powered vacuum cleaner and a 12 volt battery vacuum cleaner.	Investigate battery powered road cars and draw some conclusions about their benefits and problems.

Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.	Follow instructions to create a series circuit. Label the components of the circuit.	Make a number of series circuits containing different components. Explain the similarities between the circuits despite the different components.	Explain the concept of a series circuit and recommend some general rules.
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.	Complete incomplete circuits by adding the correct components. Answer questions about the completeness of various circuits.	Predict the effect of changing the arrangement of the components of a circuit (some of which maintain a circuit and others that do not). Experiment with the effect of placing more than one bulb in a series circuit and summarise your findings.	Find and rectify faults (solve non-routine problems) for a range of incomplete circuits.
Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.	Observe and describe the effect of using switches in a circuit. Complete circuit diagrams showing and labelling switches.	Explain why opening and closing switches affects a series circuit.	True or false: If there are five switches in a row in a series circuit, only one needs to be 'on' for the circuit to be complete? Relate the idea of switches to the creation and sending of 'morse code'.
Recognise some common conductors and insulators, and associate metals with being good conductors.	Observe and record how different materials act as conductors or insulators of electricity. Observe the effect of some poor and good conductors and label materials as poor or good conductors.	Categorise materials on the basis of their conductivity. Experiment with materials that conduct but also resist the flow of electricity. Summarise your findings.	True or false: Everything on Earth either conducts or doesn't conduct electricity, including humans?

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

	Year 3	Year 4	
Milestone indicator	Basic	Advancing	Deep
Describe the movement of the Earth relative to the Sun in the solar system.	Describe the movement of the Earth relative to the Sun. Label and describe our solar system. Answer questions about the scientists who first observed the Earth's movement around the Sun. Describe how the movement of the Earth gives rise to seasonal changes.	Explain why the Earth's movement gives rise to the seasons. Explain why the effect of the Earth's movement on seasons is more acute further away from the equator.	True or false: A year is always 365 days, no matter where one is in our solar system? Relate your knowledge of the Earth's movement relative to the Sun to time zones. Assess the significance of this to our daily lives. Do you agree: At any time of day it is always 5 O' Clock somewhere on Earth.
Describe the movement of the Moon relative to the Earth.	Identify and label the Moon and Earth. Describe the Moon's movement relative to the Earth. Answer questions about theMoon's movement relative to the earth. Observe, name and record the phases of the Moon.	Explain why the moon's movement affects the tides of oceans and seas on Earth. Explain how we can predict the times of high and low tides.	Could this be true: the shape of the moon's phases is a natural calendar? Is it possible (prove or disprove) to calculate how long until a particular moon shape will appear again? Explain the concept of a leap year.

Milestone 3 Curriculum Map Organisation

Year 5&6

Autumn	Spring	Summer
Describe the processes of all living things	**Describe** how living things are classified into broad groups according to common observable characteristics.	**Give reasons** for classifying plants and animals based on specific characteristics.
Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.	**Describe** the life process of reproduction in some plants and animals. Investigation - dissect plants	**Recognise** the importance of diet, exercise, drugs and lifestyle on the way the human body functions. Investigation Heart dissection
Describe the changes as humans develop to old age. **Identify** and name the main parts of the human circulatory system, and **describe** the functions of the heart, blood vessels and blood.	**Describe** the ways in which nutrients and water are transported within animals, including humans.	
Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.	**Identify** how animals and plants are adapted to suit their environment in different ways and how that adaptation may lead to evolution. **Relate** knowledge of plants to studies of evolution and inheritance. **Relate** knowledge of plants to studies of all living things.	Scientist - Darwin Y5/ Goodall Y6
Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.	**Use knowledge** of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.- Investigation	**Demonstrate** that dissolving, mixing and changes of state are reversible changes. - Investigation
Compare and **group** together everyday materials based on evidence from comparative and fair tests, including their hardness, solubility, conductivity (electrical and thermal), and response to magnets. - Investigation	**Give reasons,** based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. - investigation	**Explain** that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning, oxidisation and the action of acid on bicarbonate of soda. - Investigation
Understand how some materials will dissolve in liquid to form a solution and describe how to recover a substance from a solution. - investigation	**Describe** the movement of the Moon relative to the Earth.	**Describe** the Sun, Earth and Moon as approximately spherical bodies. **Use the idea** of the Earth's rotation to explain day and night and the apparent movement of the Sun across the sky.
Scientist Y5 Helen Sharman	**Use** the idea that light travels in straight lines to **explain** why shadows have the same shape as the objects that cast them, and to **predict** the size of shadows when the position of the light source changes. - Investigation	**Understand** that force and motion can be transferred through mechanical devices such as gears, pulleys, levers and springs.
Describe the movement of the Earth relative to the Sun in the solar system.	**Find** patterns between the pitch of a sound and features of the object that produced it.	**Understand** that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.
Draw and label diagrams to explain how we see. **Understand** that light appears to travel in straight lines. **Use** the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eyes.**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**.**	. **Identify** the effect of drag forces such as **air resistance**, water resistance and friction that act between moving surfaces. Investigation 2 lessons - air resistance	**Compare** and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches.
Find patterns between the volume of a sound and the strength of the vibrations that produced it. **Recognise** that sounds get fainter as the distance from the sound source increases. Investigation	**Identify** the effect of drag forces such as air resistance, water resistance and **friction** that act between moving surfaces. Investigation friction	Scientist - Tesla Y6

Milestone 3 Curriculum Map Organisation

Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. **Describe**, in terms of drag forces, why moving objects that are not driven tend to slow down. -Investigation	**Compare** and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches.	
Use recognised symbols when representing a simple circuit in a diagram. **Associate** the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.		

Milestone 3 - Biology - To understand plants

	Year 5	Year 6	
Milestone indicator	Basic	Advancing	Deep
Relate knowledge of plants to studies of evolution and inheritance.	Describe how plants and animals may evolve through adaptation to their environment.	Compare and contrast the way different plants and animals have adapted to their environments. Organise information graphically.	What is the relationship between plants adapting to their environments and the theory of human evolution?
Relate knowledge of plants to studies of all living things.	Describe the life processes common to all living things.	In which ways do the life processes of all living things vary? (contrast) Organise information, including data that supports that the life processes of all living things vary.	Why do the leaves of deciduous trees change colour and fall off in Autumn? (generalise) How does this relate to any life processes of animals?

Milestone 3 - Biology - To understand animals and humans

	Year 5	Year 6	
Milestone indicator	Basic	Advancing	Deep
Describe the changes as humans develop to old age.	Describe the main changes in the human body from a child to an adult to old age. What are (describe) the physical signs of humans ageing?	Compare and contrast the physical appearance of children and adults. Graph changes in average heights of males and females at different ages. Summarise your findings.	Interpret data about normal blood pressure in children and adults and draw some conclusions. Make generalisations between the relationship between age and changes in humans. (emphasising continuous variables noted by the use of comparative degrees ending in er e.g. the younger the person the smaller their size)

Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.	Draw and label diagrams of the human circulatory system. Describe the functions of the heart, blood vessels and blood.	Contrast the different roles of veins and arteries in the human circulatory system. Explain the different functions of the parts of the human heart.	Discover information about human blood pressure. Relate information about blood pressure to diet and lifestyle.
Recognise the importance of diet, exercise, drugs and lifestyle on the way the human body functions.	Read and answer questions about the importance of diet and exercise. Observe and record the effect of exercise on heartbeat. Describe a healthy, balanced diet. Describe some of the possible effects of poor exercise, drug misuse (including smoking) and poor diet on the way the human body functions.	Graph the effect of exercise on pulse rate. Explain your findings. Explain the possible effects of too much sugar in the diet on how the human body functions.	Discover how coronary arteries may become blocked and cause heart attacks. Argue this statement: You are what you eat. Do you agree: diet is eighty per cent of your fitness regime and exercise twenty?
Describe the ways in which nutrients and water are transported within animals, including humans.	Name some nutrients that are important for humans. Describe how nutrients are important for animals and humans. Draw diagrams that show how arteries and veins are connected by capillaries. Describe how water and nutrients pass from the arteries, through capillaries, to veins.	Explain the similarities and differences between arteries, veins and capillaries. Explain why, in humans, capillaries are vital for the transportation of water and nutrients. Explain why the transportation of water and nutrients in humans is important for: • joints • mucus membranes • blood • removing toxins.	Relate the transportation of water in humans and animals to your knowledge of plants.

Milestone 3 - Biology - To investigate living things

	Year 5	Year 6	
Milestone indicator	Basic	Advancing	Deep
Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.	Draw and Describe the life cycle of a mammal. Draw and Describe the life cycle of an amphibian. Draw and Describe the life cycle of an insect. Draw and Describe the life cycle of a bird.	Explain the similarities and differences in the life cycles of a mammal, an amphibian, an insect and a bird.	True or false: all young offspring look like smaller versions of their adult parents? Always, sometimes or never: eggs are common to the life cycles of mammals, amphibians, insects and birds?
Describe the life process of reproduction in some plants and animals.	Draw and describe the process of reproduction in some plants. Draw and describe the process of reproduction in some animals.	Explain the similarities and differences between the process of reproduction in plants and animals.	Relate the reproduction of plants to your knowledge of the life cycle of insects. Relate the reproduction of some animals and plants to your knowledge of food chains.
Describe how living things are classified into broad groups according to common observable characteristics.	Look at and copy classification keys for common insects. Use classification keys to identify insects and animals. Make classification keys.	Identify plants, mammals, amphibians, insects and birds from classification keys. Explain why observable features are used to classify living things into broad groups.	Propose criteria for the creation of classification groups for either: • mammals • amphibians • insects • birds. Present information about and reasons for these groups.
Give reasons for classifying plants and animals based on specific characteristics.	Recognise and name the characteristics used in classification groups for plants and animals. List reasons why these characteristics are used.	Explain some of the problems with not using specific characteristics when classifying living things.	Do you agree: observable characteristics are not the only way to scientifically group plants and animals?

Milestone 3 - Biology - To understand evolution and inheritance

	Year 5	Year 6	
Milestone indicator	Basic	Advancing	Deep
Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. * Note - this indicator also appears in Milestone 2 and the tasks here are replicated.	Name a variety of animal and plant fossils. Describe the conditions in which the fossils once lived. Note, name and describe plants and animals that inhabited the Earth millions of years ago.	Categorise fossils in a number of ways. Compare and contrast different fossils. Explain the process of the formation of fossils.	Investigate the conditions in which life on Earth survived millions of years ago. Burning fossil fuels is widely thought by scientists to contribute to a rise in worldwide temperature. Investigate this and cite evidence that supports or questions this view.
Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.	Observe and describe differences between living things and their offspring. Observe and name offspring that are not identical to their parents and describe how they vary.	Categorise differences in living things and their offspring. Explain, with examples, how offspring are not identical.	Is it possible that a litter of cocker spaniel puppies from two parents of the same colour may vary in colour?
Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. * Note - a similar indicator also appears in Milestone 2 but excludes the last part - 'and that adaptation may lead to evolution' . The tasks here are replicated with some additional tasks about evolution.	Match a range of animals and plants to the environments in which they are found. Describe how animals and plants are suited to the environments in which they are found. Illustrate how animals and plants adapt to environments in different ways. Describe the theory of evolution.	Explain and give examples of the idea of adaptation. Compare and contrast different types of adaptation. Explain why adaptation may lead to evolution.	True or false: plants and animals would not survive if they could not adapt? Which do you think are the best examples (suggest) of an animal and plant that shows adaptation ? Do you agree: evolution is the only way a species can survive?

Milestone 3 - Chemistry - To investigate materials

	Year 5	Year 6	
Milestone indicator	Basic	Advancing	Deep
Compare and group together everyday materials based on evidence from comparative and fair tests, including their hardness, solubility, conductivity (electrical and thermal), and response to magnets.	Observe and describe materials on the basis of their hardness, solubility, conductivity and their response to magnets. Carry out (follow instructions) comparative tests to group materials. Carry out (follow instructions) fair tests to group materials.	Adapt a comparative test to group materials. Predict the outcomes of your test. Modify a fair test to group materials. Predict the outcomes of your test.	Devise an experiment that proves or disproves a hypothesis you have created about the properties of materials.
Understand how some materials will dissolve in liquid to form a solution and describe how to recover a substance from a solution.	Observe (through direct experience) and describe materials as soluble or non-soluble. Observe and describe the effect of evaporation of a solution on a substance (solute) that has dissolved in a liquid (solvent).	Apply your knowledge of solutions to explain how a substance has not disappeared when it forms a solution. Modify a fair test to demonstrate your knowledge.	Relate, citing evidence, your understanding of solutions to your understanding of the water cycle.
Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.	Observe and describe how items may be separated through filtering, serving and evaporation.	Experiment with ways to separate pebbles and silt in a solution of salt. Explain your methods and summarise your results.	Is there a way (propose) to recover water after recovering a substance from a solution after evaporation? Prove it.
Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.	Observe and describe materials on the basis of their hardness and conductivity. Label materials using a range of scientific vocabulary, including insulators and conductors. Carry out (follow instructions) comparative tests to assess the suitability of everyday materials for a purpose. Carry out (follow instructions) fair tests to assess the suitability of everyday materials for a purpose.	Apply your understanding of the properties of materials to explain why a range of everyday items have been made from a particular material.	What might happen (propose) if a bird sits on a live, uninsulated power line? Explain the concepts you are using to give your answer.

Demonstrate that dissolving, mixing and changes of state are reversible changes.	Observe and describe how mixing is reversible. Observe and describe how dissolving a substance into a solution is reversible. Observe and describe how changes of state are reversible.	Demonstrate reversible changes by Graphing the temperature of water as it changes state from a liquid to a solid and from a solid to a liquid and identify patterns between temperature and state. Summarise your findings.	Always, sometimes or never: changes to materials that are reversible require something else to change first before they can change? Cite evidence.
Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning, oxidisation and the action of acid on bicarbonate of soda.	Observe and describe how burning a material creates a new material and is not reversible. Observe and describe how oxidisation of (e.g. steel) creates a new material and is not reversible. Observe and describe how adding an acid to (e.g. bicarbonate of soda) creates a new material and is not reversible.	Categorise and give examples of changes as reversible or not reversible. Experiment with making Plaster of Paris moulds. Observe, record and explain what happens to the material as water is added to the powder. Summarise your findings.	True or false: changes in temperature cause only reversible and not irreversible changes? Cite evidence.

Milestone 3 - Physics - To understand movement, forces and magnets

	Year 5	Year 6	
Milestone indicator	Basic	Advancing	Deep
Describe magnets as having two poles. * Note - this indicator also appears in Milestone 2 and the tasks here are replicated. This is just retrieval.	label the north and south poles of magnets.	Explain why magnets have poles. Experiment with cutting magnets in two. Observe and explain what happens.	Why (explain concept) do we call parts of Earth the North and South poles? Investigate the Aurora Borealis and explain (the concept) how this is linked to magnetism.
Predict whether two magnets will attract or repel each other, depending on which poles are facing. * Note - this indicator also appears in Milestone 2 and the tasks here are replicated. This is retrieval.	Observe and describe the effect of placing like and different poles of a magnet next to each other. Complete tables that show what you expect to happen when different combinations of poles are facing each other.	Apply your knowledge of magnetic poles to create a game that uses the idea that magnets attract or repel each other.	Is it possible (suggest) to make a magnet? Prove or disprove this. .
Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the	Observe and describe the effect of the force of gravity.	Interpret data about the rate that different materials fall towards Earth. Summarise your	Which will reach Earth first if dropped from the same height: 1kg of feathers or 1kg of steel? (explain concepts)

falling object.		findings.	
Identify the effect of drag forces, such as air resistance, water resistance and friction that act between moving surfaces.	Observe and describe the effect of air resistance. Observe and describe the effect of water resistance. Observe and describe the effect of friction. Describe these forces as drag forces.	Apply your knowledge of friction to positive applications. Explain your ideas.	Relate the size of a drag force to the size of the object it is acting on.
Describe, in terms of drag forces, why moving objects that are not driven tend to slow down.	Observe and describe how objects tend to slow down because of drag forces.	Apply your knowledge of drag forces to some positive applications.	Always, sometimes or never: the slowing effect of drag forces can be overcome if an object is driven. (explain concept, make generalisations) (emphasising continuous variables noted by the use of comparative degrees ending in er)
Understand that force and motion can be transferred through mechanical devices such as gears, pulleys, levers and springs. Note: we recommend linking this indicator to mechanical systems in Design Technology.	Observe and describe how forces and motion can be transferred through gears, pulleys, levers and springs. Label the forces and draw the directions in which they transfer.	Apply your knowledge of forces and movement to make a working mechanism.	Can (suggest) a rotary motion be changed into a linear (up and down) motion? Prove or disprove this.
Understand that some mechanisms including levers, pulleys and gears, allow a smaller force to have a greater effect. Note: we recommend linking this indicator to mechanical systems in Design Technology.	Observe and describe the effect of changing gears on a bicycle. Observe and describe the effect of using a lever to try to move a heavy object (e.g. lifting the teacher) Observe and describe the effect of using a pulley, or geared pulleys to lift heavy objects.	Apply your knowledge of gears, pulleys and levers to demonstrate and explain how a small force can have a greater effect.	Using a pulley allows a small force to have a greater effect but increases the amount of pulls one has to make. Make generalisations about the relationship between forces and effect. (emphasising continuous variables noted by the use of comparative degrees ending in er)

Milestone 3 - Physics - To understand light and seeing

	Year 5	Year 6	
Milestone indicator	Basic	Advancing	Deep
Understand that light appears to travel in straight lines.	Draw and label diagrams to show how light travels.	Experiment with ways that demonstrate how light travels. Predict where light will appear after hitting a reflective surface.	Investigate whether light can ever 'bend' around corners and present information on this. Note :this is called diffraction. Does blocking light prove that it travels? (reason, investigate)
Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eyes.	Draw and label diagrams that show how objects are seen. Observe and describe how light diverges from a source.	Experiment with making or using a periscope to demonstrate how objects may be seen. Explain what is happening to the light.	True or false: light is invisible?
Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them, and to predict the size of shadows when the position of the light source changes.	Draw and label diagrams that show how shadows are formed and that the size of the shadow may be predicted when the position of the source of light changes. Describe how divergent light from a source affects the size of shadows.	Explain why shadows are 'longer' in the winter and 'shorter' in the summer. Explain why a shadow of an object may not appear to be the same shape as the object.	Is it possible (reason) that a shadow can be formed that is smaller than the object that created it?
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.	Draw and label diagrams to explain how we see.	Explain and demonstrate why we can not always see all of the Moon.	Investigate and present information on how objects, such as a stick, appear to bend when placed in water. Note: this is called refraction

Milestone 3 - Physics - To investigate sound and hearing

	Year 5	Year 6	
Milestone indicator	Basic	Advancing	Deep

Find patterns between the pitch of a sound and features of the object that produced it.	Observe and describe the differences in the pitch of a sound and the object that produced it.	Experiment with, explain and demonstrate the pattern between pitch of sound and the features of the object that produced it. (emphasising continuous variables noted by the use of comparative degrees ending in er)	Relate your understanding of pitch to musical instruments.
Find patterns between the volume of a sound and the strength of the vibrations that produced it.	Observe and describe differences in the volume of a sound and the strength of the vibrations that produced it.	Experiment with, explain and demonstrate the pattern between the volume of a sound and the strength of the vibrations that produced it. (emphasising continuous variables noted by the use of comparative degrees ending in er)	Relate your understanding of volume to a range of orchestral instruments. (How does, for example, a trombone player alter the strength of the vibrations he or she creates?)
Recognise that sounds get fainter as the distance from the sound source increases.	Observe and describe differences in sounds that are close and far away from their sources.	Experiment with, explain and demonstrate the pattern between the volume of a sound and the distance from its source. (emphasising continuous variables noted by the use of comparative degrees ending in er)	Why might (suggest, reason) a thunderclap sound loud to some and faint to others?

Milestone 3 - Physics - To understand electrical circuits

Milestone indicator	Basic	Advancing	Deep
Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.	Observe and describe the effect of changing the number and voltage of cells used in a series circuit.	Experiment with, explain and demonstrate the pattern between the voltage of cells and the brightness of a bulb. (emphasising continuous variables noted by the use of comparative degrees ending in er)	Suggest why a bulb or buzzer may stop working when the voltage is increased.
Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches.	Observe and describe the effect of placing extra bulbs (or buzzers) into a circuit and how this can be overcome by increasing the number and voltage of cells.	Predict the outcome of placing various components into an electrical circuit and explain why this happens. Explain the patterns. (emphasising continuous variables noted by the use of comparative degrees ending in er)	Investigate the concept of resistance and prove or disprove that components, including wire, are resistors. Is it possible (suggest, prove) to make your own resistor?
Use recognised symbols when representing a simple circuit in a diagram.	label and learn the recognised symbols for representing components in a circuit diagram.	Make circuits then represent them in circuit diagrams and apply component symbols appropriately.	How do the images of recognised symbols relate to their function?

Milestone 3 - Physics - To understand the Earth's movement in space

	Year 5	**Year 6**	
Milestone indicator	Basic	Advancing	Deep
Describe the movement of the Earth, and other planets, relative to the Sun in the solar system. Note: part of this indicator appears in Milestone 2 and the activities here have been replicated. Added are tasks that refer to other planets, which does not appear in Milestone 2.	Describe the movement of the Earth relative to the Sun. Label and describe our solar system. Answer questions about the scientists who first observed the Earth's movement around the Sun. Describe how the movement of the	Explain why the Earth's movement gives rise to the seasons. Explain why the effect of the Earth's movement on seasons is more acute further away from the equator.	True or false: A year is always 365 days, no matter where one is in our solar system? Relate your knowledge of the Earth's movement relative to the Sun to time zones. Assess the significance of this to our daily lives. Do you agree: At any time of day it is

	Earth gives rise to seasonal changes.		always 5 O' Clock somewhere on Earth.
Describe the movement of the Moon relative to the Earth. Note: this indicator appears in Milestone 2 and the activities here are replicated.	Identify and label the Moon and Earth. Describe the Moon's movement relative to the Earth. Answer questions about theMoon's movement relative to the earth. Observe, name and record the phases of the Moon.	Explain why the moon's movement affects the tides of oceans and seas on Earth. Explain how we can predict the times of high and low tides.	Could this be true: the shape of the moon's phases is a natural calendar? Is it possible (prove or disprove) to calculate how long until a particular moon shape will appear again? Explain the concept of a leap year.
Describe the Sun, Earth and Moon as approximately spherical bodies.	Observe pictures and videos of the Sun, Earth and Moon and describe them using mathematical vocabulary.	Explain , using your knowledge of gravity, why the Sun, Earth and Moon are almost spherical.	Investigate reasons why planets and moons are not completely spherical. Explore terms such as 'equatorial buldge' and suggest an experiment that would prove this phenomenon.
Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.	Draw, label and describe how the Earth's rotation gives rise to day and night.	Explain and demonstrate how and why a sundial, used to tell the time, works.	At night, sun dials do not work. Suggest or investigate other ways one could tell the approximate time using views of the night sky.