

OVERVIEW

iPrimary Year 1	iPrimary Year 2	iPrimary Year 3	iPrimary Year 4	iPrimary Year 5	iPrimary Year 6
Early scientific enquiry	Early scientific enquiry	Early scientific enquiry	Later scientific enquiry	Later scientific enquiry	Later scientific enquiry

BIOLOGY

Living things	Health and growth	Animal adaptations	Variation and classification	Plant adaptations	Micro-organisms
Myself	Living things in the environment	Teeth	Growing plants	Living things in danger	Plant life cycles
Animals	Invertebrates	Feeding relationships	Skeleton and muscles	Diet and digestion	Heart, lungs and circulation
Plants					

CHEMISTRY

Sorting and grouping materials	Materials: properties and uses	Rocks and soils	Solids, liquids and gases	Mixing and separating materials	Reversible and irreversible change
		Using and changing materials			

PHYSICS

Light and dark	Sound	Light	Making and changing sounds	Earth and space	Forces in air and water
Pushes and pulls	Space	Forces	Electricity: everyday uses and simple circuits	Seeing and reflecting	Electricity: changing circuits
		Friction			
		Magnets			

EARLY SCIENTIFIC ENQUIRY

Reference	Enquiry area	Objective	Guidance	Links to subject content
ESE1.1	Scientific ideas	Understand what is meant by a scientific question.		
		Use different types of simple enquiry to answer scientific questions.		
ESE1.2	Investigating	Recognise and use simple equipment.	For example: thermometer with simple scale, beaker and weighing scales.	
		Set up simple practical tests.		
		Observe changes, such as new materials being formed or growth and development of living things.		
		Understand what is meant by a fair test.		Year 2: Compare properties of a variety of materials using comparative and fair tests.
		Make simple observations to compare objects and/or living things.		Year 1: Compare observable similarities and differences between humans.
		Identify and classify objects and/or living things.		
		Use a simple dichotomous key to identify plants and animals.		Year 3: Use keys to identify animals and plants in local habitat(s).
ESE1.3	Obtaining and presenting evidence	Use observations to suggest answers to simple questions.		
		Collect and record data as tally charts and in simple tables.		
		Present data on simple bar charts.		
		Use drawings and labelled diagrams to present observations.		
ESE1.4	Conclusions	Draw simple conclusions using simple scientific language.		
		Identify simple patterns and trends in data.		Year 2: Investigate how sounds can be made louder or quieter by changing the distance from the source.
ESE1.5	Evaluating	Suggest ways in which tests could be improved.		

Where possible, each year group's objectives should be taught through practical investigation in order to embed learning and provide definite links with enquiry objectives.

An example of where practical investigations may be carried out is:

Year 3 Physics: P3.1F Understand patterns in the way that the sizes of shadows changes.

Other examples are highlighted in the 'Possible links to enquiry' column on each year group's objective page.

YEAR 1

BIOLOGY

LIVING THINGS

Reference	Objective	Guidance	Possible links to enquiry
B1.1A	Know that animals and plants are living things.		
B1.1B	Distinguish between living and nonliving things.		
B1.1C	Understand that animals and plants change as they grow.		Make and record observations of a plant as it grows from a seed; observe changes over time in domesticated animals.

MYSELF

Reference	Objective	Guidance	Possible links to enquiry
B1.2A	Know that humans need food, water and air to stay alive.		
B1.2B	Know the five senses and link these to the corresponding sense organ.		
B1.2C	Understand that humans use sense organs to detect changes in their surroundings.		Make predictions and use touch to identify objects hidden in <i>feely bags</i> ; go on a listening walk around school to record (written or audio record) sounds; create diagram/ map showing location of each sound.
B1.2D	Identify external parts of the human body to include head, neck, limbs and digits, skin and other sense organs.		
B1.2E	Compare observable similarities and differences between humans.		Observe and compare photographs of humans.
B1.2F	Understand that humans grow and change as they grow older.		Compare and note differences from baby photographs to current appearance.

ANIMALS

Reference	Objective	Guidance	Possible links to enquiry
B1.3A	Describe the key observable features of common animals (vertebrates only).		
B1.3B	Group animals by their observable external features.		Create a simple key to sort animals by external features. For example: <i>Does it have four or more legs; does it have hair; is it smaller than a person?</i>
B1.3C	Understand that movement is a life process and describe ways in which animals move.		Observe and describe movements of local wildlife and domestic animals.
B1.3D	Understand that growth is a life process and that all animals grow and change as they become older.		
B1.3E	Describe different ways in which animals change as they grow older (vertebrates only).		
B1.3F	Understand that nutrition is a life process and appreciate that different animals have different diets.		

PLANTS

Reference	Objective	Guidance	Possible links to enquiry
B1.4A	Recognise examples of plants in the local and wider environment.		
B1.4B	Know that plants have leaves, stems and roots.		
B1.4C	Understand that some plants have flowers and these can be a variety of shapes and colours.	No detail of floral parts is required.	
B1.4D	Recognise and name plant parts on familiar local examples.	Names (if applicable): petals, stem, roots, leaves, trunk, branches, twigs, seeds, bulbs and fruit.	Observe and draw local examples of plants; record the frequency of types of plants and features.
B1.4E	Understand that plants can grow from seeds and bulbs.		
B1.4F	Understand that plants need water, air and light to grow well.		Set up a simple practical test to grow suitable plants from seeds and observe the effect of removing first water, and then air, and then light.
B1.4G	Understand that plants can provide food for humans and other animals.		

CHEMISTRY**SORTING AND GROUPING MATERIALS**

Reference	Objective	Guidance	Possible links to enquiry
C1.1A	Recognise that objects can be made from different materials.		
C1.1B	Name and identify some common materials.	For example: wood, fabric, rock/stone, metal, glass and plastic.	
C1.1C	Understand that different materials have particular properties.		
C1.1D	Describe simple properties of materials using senses.	For example: hard, rough, smooth and shiny.	
C1.1E	Understand that materials can be sorted in a number of ways including colour, texture and hardness.		Identify and classify objects according to colour, texture and hardness; use a simple dichotomous key to identify the materials.

PHYSICS

LIGHT AND DARK

Reference	Objective	Guidance	Possible links to enquiry
P1.1A	Understand that light comes from a source and that shiny objects are not sources of light.		
P1.1B	Identify common sources of light and understand that they can vary in brightness.	For example: torches, candles, light bulbs, lamps and strings of lights.	
P1.1C	Know that the Sun is the source of light for the Earth and compare differences between night and day.		
P1.1D	Understand that we need light to see and that darkness is the absence of light.		Set up a simple practical test demonstrating that darkness is the absence of light using a dark room (any room or space with no light source will work).

PUSHES AND PULLS

Reference	Objective	Guidance	Possible links to enquiry
P1.2A	Observe and describe different ways of moving.	Examples can include moving toys such as: toy cars, yo-yos, windmills, balls and paper planes. Also include different ways a human can move.	Make simple observations to compare the movement of objects and living things.
P1.2B	Know that pushes and pulls can make objects start or stop moving.		
P1.2C	Recognise pushes and pulls as forces and classify simple examples of each.	For example: doors, toy cars and rubber balls.	

YEAR 2

BIOLOGY

HEALTH AND GROWTH

Reference	Objective	Guidance	Possible links to enquiry
B2.1A	Understand that humans need the correct amounts of water and food to stay alive.		
B2.1B	Understand that there are many types of food and humans may have different diets.		
B2.1C	Understand what is meant by a balanced diet.		
B2.1D	Know the main food groups and be able to categorise food by type.	Meat, fish and eggs; starchy foods (for example, bread, rice and pasta); fruit and vegetables; milk and dairy; sugary and fatty foods.	Identify foods and categorise them into the main food groups by type of food.
B2.1E	Understand the need for exercise to stay healthy.		
B2.1F	Understand that human and animal offspring need differing types and amounts of parental care while they are growing.		
B2.1G	Understand that personal and food hygiene is important to maintain health.		
B2.1H	Understand why humans take medicines and recognise hazards associated with taking and storing medicines.	Humans take medicines to get better when ill and often these are prescribed by a doctor. The hazards associated with medicines are that they can be harmful, especially if the wrong amount is taken. Medicines should be stored out of the reach of children.	

LIVING THINGS IN THE ENVIRONMENT

Reference	Objective	Guidance	Possible links to enquiry
B2.2A	Understand the term 'habitat' as being the place where animals and plants are found living.		
B2.2B	Understand that within a habitat there may be smaller microhabitats.		Make simple observations to compare living things within a habitat or microhabitat; collect and record data from habitats/microhabitats as tally charts or in simple tables.
B2.2C	Recognise that animals and plants may have features that best suit them to a particular habitat in order to survive.		
B2.2D	Understand that living things may be interdependent.	Examples may include simple food chains such as a rabbit eating grass, then a fox eating a rabbit.	
B2.2E	Understand that environmental factors, such as availability of food, water, light and shelter, may affect the distribution of animals and plants.		

INVERTEBRATES

Reference	Objective	Guidance	Possible links to enquiry
B2.3A	Identify a variety of common invertebrates using pictures and simple keys.	For example: insects, worms, crustaceans such as crabs and lobsters, and octopuses.	Use a simple dichotomous key to identify various common invertebrates.
B2.3B	Describe the key observable features of common invertebrates.		
B2.3C	Group invertebrates according to shared features.	For example: wings, colour, shape and number of legs.	Make simple observations to identify invertebrates and to classify them in groups based on shared characteristics.
B2.3D	Describe how some invertebrates change as they grow using simple life cycles.	Illustrate with butterfly or moth and grasshopper or locust.	

CHEMISTRY

MATERIALS: PROPERTIES AND USES

Reference	Objective	Guidance	Possible links to enquiry
C2.1A	Understand that the same object can be made from a variety of different materials.	For example: a ruler can be made from wood or plastic; a table can be made from metal, wood or plastic; a bottle can be made from glass or plastic; a bag can be made from paper, plastic or cotton.	
C2.1B	Compare examples of materials that are naturally occurring with those that are not.		Make simple observations to compare the properties of natural and synthetic materials.
C2.1C	Understand that particular properties of materials can make them suitable for particular uses.	For example: discussing building materials used for houses, why glass is used for windows and why cotton or wool may be used for clothes.	
C2.1D	Distinguish between the terms 'hard'/'soft', 'stretchy'/'stiff', 'shiny'/'dull', 'rough'/'smooth' and 'bendy'/'not bendy'.		
C2.1E	Group materials according to their properties.	For example: hard/soft; stretchy/stiff; shiny/dull; rough/smooth; bendy/not bendy; waterproof/not waterproof and absorbent/not absorbent.	Set up a simple practical test to investigate the physical properties of a variety of materials. Some materials should have a combination of properties and some should be contrasting, for example, hard and shiny, hard and dull, etc. Students should group materials according to their properties.
C2.1F	Justify the use of a particular material for a particular purpose based on the properties of the material.		
C2.1G	Compare properties of a variety of materials using comparative and fair tests.		Set up a fair test to investigate the best waterproof material to use as a teddy bear's coat. Provide students with a variety of materials to choose from including cling film, paper, cotton, towelling, rock and wood.

PHYSICS

SOUND

Reference	Objective	Guidance	Possible links to enquiry
P2.1A	Understand the term 'source' as the place where a sound originates.		
P2.1B	Recognise and describe sounds made in different ways from a variety of sources.	For example: a motorbike, a lawnmower, the sea, a cat meowing, a train, a door being closed.	
P2.1C	Understand that loud sounds may damage hearing.		
P2.1D	Understand that sounds travel from a source to our ears.		
P2.1E	Explain how sounds can be made louder or quieter by changing the distance from the source.		Set up a simple practical test of how sounds can be made louder or quieter by changing the distance from the source. Ask students to suggest a suitable stable sound source. If none suitable, use a ringtone from a phone at a set volume.

SPACE

Reference	Objective	Guidance	Possible links to enquiry
P2.2A	Know that the Earth, Sun and Moon are part of our Solar System.		
P2.2B	Describe how the shape of the Moon appears to change over time.	Recognise and name some phases of the Moon.	Record observations of the Moon on a calendar.
P2.2C	Know that the Sun is one of many stars in space and that stars can form constellations.		Use book research and simple observations of the sky.
P2.2D	Understand the term 'astronaut' and describe simple aspects of living in space and space travel.	Astronauts need to wear protective clothing in space and must have a constant supply of air.	

YEAR 3

BIOLOGY

ANIMAL ADAPTATIONS

Reference	Objective	Guidance	Possible links to enquiry
B3.1A	Group animals according to observable features.	This section builds on work started in Year 2 and now includes both vertebrates and invertebrates.	Make simple observations to classify various animals based on their observable features.
B3.1B	Use a simple dichotomous key to identify animals.	For example (a snail): <ul style="list-style-type: none"> · Is it a vertebrate? <u>YES/NO</u> · Does it live on land? <u>YES/NO</u> · Does it have legs? <u>YES/NO</u> · Does it have a shell? <u>YES/NO</u> 	Use keys to identify animals in local habitat(s).
B3.1C	Describe ways in which animals are suited to the environment in which they are found.	<p>Owls:</p> <ul style="list-style-type: none"> · Their feathers are coloured to camouflage and protect them. <p>Polar bears:</p> <ul style="list-style-type: none"> · They have thick fur to keep them warm. · The light colour of their fur allows them to be camouflaged. · They have large feet to spread their weight over the ice. <p>Male deer:</p> <ul style="list-style-type: none"> · They have antlers so that they can fight other males. 	
B3.1D	Compare animals in two contrasting habitats.	For example: compare the habitat of a snail with the habitat of a camel, or the habitat of a cow with the habitat of a polar bear.	Compare local habitat(s) with geographically different habitat(s).
B3.1E	Predict the likely habitat of a variety of animals from the adaptations that they show.		

TEETH

Reference	Objective	Guidance	Possible links to enquiry
B3.2A	Recognise that human teeth are not all the same size or shape.		
B3.2B	Identify and name the main types of teeth in humans: incisor, canine, premolar and molar.		
B3.2C	Relate the shape of a tooth to its function, for example, slicing, tearing, chewing or grinding food.		
B3.2D	Know that teeth are part of the digestive system and are used to physically break down food for swallowing.		
B3.2E	Compare the basic types of teeth in a variety of animals.		Make simple observations using online research, books or real examples if available.
B3.2F	Identify herbivores and carnivores from their dentition and relate the type of teeth in a variety of animals to their diet.		
B3.2G	Distinguish between the terms 'herbivore', 'omnivore' and 'carnivore'.	Humans and foxes are omnivores. Cows and giraffes are herbivores. Lions and snakes are carnivores.	

FEEDING RELATIONSHIPS

Reference	Objective	Guidance	Possible links to enquiry
B3.3A	Understand that food is a basic need and that the availability of food affects the size of animal populations and their distribution.		
B3.3B	Distinguish between the terms 'producer' and 'consumer'.	A producer is at the start of a food chain and makes food. It is usually a plant, for example, grass. A consumer is midway through or at the end of the food chain and eats the food. It can be a herbivore or a carnivore, for example, an owl.	
B3.3C	Understand that plants make their own food but animals depend on plants and/or other animals as a food source.		
B3.3D	Distinguish between the terms 'predator' and 'prey'.		
B3.3E	Consider the interrelationship between predators and prey.		
B3.3F	Interpret and construct simple, linear food chains involving three or four organisms.		Construct food chains in local and global habitats.
B3.3G	Identify producers, consumers, herbivores, carnivores, predators and prey in a variety of simple food chains and food webs.		Interpret food chains and food webs in local and global habitats.

CHEMISTRY

ROCKS AND SOILS

Reference	Objective	Guidance	Possible links to enquiry
C3.1A	Understand that different rocks have different physical properties and observable features.	For example: pumice is light and soft, granite is hard and heavy and slate is hard but fragile.	
C3.1B	Compare and contrast the properties and observable features of different rocks.		Investigate with a comparative test.
C3.1C	Identify different rocks using research, by comparing to samples and/or from information about their properties (such as a key).		Use or make simple keys for identifying rocks.
C3.1D	Describe how sedimentary, igneous and metamorphic rocks are formed.		
C3.1E	Understand that the formation of different types of rocks affects whether they may contain fossils.	This is intended to link with work on fossils in Year 5 Biology.	
C3.1F	Explain that over time rocks can be broken down into smaller pieces by processes such as weathering.		
C3.1G	Understand that soil contains small parts of rocks and organic matter.		
C3.1H	Compare and contrast the different characteristics of soils such as colour, texture and drainage.		Observe soil around school; collect small samples to examine and contrast.
C3.1I	Identify different soils using research by comparing to samples and/or using information about their properties (such as a key).	For example: clay, chalky, sandy, silty, peaty and loamy.	Use or make simple keys for identifying soils.

USING AND CHANGING MATERIALS

Reference	Objective	Guidance	Possible links to enquiry
C3.2A	Compare a range of materials with different properties.	For example: stone, wood, rubber, plastic, cotton and sponge.	Investigate the properties of a range of different materials through handling and exposure to forces and liquid.
C3.2B	Describe how objects made from some materials can be altered by squashing, bending, twisting and squeezing.	For example: clay can be moulded, rubber can be bent and twisted and a sponge can be squeezed.	
C3.2C	Understand that some objects can be changed by physical forces but cannot be changed back easily.	For example: a ruler can be snapped but cannot be put back together again easily.	
C3.2D	Understand that some materials can change when they are heated and/or cooled and that this can change their properties.	For example: water will evaporate when it is boiled and will become solid when it is frozen.	
C3.2E	Distinguish between the terms 'melting', 'freezing', 'evaporating' and 'condensing'.		Observe a teacher-led experiment with water in its different states: melting, freezing, evaporating and condensing. Take notes of results and plot the data using charts.

PHYSICS

LIGHT

Reference	Objective	Guidance	Possible links to enquiry
P3.1A	Understand that we need light in order to see things and that dark is the absence of light.		
P3.1B	Understand that light comes from a source and know some sources of light.	For example: Sun, torch.	
P3.1C	Understand that some materials block light and are described as being <i>opaque</i> .		
P3.1D	Explain that, although some objects can reflect light, they are not light sources.	For example: Moon, mirror.	
P3.1E	Understand that, when light from a source is blocked by an opaque object, a shadow can form that is the same shape as the object.		Investigate the relationship between light sources, objects and shadows using shadow puppets.
P3.1F	Understand patterns in the way that the sizes of shadows change.		Investigate the relationship between the length of an object's shadow and its distance from a light source.
P3.1G	Distinguish between the terms 'transparent', 'translucent' and 'opaque'.	For example: windows are transparent, balloons are translucent and wooden doors are opaque.	

FORCES

Reference	Objective	Guidance	Possible links to enquiry
P3.2A	Understand that a force is needed to make objects move.		
P3.2B	Describe and compare how a range of objects move on different surfaces and slopes.		Design a fair comparison to investigate the movement of a toy car on various surfaces.

FRICTION

Reference	Objective	Guidance	Possible links to enquiry
P3.3A	Describe friction as a contact force that acts between surfaces to slow down movement.	For example: tyres against a concrete road generate friction; skis sliding against snow generate friction.	
P3.3B	Describe some ways in which friction between solid surfaces can be increased and decreased.	Friction is increased when more pressure is applied to the surfaces and when the materials/surfaces used are more rough.	

MAGNETS

Reference	Objective	Guidance	Possible links to enquiry
P3.4A	Describe magnets as having two poles, known as North and South.		
P3.4B	Distinguish between the terms 'attract' and 'repel'.	Observe how magnets attract or repel each other.	
P3.4C	Predict whether two magnets will attract or repel each other, depending on which poles are facing.		
P3.4D	Understand that some forces need contact between two objects, but magnetic forces can act at a distance.		Investigate distance between a magnet and a magnetic object before the latter starts to move.
P3.4E	Identify materials that are magnetic and those that are nonmagnetic and apply this to practical uses of magnets.	For example: fridge magnets.	Investigate magnetic and nonmagnetic materials by using a range of different materials (iron, copper, silver, plastic etc.) and testing them with a magnet.

LATER SCIENTIFIC ENQUIRY

Reference	Enquiry area	Objective	Guidance
LSE3.1	Scientific ideas	Ask relevant scientific questions.	
		Distinguish between questions that can be answered by scientific enquiry and those that cannot.	
		Plan different types of scientific enquiry.	
LSE3.2	Investigating	Use different types of enquiry to answer scientific questions.	
		Set up simple enquiries, comparative and fair tests.	
		Make systematic and careful observations.	
		Select equipment appropriate to the enquiry.	In addition to equipment in Early Primary Enquiry, include: measuring cylinder, stopwatch, test tube, Bunsen burner and evaporating dish.
		Take measurements, using a range of scientific equipment, with increasing accuracy and precision.	If available, include: thermometers, sound meters, light meters, stopwatches and measuring cylinders.
		Understand the need for repeat readings and relate this to the reliability of the data collected.	
LSE3.3	Obtaining and presenting evidence	Record data using scientific diagrams, keys, tables, bar graphs and line graphs.	
LSE3.4	Conclusions	Use results to draw simple conclusions and to predict new values.	
		Identify scientific evidence that has been used to support or refute their own conclusions and those of others.	
LSE3.5	Evaluating	Identify limitations to investigations and suggest how an investigation might be improved.	

Where possible each year group's objectives should be taught through practical investigation in order to embed learning and provide definite links with enquiry objectives.

Examples of where practical investigations may be carried out are:

Year 4 Biology: B4.2D Understand the way in which water is transported within plants.

Year 5 Physics: P5.1H Understand how shadow length changes during the course of a day.

Year 6 Biology: B6.2C Understand conditions required for the germination of seeds.

Year 6 Biology: B6.3D Understand how pulse rate changes with exercise and explain the reason for the change in terms of transporting oxygen and nutrients to muscles.

Other examples are highlighted in the 'Possible links to enquiry' column on each year group's objective page.

YEAR 4

BIOLOGY

VARIATION AND CLASSIFICATION

Reference	Objective	Guidance	Possible links to enquiry
B4.1A	Explain how living things can be classified according to shared features.		
B4.1B	Explore and use classification keys to help group, identify and name a variety of living things in the local and wider environment.	This section builds on Year 3 work.	Use keys to identify plants in local habitat(s).
B4.1C	Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including plants and animals.		
B4.1D	Identify the observable characteristics to classify a specific species of plant, for example, a buttercup.	For example: a buttercup is a small flower that can grow up to 16 inches tall; it has 5 shiny yellow petals and a green stalk; it grows in fields, meadows and in the wild.	
B4.1E	Identify the observable characteristics to classify a specific species of animal, for example, an earthworm.	For example: an earthworm is a worm made up of segments; it is usually pink, brown or red in colour; most earthworms are only a few inches long, but some can grow much longer; earthworms like to live in moist soil.	

GROWING PLANTS

Reference	Objective	Guidance	Possible links to enquiry
B4.2A	Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers.	This section builds on the very simple introduction to plants started in Year 1 and is intended to be investigative in approach.	Make observational sketches and see the function of roots using coloured dye.
B4.2B	Use a simple dichotomous key to identify a variety of plants.		Use or create a dichotomous key to investigate plants in their habitat(s).
B4.2C	Group plants according to observable features.	For example: leaf shape, leaf margins, flower shape (identification of floral parts, other than petals, is not required until Year 6).	Decide on sorting criteria for a selection of plants (actual or photographs).
B4.2D	Understand the way in which water is transported within plants.		Observe uptake of dye in celery, carnations, etc.
B4.2E	Describe the pathway of water as being from the soil into a plant's roots and up through the stem through the plant to the leaves and other parts of the plant.		
B4.2F	Understand that plants need the correct amount of water to grow well.		Observe wilting/rehydration and effect of overwatering, for example, using a photo diary.
B4.2G	Understand that plants need the correct amount of light to grow well.		Observe phototropism and etiolated growth, for example, using a photo diary (these terms are not required).
B4.2H	Understand that soil provides minerals to help plants grow and that fertilisers/organic matter can supplement this.		Create and observe a comparative/fair test, for example, the same plants in different soils or with/without fertiliser.

SKELETON AND MUSCLES

Reference	Objective	Guidance	Possible links to enquiry
B4.3A	Understand that humans have internal skeletons that provide support and protection and allow movement.		
B4.3B	Identify and locate the skull and rib cage and understand their function in protecting vital organs.		
B4.3C	Understand the term 'joint' as a place where bones meet and describe the extent of movement of a variety of joints.	Compare the fixed joint of a skull with the range of movement of shoulder and elbow joints.	Conduct further research; make model joints.
B4.3D	Understand the terms 'contract' and 'relax' in relation to antagonistic muscle action resulting in movement.	The principle of antagonistic action is important but the term is <i>not</i> required.	
B4.3E	Know that bones are important for producing blood cells.		
B4.3F	Explain the importance of exercise and diet in maintaining healthy muscles and bones.		

CHEMISTRY

SOLIDS, LIQUIDS AND GASES

Reference	Objective	Guidance	Possible links to enquiry
C4.1A	Identify materials as solids, liquids or gases and distinguish between them.		Investigate and classify a variety of suitable materials.
C4.1B	Describe some common properties of solids, liquids and gases.	Solids have a fixed shape and cannot be easily compressed. Liquids can flow and take a new shape but they cannot be compressed. Gases can flow and completely fill a new container and they can be compressed.	
C4.1C	Understand that solids consisting of very small particles can behave as liquids in some ways.	For example: sand, sugar.	Investigate the properties of sand in a variety of containers and through compression.
C4.1D	Understand that temperature is a measure of how hot or cold something is and is measured in degrees Celsius (°C) using a thermometer.		Practise measuring and recording temperatures with a thermometer.
C4.1E	Understand that water exists in three states and changes from one to another at different temperatures.		
C4.1F	Understand that different substances change state at different temperatures.		

PHYSICS

MAKING AND CHANGING SOUNDS

Reference	Objective	Guidance	Possible links to enquiry
P4.1A	Explain that sounds come from a source and can travel through solids, liquids and gases.	This section, which is best exemplified using musical instruments, builds on work started in Year 2.	
P4.1B	Understand that vibrations from sounds travel through a medium to the ear.		
P4.1C	Understand that some materials are effective in preventing vibrations from sound sources reaching the ear.		Investigate with a comparative test.
P4.1D	Understand that <i>volume</i> refers to how loud a sound is and that the volume of a sound can be changed.		
P4.1E	Know that the volume of sounds can be measured with a sound meter (data logger) and the unit is a decibel (dB).		Use a soundmeter (if available) to investigate different sounds in the environment.
P4.1F	Find patterns between the volume of a sound and the strength of the vibrations that produced it.		
P4.1G	Recognise that there are high- and low-pitched sounds and that the pitch of a sound can be changed.		
P4.1H	Identify and describe features of an object that can be changed to alter its pitch, for example, length of tube, length of string and tension of string.		Use available musical instruments to investigate or use junk modelling to create own instruments with variable pitch.
P4.1I	Find patterns between the pitch of a sound and features of the object that produced it.		

ELECTRICITY: EVERYDAY USES AND SIMPLE CIRCUITS

Reference	Objective	Guidance	Possible links to enquiry
P4.2A	Understand some uses of electricity and identify common appliances that use electricity.	For example: · bedside lamp, hairdryer, kettle and iron (mains) · mobile phone, mp3 player, remote control and torch (battery)	
P4.2B	Understand that some devices use batteries that supply electricity.	For example: mobile phone, mp3 player, remote control and torch.	
P4.2C	Describe dangers associated with mains electricity.	For example: mains electricity must not be used near water; check appliances regularly; ensure wires are in good repair; mains electricity is significantly more dangerous than electricity from a cell (battery).	
P4.2D	Construct simple working series circuits from simple instructions or drawings.	Formal symbols will be introduced in Year 6.	Follow simple instructions and select appropriate equipment to create working circuits and to correct noncircuits.
P4.2E	Identify and name components in a simple series circuit.	Components include: bulb, buzzer, wire, cell, battery and switch.	
P4.2F	Understand that a circuit needs a power source to work.		
P4.2G	Understand that a complete circuit is needed for a device to work and that a switch can be used to break a circuit.		
P4.2H	Understand that some materials conduct electricity better than others using the terms electrical 'conductor' and 'insulator'.	For example: · insulators: rubber, wood · conductors: copper, water · vs examples: steel conducts electricity better than paper.	
P4.2I	Understand the use of common electrical conductors and insulators.	For example: contrast the use of plastic and copper in electrical cables and household appliances.	

YEAR 5

BIOLOGY

PLANT ADAPTATIONS

Reference	Objective	Guidance	Possible links to enquiry
B5.1A	Understand that different habitats and microhabitats have different environmental conditions.	Understand that light, moisture, temperature and shelter can be variable and contrast some local environments.	Using thermometers and light meters, record patterns of light and shade, and density of tree foliage.
B5.1B	Understand that plants obtain water via their roots and that the availability of water may affect the pattern of root growth.	This work builds on the pathway of water introduced in Year 4.	Investigate with a comparative test: provide plants with different amounts of water over a period of time and then observe their roots to look for differences in root growth.
B5.1C	Understand that both plants and animals require oxygen from the air for respiration.		
B5.1D	Understand that plants require light and that the availability of light affects their distribution.	This work builds on observations of plant-growth patterns in response to availability of light introduced in Year 4.	Compare two contrasting local habitats and record the extent of plant growth in both.
B5.1E	Describe ways in which plants are suited to the environment in which they are found.		Observe local plants' adaptations and compare to plants from other environments using books/the internet.
B5.1F	Compare features of plant adaptations in two contrasting habitats.		
B5.1G	Predict the likely habitats of a variety of plants from the adaptations that they show.		Make observations from actual examples from suitable habitats, for example, seashore, aquatic, desert (cactus) etc. and apply these to other plants seen outside of their natural environment(s).

LIVING THINGS IN DANGER

Reference	Objective	Guidance	Possible links to enquiry
B5.2A	Understand that environments can change and that this can sometimes pose dangers to living things.	For example: deforestation can remove shelter for animals; forest fires can remove shelter and food sources; flooding can remove food and shelter; a newly built road can separate an animal from a water source.	
B5.2B	Understand that environments can be changed in positive ways, for example, the creation of nature reserves, and in negative ways, for example, deforestation.		Use local knowledge and contacts, books and the internet (if available) to research examples of both.
B5.2C	Recognise ways in which living things and the environment need protection, both locally and globally.		Investigate the local environment and make a plan to support a habitat that's in danger.
B5.2D	Understand the term 'conservation' and describe examples of ways in which humans can reduce the effects of environmental change.		Use local knowledge and contacts, books and the internet (if available) to research examples of both.
B5.2E	Distinguish between the terms 'endangered' and 'extinct'.	Extinct means there are no more individuals of a plant or animal species alive anywhere in the world. Endangered means there are very few individuals of a species left and they are in danger of becoming extinct.	
B5.2F	Explain in simple terms how fossils are formed when things that have lived, or parts of living things, are trapped within rock.	This is intended to link with work on rocks in Year 3 Chemistry.	
B5.2G	Understand how fossils provide evidence of organisms that are now extinct and information about when/where they may have lived.		Observe and draw actual examples of fossils and discuss what these examples show us.

DIET AND DIGESTION

Reference	Objective	Guidance	Possible links to enquiry
B5.3A	Understand that to stay healthy humans need a balanced diet containing the correct amounts of a range of nutrient groups.	This section builds on the introduction to balanced diet in Year 2.	
B5.3B	Describe, in outline only, the main benefits of each food group, with examples.	These are: protein, carbohydrate, fats, vitamins, minerals, fibre and water.	
B5.3C	Understand the relationship between diet, lifestyle (for example, sleep), exercise and health.		
B5.3D	Sequence the process of digestion in humans as ingestion, swallowing, digestion, absorption and egestion.		
B5.3E	Describe the simple functions of the basic parts of the digestive system involved in the sequence of digestion.	This revises the functions of the teeth and tongue in physical digestion; essential vocabulary may be limited to <i>oesophagus</i> , <i>stomach</i> , <i>small and large intestines</i> and <i>anus</i> .	

CHEMISTRY

MIXING AND SEPARATING MATERIALS

Reference	Objective	Guidance	Possible links to enquiry
C5.1A	Understand that solids can be mixed and that sieving may be used to separate some mixtures.	Sieving can be used to separate larger solids from smaller solids, for example, sugar and raisins. Sieving cannot be used to separate smaller solids from smaller solids, for example, sugar and flour.	Investigate separation using a sieve with a series of mixed solids (for example, flour and nuts; flour and sugar; sand and sugar).
C5.1B	Explain how filtration may be used to separate some solids from a liquid.	For example: sand from water.	Predict and investigate separation through filtration with a series of mixtures (for example, sand and water; water and salt).
C5.1C	Understand that when a solid dissolves in water it forms a solution that cannot be separated by filtration.	For example: salt dissolves completely in water and cannot be separated by filtration.	
C5.1D	Describe ways in which simple substances such as sugar and salt can be dissolved more quickly.		Investigate with a comparative test.
C5.1E	Explain that when a solution is left exposed to the air the liquid will evaporate into the air, leaving the dissolved solid behind.		Investigate and observe a solution, such as salt water, left exposed to the air over time. Take water-level measurements and sketch and record results.
C5.1F	Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including by sieving, using a magnet, filtering and evaporating.		Investigate different methods using a series of mixtures (for example, solid/solid; solid/liquid).

PHYSICS

EARTH AND SPACE

Reference	Objective	Guidance	Possible links to enquiry
P5.1A	Understand that the Sun is a star and is at the centre of our Solar System.		
P5.1B	Understand that the Earth, Sun and Moon are part of the Solar System and that Earth is a planet with one Moon.	This builds on earlier work in Year 2.	
P5.1C	Understand that planets may be different sizes and some have more than one moon.		
P5.1D	Describe the position and the movement of the Earth, and other planets, relative to the Sun in our Solar System.		
P5.1E	Describe the movement of the Moon relative to Earth, and Earth and other planets relative to the Sun, correctly using the term 'orbit'.		
P5.1F	Understand that ideas about the Solar System have changed and developed over time.	For example, students should know that more planets have been discovered over time, and that people used to believe the Sun orbited the Earth.	
P5.1G	Explain that Earth spins on its axis causing some parts of Earth to be in daylight when other parts are in darkness.		
P5.1H	Understand how shadow length changes during the course of a day.		Investigate patterns in shadow lengths, using simple sundials or shadow clocks.
P5.1I	Use the idea of Earth's rotation to explain the apparent movement of the Sun across the sky.	The Sun appears to move across the sky because Earth rotates into and out of the path of sunlight. It appears that the Sun is moving, but really it is the Earth moving on its axis.	

SEEING AND REFLECTING

Reference	Objective	Guidance	Possible links to enquiry
P5.2A	Understand that light comes from a source and appears to travel in straight lines.	This section builds on work started in Years 1 and 3 and introduces simple ray diagrams.	Set up and observe shadow investigations.
P5.2B	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.	Students draw and interpret simple ray diagrams that illustrate the direction of travel of light.	
P5.2C	Use the idea that light appears to travel in straight lines to explain that objects are seen because they give out or reflect light into our eyes.		Observe small objects from the opposite end of a sealed black tube; discuss and note findings.
P5.2D	Understand that light can be reflected from shiny surfaces and, when reflected, the light changes direction.	Angles of incidence and angles of reflection are not expected to be taught formally at this stage.	
P5.2E	Understand that smooth and shiny surfaces reflect light well but light is more scattered when it is reflected off a dull surface.		Plan and carry out an investigation into the best safety clothing to wear at night.
P5.2F	Recognise and give simple explanations for differences between shadows and reflections.	For example: foil, a mirror, brick, wood.	

YEAR 6

BIOLOGY

MICRO-ORGANISMS

Reference	Objective	Guidance	Possible links to enquiry
B6.1A	Know the term 'micro-organisms' and that these can be bacteria, viruses or microscopic fungi.	For example: yeasts, E coli (a bacteria found in our gut to aid in digestion) and influenza (a virus).	
B6.1B	Describe ways in which some micro-organisms can be useful and others can be harmful.	Examples of useful: making bread, compost, cheese and yoghurt Examples of harmful: disease, food poisoning and food going mouldy.	
B6.1C	Explain that micro-organisms grow and reproduce on food and explain some simple food hygiene precautions.	For example: hand washing, storage/refrigeration.	Carry out an investigation into what conditions help mould grow on bread by varying the temperature, light and amount of moisture to which the bread is exposed.
B6.1D	Understand the role of decomposers in food chains and the recycling of materials.	This section relates to soil work from Year 3.	Carry out an investigation to create a composter and observe the results in decomposition of materials. Use the resulting compost to grow things in the classroom.

PLANT LIFE CYCLES

Reference	Objective	Guidance	Possible links to enquiry
B6.2A	Understand that some plants have flowers, which produce seeds that grow into new plants.		
B6.2B	Sequence the life cycle of a typical flowering plant using the terms 'germination', 'flowering', 'pollination', 'fertilisation' and 'seed dispersal'.		
B6.2C	Understand conditions required for the germination of seeds.		Compare how successfully seeds germinate in different conditions (e.g. light, water).
B6.2D	Explain why seeds need to be dispersed and the ways in which this can occur.	Dispersal of seeds ensures that the parent plant does not compete with its offspring for limited resources.	
B6.2E	Define 'pollination' as the transfer of pollen from the anther to the stigma on the same or a different flower.		
B6.2F	Distinguish between the processes of insect and wind pollination.		
B6.2G	Identify the parts of an insect-pollinated flower and explain the function of each part.	Students should be familiar with sections of the plant: petal, anther, filament, stigma, style, ovule, ovary, nectary, sepal and receptacle.	Observe, examine and draw suitable examples of real flowers and identify their different parts.
B6.2H	Distinguish between pollination and fertilisation in plants.	Pollination is the transfer of male pollen from anther to stigma of same or different flower. Fertilisation is when the male pollen grain, now on the stigma, joins with the female ovule.	
B6.2I	Describe different mechanisms by which seeds are dispersed.	For example: poppy, coconut, dandelion. Look at local examples of plants with seeds that are dispersed by animals or the wind.	Observe different types of local plants and note the different ways in which they disperse seeds.

HEART, LUNGS AND CIRCULATION

Reference	Objective	Guidance	Possible links to enquiry
B6.3A	Describe the heart as an organ that pumps blood as part of the circulatory system.		
B6.3B	Understand that water and nutrients are transported around our bodies in blood.		
B6.3C	Describe the circulatory system as comprising the heart and blood vessels containing blood.	Students should also understand the function of the lungs in the circulatory system, that is, to breathe in oxygen and breathe out carbon dioxide transported by the blood.	
B6.3D	Understand how pulse rate changes with exercise and explain the reason for the change in terms of transporting oxygen and nutrients to muscles.		Investigate own pulse rate and how it changes as a result of exercise.
B6.3E	Describe the lungs as being located in the thorax and as the organs used for breathing.		
B6.3F	Understand that air is a mixture of gases, including oxygen.	Students do not need to know all the gases at this stage, only oxygen.	
B6.3G	Understand that blood picks up oxygen from the lungs and transports it through blood vessels to organs of the body.		
B6.3H	Distinguish between and correctly use the terms 'breathing' (ventilation of the lungs) and 'respiration' (how oxygen is used by the body once it reaches organs).	Only a simple distinction is required at this level.	

CHEMISTRY

REVERSIBLE AND IRREVERSIBLE CHANGE

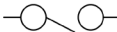
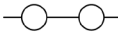
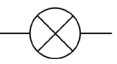


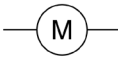

Reference	Objective	Guidance	Possible links to enquiry
C6.1A	Explain, with examples, that mixtures can be separated using a sieve or filter.	This section builds on earlier work in Year 5. Examples of mixtures: sandy water, nuts in flour and rocks in soil	Carry out practical experiments to separate various mixtures using a sieve or filtration.
C6.1B	Understand the terms 'dissolving', 'solution', 'solvent' and 'solute'.		
C6.1C	Explain how a solute can be recovered from a solution by evaporating the solvent.	For example: using a salt solution	Observe a teacher-led practical experiment to separate salt from water using evaporation.
C6.1D	Understand that melting, freezing, evaporation and condensation are changes of state.		Observe a teacher-led practical experiment to melt, freeze, evaporate and condense water.
C6.1E	Explain that changes of state require changes of temperature.	Freezing and condensation are achieved by cooling; melting and evaporation are achieved by heating.	
C6.1F	Describe the role of evaporation and condensation in the water cycle.		
C6.1G	Understand that dissolving, mixing and changes of state are reversible changes.		
C6.1H	Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible.	For example: · vinegar and baking powder combine to form carbon dioxide. · cement and water produce a hardening and a chemical reaction.	
C6.1I	Describe simple irreversible changes.	For example: iron nails rusting, wax burning, wood burning and bread cooking	
C6.1J	Describe observable changes when acid and bicarbonate of soda are mixed, as evidence that new materials are formed.	Lemon or lime juice could be used here if nothing else is available.	Observe a practical experiment in which acid and bicarbonate of soda are mixed together; note findings.

PHYSICS

FORCES IN AIR AND WATER

Reference	Objective	Guidance	Possible links to enquiry
P6.1A	Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.		
P6.1B	Understand that weight is a force and forces are measured in newtons (N).		
P6.1C	Understand that more than one force can act on an object at the same time.		
P6.1D	Know how friction acts on moving objects to slow them down.	This builds on Year 3 content – now friction between water, air and solid surfaces are considered, not just two solid surfaces.	
P6.1E	Understand how friction can be used to improve how well an object grips to a surface.		Compare shoe grips practically through an investigation.
P6.1F	Understand that friction can act between solid surfaces and air and water.	Water resistance causes friction between a solid surface and water (e.g. a speedboat in a lake). Air resistance causes friction between a solid surface and air (e.g. an airplane flying).	
P6.1G	Understand that air resistance and water resistance are forces that reduce the speed at which objects move.		
P6.1H	Identify the effects of air resistance, water resistance and friction acting between moving surfaces.	For example: a speedboat in a lake (water resistance); an airplane flying (air resistance); a tyre against the road	Research ice/water sports.
P6.1I	Describe how the shape of objects can be used to reduce the effects of water and air resistance, including the term 'streamlined'.		Investigate time taken for objects of different shapes to fall through a viscous medium, for example, wallpaper paste.

ELECTRICITY: CHANGING CIRCUITS

Reference	Objective	Guidance	Possible links to enquiry
P6.2A	Understand the need for universally recognised symbols for electrical components.	This section builds on work started in Year 4; formal circuit drawing is now introduced.	
P6.2B	Draw and identify recognised electrical-component symbols for a bulb, buzzer, battery (cell), wire, switch and motor.	    Open Switch Closed Switch Bulb Battery (cell)    Wire Motor Buzzer	
P6.2C	Use and interpret recognised symbols for components when drawing or designing simple series circuits.		Design, build and draw simple circuits, using the correct symbols.
P6.2D	Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.	If you increase the number of cells/voltage of a circuit, the bulb will become brighter. If you decrease these, the bulb will become dimmer.	Practically investigate the effect of the number of cells in the circuit.
P6.2E	Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers, the on/off position of switches and the speed of motors.	Students should understand that, for some components, the higher the voltage available, the louder/brighter/quicker they will be.	