

Ebchester CE Primary School

Progression of Learning – Science Lower KS2



		By the end of Lower KS2	
		Breadth of Study	Knowledge and Skills By the end of Year 4, pupils will be able to:
Working Scientifically	<ul style="list-style-type: none"> Asking questions 	<ul style="list-style-type: none"> ask relevant questions and use different types of scientific enquiries to answer them set up simple practical enquiries, comparative and fair tests 	<ul style="list-style-type: none"> Raise their own relevant questions about the world around them Start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions
	<ul style="list-style-type: none"> Measuring and recording 	<ul style="list-style-type: none"> make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables gather, record, classify and present data in a variety of ways to help in answering questions 	<ul style="list-style-type: none"> Make systematic and careful observations Help to make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used Begin to look for naturally occurring patterns and relationships and decide what data to collect to identify them Take accurate measurements using standard units Use a range of (new) equipment, such as data loggers / thermometers appropriately Collect and record data from their own observations and measurements in a variety of ways: notes, bar charts and tables, standard units, drawings, labelled diagrams, keys and help to make decisions about how to analyse this data

	<ul style="list-style-type: none"> Concluding 	<ul style="list-style-type: none"> identify differences, similarities or changes related to simple scientific ideas and processes report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions use straightforward scientific evidence to answer questions or to support their findings 	<ul style="list-style-type: none"> Look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions with help Use relevant simple scientific language to discuss their ideas and communicate their findings in ways that are appropriate for different audiences, including oral and written explanations, displays or presentations of results and conclusion
	<ul style="list-style-type: none"> Evaluating 	<ul style="list-style-type: none"> use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions 	<ul style="list-style-type: none"> Identify new questions arising from the data, making predictions for new values within or beyond the data they have collected and finding ways of improving what they have already done Suggest improvements to their work

Working Scientifically Vocabulary

By the end of Year 4, pupils will recognise and understand the terms:

Relative, scientific enquiry, comparative and fair test, systematic, conclusion, prediction, evidence,

Biology	<ul style="list-style-type: none"> Plants 	<ul style="list-style-type: none"> identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant 	<ul style="list-style-type: none"> Identify parts of flowering plants Describe why healthy roots and a healthy stem are needed for plants to grow Recognise that the leaves of a plant are associated with healthy growth and more specifically nutrition Recognise that plants need light, water and warmth and healthy leaves, roots and stems in order to grow well Know that water travels from the roots up the stem Know that plants make their own food Know that fertilisers contain minerals Understand that plants absorb minerals from the soil
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		<ul style="list-style-type: none"> investigate the way in which water is transported within plants explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal 	<ul style="list-style-type: none"> Describe how changes to light and fertiliser affect plant growth Explain that differences in plant growth are due to the amount of light and/or water Describe how the stem has a role in support and nutrition (transport of water) Explain why healthy roots and a healthy stem are needed for plants to grow Describe why plants need flowers Sequence pictures to show the life cycle of a plant Describe how pollen and seeds are dispersed Explain the role of bees and insects in pollination Describe the processes of pollination, seed formation and seed dispersal
	<ul style="list-style-type: none"> Animals (including humans) 	<ul style="list-style-type: none"> identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat identify that humans and some other animals have skeletons and muscles for support, protection and movement describe the simple functions of the basic parts of the digestive system in humans identify the different types of teeth in humans and their simple functions construct and interpret a variety of food chains, identifying producers, predators and prey 	<ul style="list-style-type: none"> Identify some foods needed for a healthy and varied diet Name the components of a healthy and varied diet Describe how their diet is balanced Describe the role of different food groups Compare and contrast diets of animals including pets Describe an adequate and varied diet for humans, recognising that there are many ways of achieving this Know they have bones and muscles in their body State that they and other animals have skeletons Identify animals that do not have an internal skeleton (invertebrates) Group animals with and without an internal skeleton Describe some advantages of having an internal skeleton over no skeleton or an exoskeleton Describe some observable characteristics of bones Describe the main functions of their skeletons State that movement depends on both skeleton and muscles State that when one muscle contracts another relaxes Recognise that their skeletons grow as they grow Describe problems associated with broken bones or bones diseases

			<ul style="list-style-type: none"> • Identify a wider range of body parts, including some internal organs (large intestine, small intestine, brain, lungs, heart, stomach, oesophagus) • Locate and name the different organs in the digestive system • Describe the role of each organ in the digestive system • Explain why food needs to be broken down • Recognise they need to take care of their teeth • Name the different types of teeth • Describe the role of each type of teeth in digestion • Explain how they should look after their teeth and recognise why they need to do so • Explain why dentists are concerned about the amount of sugar children have • State that animals have different diets and may have different kinds of teeth • Explain how fossilised teeth give us clues about an animals' diet • Explain why the teeth of certain types of animals need to be different
	<ul style="list-style-type: none"> • Living things and their habitats 	<ul style="list-style-type: none"> • recognise that living things can be grouped in a variety of ways • explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment • recognise that environments can change and that this can sometimes pose dangers to living things 	<ul style="list-style-type: none"> • Explore ways of grouping living things including animals and plants (flowering and non-flowering) • Recognise that animals can be grouped into vertebrates and invertebrates • Describe some of the characteristics of the vertebrate (fish, mammals, amphibians, reptiles and birds) groups (e.g. warm-blooded, have fur, lay eggs) • Group animals into vertebrate (fish, mammals, amphibians, reptiles and birds) and invertebrate groups (snails, slugs, spiders, worms and insects) • Explain why some animals are hard to classify (e.g. platypus, echidna, bat, flightless birds) • Identify that some animals feed on other animals and some on plants • Represent feeding relationships with simple food chains • Recognise that a food chain must always start with a green plant

			<p>(a producer)</p> <ul style="list-style-type: none"> • Represent feeding relationships within a habitat with food chains beginning with a green plant which 'produces' food for the other organisms • Recognise that green plants are the ultimate source of food for all animals • Use and understand the terms: producer, predator and prey • Use food chains to predict what might happen to the numbers of an organism if there are suddenly more predators or less prey • Know the function of some of the more complex features which aid survival in specific habitats (e.g. gills, blubber, camouflage) • Describe why different animals and plants live in different habitats • Describe how humans can cause changes to environments • Explain why it is necessary to use a reasonably large sample when investigating the preferences of small invertebrates • Explain that different organisms are found in different habitats because of differences in environmental factors • Describe how humans have negatively impacted environments (e.g. pollution, deforestation, introduction of invasive species)
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Biology Vocabulary

By the end of Year 4, pupils will recognise and understand the terms:

nutrients, growth, pollen, pollination, seed formation, seed dispersal, nutrition, anchor, reproduction

Balanced diet, carbohydrates, protein, fats, fibre, muscles, femur, ribs, spine, tibia, shoulder blade, hollow, relax and contract, protect, support, internal skeleton, exoskeleton

incisor, molar, canine, diet, decay, acids, rip, tear, chew, grind

Digestive system, saliva, toilet waste, nutrients, energy, stomach, large/small intestine, brain, lungs, acids, urine, faeces, oesophagus

Predator, prey, producer, vegetation, vertebrate, invertebrate, classify, characteristic, fern, moss

Chemistry	<ul style="list-style-type: none"> • Rocks 	<ul style="list-style-type: none"> • compare and group together different kinds of rocks on the basis of their appearance and simple physical properties • describe in simple terms how fossils are formed when things that have lived are trapped within rock • recognise that soils are made from rocks and organic matter 	<ul style="list-style-type: none"> • Observe the characteristics of a variety of rocks • Name and describe the characteristics of several rocks • Identify fossils in rocks • Classify rocks from the evidence of investigations • Explain that rocks are used for different purposes dependent on their physical properties • Explain that different types of rock react differently to physical forces (e.g. water, rubbing) • Understand that there are rocks under the Earth's surface • Relate the simple physical properties of some rocks to their formation • Explain why certain rocks are used for different purposes and why some rocks could be used for these jobs for example: <ul style="list-style-type: none"> ▪ Marble- kitchen worktops or statues ▪ Slate roof tiles ▪ Granite walls • Explain how a model (e.g. biscuits, chocolate bars) can be used to represent sedimentary, metamorphic and igneous rocks • Explain why we might find lots of the same types of rock in one place • Describe how Mary Anning discovered fossils • Explain why we do not see the soft parts of animals in fossils • Recognise that soil is a mixture of different materials and living things • Recognise that soil contains dead plants and animals • Recognise that there is rock under all surfaces and that soils come from rocks
	<ul style="list-style-type: none"> • States of matter 	<ul style="list-style-type: none"> • compare and group materials together, according to whether they are solids, liquids or gases • observe that some materials change state when they are heated or cooled, and 	<ul style="list-style-type: none"> • Name some solids and liquids • State that air is a gas • State some differences between solids, liquids and gases • Recognise everyday substances as mixtures of solids, liquids and/or gases • Recognise that air is a material and that it is one of a range of gases which have important uses

measure or research the temperature at which this happens in degrees Celsius (°C)

- identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature

- Recognise that gases flow from place to place
- Know that gases can be easily compressed
- Describe the differences between solids and liquids
- Describe the behaviour and properties of gases
- Compares simple solids and liquids (e.g. in terms of ease of squashing or pouring)
- Make clear distinctions between the properties of solids, liquids and gases
- Explain why granular solids have some of the properties associated with liquids
- Explain why some substances are hard to classify as solids, liquids and gases (e.g. whipped cream, mousse, mayonnaise, muddy water, fizzy drinks, cornflour and water)
- Observe what happens to a variety of materials when they are heated (e.g. chocolate, ice cream, butter, water)
- Identify a wide range of contexts in which changes of state take place describe a few examples where these changes occur
- Recognise that for a substance to be detected by smell, some of it must be in the gas state
- Compare the boiling point of different liquids
- State that ice, water and steam are the same material
- Identify the processes of melting, freezing, evaporation and condensation
- Describe what happens to water when it is heated and cooled
- Recognise that these processes can be reversed
- Describe how when ice melts it turns to liquid and how when water freezes it becomes ice
- Describe how these processes can be reversed
- Describe how liquids evaporate to form gases and how gases condense to form liquids
- Sequence the changes that happen in the water cycle
- Describe the water cycle in terms of these processes
- Explain the relationship between liquids and solids in terms of melting and freezing

			<ul style="list-style-type: none"> • Explain the relationship between liquids and gases in terms of evaporation and condensation • Know that temperature can affect the rate of evaporation or condensation • Describe the effect of temperature on evaporation • Explain how changing conditions affects processes such as evaporation and condensation • Identify a range of contexts in which changes take place (e.g. evaporation of puddles in the school playground or from clothes on a washing line, condensation in the bathroom) • Explore the effect of salt on ice • Explain why salt is put on the roads in winter
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Chemistry Vocabulary
By the end of Year 4, pupils will recognise and understand the terms:
marble, granite, slate, chalk, clay, texture, absorbed, permeable, characteristic, organic, impermeable, crystal, grains, crumbly, igneous, sedimentary, metamorphic, fossil, grain/granular, evaporate, condense, properties, melting point, degrees Celsius,

Physics	<ul style="list-style-type: none"> • Light 	<ul style="list-style-type: none"> • recognise that they need light in order to see things and that the dark is the absence of light • notice that light is reflected from surfaces • recognise that light from the sun can be dangerous and that there are ways to protect their eyes • recognise that shadows are formed when the light from a light source is blocked by a solid object 	<ul style="list-style-type: none"> • Name a number of light sources, including the sun • Describe and compare some light sources • State that light sources are seen when light from them enters the eyes • Recognise that they cannot see in the dark • Recognise that light travels from a source • Explain that places are dark because there is no light and a light source is needed to help us see in such places • State that reflections can be seen in shiny surfaces • Make generalisations about shiny surfaces (e.g. smooth) • Demonstrate light travelling using a torch and record light bouncing off a mirror • Identify suitable reflective clothing for travelling in the dark • explain that they cannot see shiny objects in the dark because
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	<ul style="list-style-type: none"> • Forces and Magnets 	<ul style="list-style-type: none"> • compare how things move on different surfaces • notice that some forces need contact between two objects, but magnetic forces can act at a distance • observe how magnets attract or repel each other and attract some materials and not others • compare and group together a variety of everyday materials on the basis on whether they are attracted to a magnet, and 	<ul style="list-style-type: none"> • Recognise that pushes and pulls are forces • Recognise that a force acts in a particular direction • Observe the movements, shape and direction of objects when forces act on them • Describe how to make a familiar object start moving by pushing or pulling • Describe how to use pushes and pulls to make familiar objects speed up, slow down, change direction or shape • Produce annotated drawings showing the direction of force needed to make an object move • Identify friction as a force • Observe and explore how friction affects the movement of objects • Describe some ways in which friction between solid surfaces can

		<p>identify some magnetic materials</p> <ul style="list-style-type: none"> • describe magnets as having two poles • predict whether two magnets will attract or repel each other, depending on which poles are facing 	<p>be increased or decreased</p> <ul style="list-style-type: none"> • Classify materials as magnetic or non-magnetic • Describe the difference between a magnet and a magnetic material • Describe what happens when some materials are put near a magnet • Recall that magnets have a north and a south pole • Describe the direction of forces between magnets • Describe some everyday uses of magnets • Explain that a compass works by lining up with the Earth's magnetic field • Describe how lodestone was found to be a naturally occurring magnet and was used as the first compass for navigation
	<ul style="list-style-type: none"> • Sound 	<ul style="list-style-type: none"> • identify how sounds are made, associating some of them with something vibrating • recognise that vibrations from sounds travel through a medium to the ear • find patterns between the pitch of a sound and features of the object that produced it • find patterns between the volume of a sound and the strength of the vibrations that produced it • recognise that sounds get fainter as the distance from the sound source increases 	<ul style="list-style-type: none"> • Recognise and describe many sounds and sound sources • State that they hear sounds through their ears • Recognise that when sounds are generated by objects, something moves or vibrates • Identify what is vibrating in a range of musical instruments • Generalise that sounds are produced when objects vibrate • Describe how sounds are generated by specific objects • Suggest ways of producing sounds • Recognise that sounds travel through solids, water and air • Explore how sound travels through a variety of materials • Distinguish between pitch and volume (loudness) • Describe differences in pitch and volume • Know that altering vibrations alters the pitch or volume • Describe ways in which the pitch of a sound made by a particular instrument or vibrating object can be raised or lowered • Generalise the effects of changes on sound (e.g. the tighter the tension the higher the pitch) • Explore how to vary the pitch and volume of sounds from a variety of objects or instruments • Suggest how to change the loudness of the sounds produced by

			<p>a range of musical instruments</p> <ul style="list-style-type: none"> • Describe what they observe when they move further away from a source of sound • Group instruments independently by the way sounds are produced • Identify suitable materials to use for sound insulation • Recognise that sound can be reflected from a surface which can cause an echo • Describe how some animals use echo-location
	<ul style="list-style-type: none"> • Electricity 	<ul style="list-style-type: none"> • identify common appliances that run on electricity • construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers • identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery • recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit • recognise some common conductors and insulators, and associate metals with being good conductors 	<ul style="list-style-type: none"> • Identify mains operated and battery operated devices • Describe some of the dangers associated with mains electricity • Name some components of a simple electrical circuit • Know that batteries are sources of electricity • Recognise that for a circuit to work it must be complete • Construct a working circuit • Make drawings of simple working circuits • Make circuits from drawings provided • Be methodical in tracing faults in simple circuits • Describe the effect of making and breaking one of the contacts on a circuit • Explain why some circuits work and others do not • Describe how switches work • Construct a home-made switch • Identify materials as conductors or insulators • Construct simple circuits and use them to test whether materials are electrical conductors or insulators • Relate knowledge about metals and non-metals to their use in electrical appliances • Describe the use of conductors and insulators in components including connecting wires • Identify playdough and graphite as non-metal conductors and explain why this is unusual

Physics Vocabulary

By the end of Year 4, pupils will recognise and understand the terms:

opaque, block, transparent, translucent, light source, absorb, reflect, reflective surface, surface, sundial, pitch, vibrations, insulation
Force, friction, magnets, magnetic, magnetism, repel, attract,
cell, wires, switch, crocodile clips, buzzer, circuit, insulator, conductor, appliance, component