



Howden C of E Infant and Junior School

Sequence of Learning: Science



Science has changed our lives and is vital to the world's future prosperity. Our Howden Science curriculum endeavours to teach the essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils are encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They are encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

Science: Age Related Statutory Coverage

Development Matters Children age 3 and 4	Early Learning Goal	Key Stage One	Lower Key Stage Two	Upper Key Stage Two
<u>Personal Social and Emotional Development</u> Make healthy choices about food, drink, activity and toothbrushing. <u>Understanding the World</u> Use all their senses in hands-on exploration of natural materials.	<u>Understanding the World: The Natural World</u> 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	The principal focus of science teaching in key stage 1 is to enable pupils to experience and observe phenomena, looking more closely at the natural and humanly-constructed world around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their understanding of	The principal focus of science teaching in lower key stage 2 is to enable pupils to broaden their scientific view of the world around them. They should do this through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar	The principal focus of science teaching in upper key stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. At upper key

Explore collections of materials with similar and/or different properties. 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.	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.	scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information. They should begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways. Most of the learning about science should be done through the use of first-hand practical experiences, but there should also be some use of appropriate secondary sources, such as books, photographs and videos.	environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They should draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out.	stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings.
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Substantive and Disciplinary Knowledge in Science

Substantive Knowledge in Science:	This is the factual content produced by the areas of biology, physics and chemistry e.g. naming the simple physical properties of everyday materials or that plants need water, light and a suitable temperature to grow and stay healthy.
Disciplinary Knowledge in Science:	This is the scientific methods e.g. using the skills of predicting, investigating, gathering data and hypothesising an idea. It is the opportunity to develop understanding of a substantive knowledge e.g. investigating if a plant will grow healthily in the dark will develop understanding of what a plant needs to be healthy.



Howden C of E Infant School

Sequence of Learning: Science FS2



Knowledge		
	Understanding our World (The Natural World)	Personal, Social and Emotional Development
FS2	Plants Know that a plant is a living thing and recognise/name parts of a plant. Name and describe some plants they see in the natural world around them. Plant and care for a bean. Understand how certain plants grow and correctly sequence the growth patterns of a bean. Animals and Humans Name and describe animals that live in different habitats, including those they see around them. Describe different habitats. Begin to understand what impact humans have had on animals and their environments. Describe people who are familiar to them. Seasons Understand and talk about the effect of changing seasons on the natural world around them. Materials Use all their senses in exploration of materials, including natural materials.	Health Know and talk about the different factors that support overall health and wellbeing including handwashing, regular physical exercise, healthy eating, toothbrushing, sleep and screen time.

	Explore collections of materials with similar and/or different properties. Talk about the differences between materials and changes they notice. Explore how and begin to understand why certain materials are better to use for different things. Notice and talk about what happens to water when it's cold and begin to understand that when water gets cold enough it freezes and becomes ice. Also begin to understand that when ice warms up it melts and changes back to water.	
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Working Scientifically		
FS2	Observe and make links, noticing patterns in their learning and begin to give reasons why changes they observe occur. Develop ideas of grouping, sequences, cause and effect. Comment and ask questions. Select and use a range of scientific equipment. Make predictions based on what they observe. Investigate and ask questions about the world around them.	

Key Vocabulary		
	Understanding our World (The Natural World)	
FS2	Plants Plant, tree, bush, flower, vegetable, herb, weed, animal, names of plants they see, seed, roots, stem, leaves, petals	

	Animals Names of animals they see, names of other animals, live, on land, in water, names of other habitats, e.g. jungle, desert, sea. Seasons Spring, summer, autumn, winter, sunny, cloudy, hot, warm, cold, shower, raining, storm, thunder, lightning, hail, sleet, snow, icy, frost, puddles, windy, rainbow. Materials Ice, water, frozen, icicle, snow, melt, wet, cold, slippery, smooth, big, bigger, biggest, smaller, smaller, smallest, hard, soft, brick, wood, straw, plastic, paper, card, metal, strong, weak, hot, apply heat, waterproof, soggy, not waterproof, best, change, change back.
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Common Misconceptions	
Understanding our World (The Natural World)	
FS2	Plants <i>Some children may think:</i> Trees are not plants. Trees are not living as they do not seem to change or grow Animals <i>Some children may think:</i> Animals are furry and have four legs. A bee is not an animal because it is an insect. Animals adapt to their surroundings, e.g. a brown bear turns white and becomes a polar bear. Animals living in the soil breathe by coming to the surface. Dragons and other mythical creatures are real animals.

	<i>Some children may think:</i> All babies and young animals are born in spring. Plants only have flowers in the spring and summer. Animals sleep during winter. <i>Some children may think:</i> Material only means fabric. All plastic/wood etc. is the same.
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Howden C of E Infant School

Sequence of Learning: Science Year 1



Knowledge			
	Biology	Chemistry	Physics
Year 1	Animals including Humans Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. Identify and name a variety of common animals that are carnivores, herbivores and omnivores. Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). Identify, name, draw and label the basic parts of the human body which can be seen and say which part of the body is associated with each sense. Plants Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. Identify and name the petals, stem, leaves and root of a plant.	Materials Distinguish between an object and the material from which it is made. Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. Describe the simple physical properties of a variety of everyday materials. Compare and group together a variety of everyday materials on the basis of their simple physical properties.	Seasonal Change Observe changes across the four seasons. Observe and describe weather associated with the seasons and how day length varies.

	Identify and name the roots, trunk, branches and leaves of a tree.		
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Working Scientifically	
Year 1	Use different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information. Ask simple questions and listen to the answers. Begin to observe closely, using simple equipment. Identify and classify objects. Use their observations and ideas to suggest answers to questions. Gather and record data to help in answering questions.

Key Vocabulary			
	Biology	Chemistry	Physics
Year 1	Animals including Humans Head, body, eyes, ears, mouth, teeth, leg, tail, wing, claw, fin, scales, feathers, fur, beak, paws, hooves. Names of animals experienced first-hand from each vertebrate group.	Materials Object, material, wood, plastic, glass, metal, water, rock, brick, paper, fabric, elastic, foil, card/	Seasonal Change Weather (sunny, rainy, windy, snowy etc.). Seasons (winter, summer, spring, autumn).

	Senses, touch, see, smell, taste, hear, fingers (skin), eyes, nose, ear and tongue. Plants Leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud. Names of trees in the local area. Names of garden and wild flowering plants in the local area.	cardboard, rubber, wool, clay, hard, soft, stretchy, stiff, bendy, floppy, waterproof, absorbent, breaks/tears, rough, smooth, shiny, dull, see-through, not see-through.	Sun, sunrise, sunset, day length.
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Common Misconceptions			
	Biology	Chemistry	Physics
Year 1	Animals including Humans <i>Some children may think:</i> Only four-legged mammals, such as pets, are animals. Humans are not animals. Insects are not animals. All 'bugs' or 'creepy crawlies', such as spiders, are part of the insect group. Amphibians and reptiles are the same. Plants <i>Some children may think:</i> Plants are flowering plants grown in pots with coloured petals and leaves and a stem. Trees are not plants. All leaves are green. All stems are green.	Materials <i>Some children may think:</i> Only fabrics are materials. Only building materials are materials. Only writing materials are materials. The word 'rock' describes an object rather than a material. 'Solid' is another word for hard.	Seasonal Change <i>Some children may think:</i> It always snows in winter. It is always sunny in the summer. There are only flowers in spring and summer. It rains most in the winter.

	A trunk is not a stem. Blossom is not a flower.		
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Howden C of E Infant School

Sequence of Learning: Science Year 2



Knowledge		
	Biology	Chemistry
Year 2	Living Things and their Habitats Explore and compare the differences between things that are living, dead, and things that have 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. Identify and name a variety of plants and animals in their habitats, including micro-habitats. 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. Plants Observe and describe how seeds and bulbs grow into mature plants. Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.	Everyday Materials Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.

	Animals including Humans Notice that animals, including humans, have offspring which grow into adults. Find out about and describe the basic needs of animals, including humans, for survival (water, food and air). Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.	
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Working Scientifically		
Year 2	Use different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information. Ask simple questions and recognising that they can be answered in different ways. Observe closely, using a variety of simple equipment. Perform simple tests to help with identifying and classifying. Use their observations and ideas to suggest answers to questions and any further questions they may have. Gather and record data to help in answering questions, communicating their findings in a variety of ways.	

Key Vocabulary		
	Biology	Chemistry

Year 2	Living Things and Their Habitat Living, dead, never been alive, suited, suitable, basic needs, food, food chain, shelter, move, feed. Names of local habitats e.g. pond, woodland etc. Names of micro-habitats e.g. under logs, in bushes etc. Plants As for Year 1 plus light, shade, sun, warm, cool, water, germinate, grow, healthy. Animals including Humans Offspring, reproduction, growth, adult, child, young/old, stages (examples - chick/hen, baby/child/adult, caterpillar/butterfly), exercise, heartbeat, breathing, hygiene, germs, disease, diet, nutrition, food types (examples - meat, fish, vegetables, bread, rice, pasta).	Everyday Materials Names of materials - wood, metal, plastic, glass, brick, rock, paper, cardboard. Properties of materials - as for Year 1 plus reflective, non-reflective, flexible, rigid.
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Common Misconceptions		
	Biology	Chemistry
Year 2	Living Things and their Habitats <i>Some children may think:</i> An animal's habitat is like its 'home'. Plants and seeds are not alive as they cannot be seen to move. Fire is living. Arrows in a food chain mean 'eats'. Plants <i>Some children may think:</i> Plants are not alive as they cannot be seen to move. Seeds are not alive.	Everyday Materials <i>Some children may think:</i> Only fabrics are materials. Only building materials are materials. Only writing materials are materials. The word rock describes an object rather than a material. Solid is another word for hard.

	All plants start out as seeds. Seeds and bulbs need sunlight to germinate. Animals including Humans <i>Some children may think:</i> An animal's habitat is like its 'home'. All animals that live in the sea are fish. Respiration is breathing. Breathing is respiration.	
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Howden Junior School

Sequence of Learning: Science Year 3



Knowledge			
	Biology	Chemistry	Physics
Year 3	Animals including humans 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 Plants 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,	Rocks 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	Forces and magnets Compare how things move on different surfaces Notice that some forces need contact between 2 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 of whether they are attracted to a magnet, and identify some magnetic materials Describe magnets as having 2 poles

	and room to grow) and how they vary from plant to plant 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		Predict whether 2 magnets will attract or repel each other, depending on which poles are facing Light Recognise that they need light in order to see things and that dark is the absence of light Notice that light is reflected from surfaces Recognise that light from the sun can be dangerous and that there are ways to protect their eyes Recognise that shadows are formed when the light from a light source is blocked by an opaque object Find patterns in the way that the size of shadows change
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Working Scientifically	
Year 3	Ask relevant questions and use different types of scientific enquiries to answer them. Gather, record, classify and present data in a variety of ways to help in answering questions.

	Identify differences, similarities or changes related to simple scientific ideas and processes. Make systematic and careful observations and, where appropriate, taking 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. Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions Set up simple practical enquiries, comparative and fair tests. Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions Use straightforward scientific evidence to answer questions or to support their findings
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Key Vocabulary			
	Biology	Chemistry	Physics
Year 3	Animals including humans Nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, support, protect, move, skull, ribs, spine, muscles, joints Plants Photosynthesis, pollen, insect/wind pollination, seed formation, seed dispersal (wind dispersal, animal dispersal, water dispersal)	Rocks Rock, stone, pebble, boulder, grain, crystals, layers, hard, soft, texture, absorb water, soil, fossil, marble, chalk, granite, sandstone, slate, soil, peat, sandy/chalk/clay soil	Forces and magnets Force, push, pull, twist, contact force, non-contact force, magnetic force, magnet, strength, bar magnet, ring magnet, button magnet, horseshoe magnet, attract, repel, magnetic material, metal, iron, steel, poles, north pole, south pole Light Light, light source, dark, absence of light, transparent, translucent, opaque, shiny,

			matt, surface, shadow, reflect, mirror, sunlight, dangerous
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Common Misconceptions			
	Biology	Chemistry	Physics
Year 3	Animals including humans <i>Some children may think:</i> certain whole food groups like fats are 'bad' for you certain specific foods, like cheese are also 'bad' for you diet and fruit drinks are 'good' for you snakes are similar to worms, so they must also be invertebrates invertebrates have no form of skeleton. Plants <i>Some children may think:</i> plants eat food food comes from the soil via the roots flowers are merely decorative rather than a vital part of the life cycle in reproduction plants only need sunlight to keep them warm	Rocks <i>Some children may think:</i> rocks are all hard in nature rock-like, man-made substances such as concrete or brick are rocks materials which have been polished or shaped for use, such as a granite worktop, are not rocks as they are no longer 'natural' certain found artefacts, like old bits of pottery or coins, are fossils a fossil is an actual piece of the extinct animal or plant soil and compost are the same thing.	Forces and magnets <i>Some children may think:</i> the bigger the magnet the stronger it is all metals are magnetic. Light <i>Some children may think:</i> we can still see even where there is an absence of any light our eyes 'get used to' the dark the moon and reflective surfaces are light sources a transparent object is a light source shadows contain details of the object, such as facial features on their own shadow shadows result from objects giving off darkness.

	roots suck in water which is then sucked up the stem.		
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Howden Junior School

Sequence of Learning: Science Year 4



Knowledge			
	Biology	Chemistry	Physics
Year 4	Animals including humans 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 Living things and their habitat 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	States of matter Compare and group materials together, according to whether they are solids, liquids or gases Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius ($^{\circ}\text{C}$) Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature	Sound 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

	in their local and wider environment Recognise that environments can change and that this can sometimes pose dangers to living things		Electricity 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
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Working Scientifically	
Year 4	Ask relevant questions and use different types of scientific enquiries to answer them. Gather, record, classify and present data in a variety of ways to help in answering questions. Identify differences, similarities or changes related to simple scientific ideas and processes. Make systematic and careful observations and, where appropriate, taking 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. Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions Set up simple practical enquiries, comparative and fair tests. Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions Use straightforward scientific evidence to answer questions or to support their findings

Key Vocabulary			
	Biology	Chemistry	Physics
Year 4	Animals including humans Digestive system, digestion, mouth, teeth, saliva, oesophagus, stomach, small intestine, nutrients, large intestine, rectum, anus, teeth, incisor, canine, molar, premolars, herbivore, carnivore, omnivore, producer, predator, prey, food chain Living things and their habitat	States of matter Solid, liquid, gas, state change, melting, freezing, melting point, boiling point, evaporation, temperature, water cycle	Sound Sound, source, vibrate, vibration, travel, pitch (high, low), volume, faint, loud, insulation Electricity Electricity, electrical appliance/device, mains, plug, electrical circuit, complete circuit, component, cell, battery,

	Classification, classification keys, environment, habitat, human impact, positive, negative, migrate, hibernate		positive, negative, connect/connections, loose connection, short circuit, crocodile clip, bulb, switch, buzzer, motor, conductor, insulator, metal, non-metal, symbol N.B. Children in Year 4 do not need to use standard symbols for electrical components, as this is taught in Year 6.
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Common Misconceptions			
	Biology	Chemistry	Physics
Year 4	Animals including humans <i>Some children may think:</i> arrows in a food chains mean 'eats' the death of one of the parts of a food chain or web has no, or limited, consequences on the rest of the chain there is always plenty of food for wild animals your stomach is where your belly button is food is digested only in the stomach	States of matter <i>Some children may think:</i> 'solid' is another word for hard or opaque solids are hard and cannot break or change shape easily and are often in one piece substances made of very small particles like sugar or sand cannot be solids particles in liquids are further apart than in solids and they take up more space	Sound <i>Some children may think:</i> sound is only heard by the listener sound only travels in one direction from the source sound can't travel through solids and liquids high sounds are loud and low sounds are quiet. Electricity <i>Some children may think:</i>

	when you have a meal, your food goes down one tube and your drink down another the food you eat becomes "poo" and the drink becomes "wee". Living things and their habitat <i>Some children may think:</i> the death of one of the parts of a food chain or web has no or limited consequences on the rest of the chain there is always plenty of food for wild animals animals are only land-living creatures animals and plants can adapt to their habitats, however they change all changes to habitats are negative.	when air is pumped into balloons, they become lighter water in different forms - steam, water, ice - are all different substances all liquids boil at the same temperature as water (100 degrees) melting, as a change of state, is the same as dissolving steam is visible water vapour (only the condensing water droplets can be seen) clouds are made of water vapour or steam the substance on windows etc. is condensation rather than water the changing states of water (illustrated by the water cycle) are irreversible evaporating or boiling water makes it vanish evaporation is when the Sun sucks up the water, or when water is absorbed into a surface/material.	electricity flows to bulbs, not through them electricity flows out of both ends of a battery electricity works by simply coming out of one end of a battery into the component.
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Howden Junior School

Sequence of Learning: Science Year 5



Knowledge			
	Biology	Chemistry	Physics
Year 5	Living things and their habitats 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 Animals including humans Describe the changes as humans develop to old age	Properties and changes of materials Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating	Earth and Space Describe the movement of the Earth and other planets relative to the sun in the solar system 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 Forces Explain that unsupported objects fall towards the Earth because of the force of gravity acting

		Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic Demonstrate that dissolving, mixing and changes of state are reversible changes 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 and the action of acid on bicarbonate of soda	between the Earth and the falling object Identify the effects of air resistance, water resistance and friction, that act between moving surfaces Recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect
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Working Scientifically	
Year 5	Identify scientific evidence that has been used to support or refute ideas and arguments. Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables and bar and line graphs Report and present findings from enquiries, including conclusions, causal relationships and explanations of results, in oral and written forms such as displays and other presentations. Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. Use test results to make predictions to set up further comparative and fair tests

Key Vocabulary			
	Biology	Chemistry	Physics
Year 5	Living things and their habitats Life cycle, reproduce, sexual, sperm, fertilises, egg, live young, metamorphosis, asexual, plantlets, runners, bulbs, cuttings Animals including humans Puberty - the vocabulary to describe sexual characteristics	Properties and changes of materials Thermal/electrical insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve, reversible/non-reversible change, burning, rusting, new material	Earth and Space Earth, Sun, Moon, (Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune), spherical, solar system, rotates, star, orbit, planets Forces Force, gravity, Earth, air resistance, water resistance, friction, mechanisms, simple machines, levers, pulleys, gears

Common Misconceptions			
	Biology	Chemistry	Physics
Year 5	Living things and their habitats <i>Some children may think:</i> the heavier the object the faster it falls, because it has more gravity acting on it forces always act in pairs which are equal and opposite smooth surfaces have no friction objects always travel better on smooth surfaces a moving object has a force which is pushing it forwards	Properties and changes of materials Lots of misconceptions exist around reversible and irreversible changes, including around the permanence or impermanence of the change. There is confusion between physical/chemical changes and reversible and irreversible changes. They do not correlate	Earth and Space <i>Some children may think:</i> the Earth is flat the Sun is a planet the Sun rotates around the Earth the Sun moves across the sky during the day the Sun rises in the morning and sets in the evening the Moon appears only at night

	and it stops when the pushing force wears out a non-moving object has no forces acting on it heavy objects sink and light objects float. Animals including humans <i>Some children may think:</i> a baby grows in a mother's tummy a baby is "made".	simply. Chemical changes result in a new material being formed. These are mostly irreversible. Physical changes are often reversible but may be permanent. These do not result in new materials e.g. cutting a loaf of bread. It is still bread, but it is no longer a loaf. The shape, but not the material, has been changed. <i>Some children may think:</i> thermal insulators keep cold in or out thermal insulators warm things up solids dissolved in liquids have vanished and so you cannot get them back lit candles only melt, which is a reversible change.	night is caused by the Moon getting in the way of the Sun or the Sun moving further away from the Earth. Forces <i>Some children may think:</i> the heavier the object the faster it falls, because it has more gravity acting on it forces always act in pairs which are equal and opposite smooth surfaces have no friction objects always travel better on smooth surfaces a moving object has a force which is pushing it forwards and it stops when the pushing force wears out a non-moving object has no forces acting on it heavy objects sink and light objects float.
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Howden Junior School

Sequence of Learning: Science Year 6



Knowledge			
	Biology	Chemistry	Physics
Year 6	Living things and their habitats Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals Give reasons for classifying plants and animals based on specific characteristics Animals including humans Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood		Light Recognise 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 eye Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them Electricity

	Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function Describe the ways in which nutrients and water are transported within animals, including humans Evolution and inheritance Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution		Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit 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
Working Scientifically			

Year 6	Identify scientific evidence that has been used to support or refute ideas and arguments. Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables and bar and line graphs Report and present findings from enquiries, including conclusions, causal relationships and explanations of results, in oral and written forms such as displays and other presentations. Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. Use test results to make predictions to set up further comparative and fair tests
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Key Vocabulary			
	Biology	Chemistry	Physics
Year 6	Living things and their habitats Vertebrates, fish, amphibians, reptiles, birds, mammals, invertebrates, insects, spiders, snails, worms, flowering, non-flowering Animals including humans Heart, pulse, rate, pumps, blood, blood vessels, transported, lungs, oxygen, carbon dioxide, nutrients, water, muscles, cycle, circulatory system, diet, exercise, drugs, lifestyle Evolution and inheritance		Light Light, light source, dark, absence of light, transparent, translucent, opaque, shiny, matt, surface, shadow, reflect, mirror, sunlight, dangerous Light, plus straight lines, light rays Electricity Circuit, complete circuit, circuit diagram, circuit symbol, cell, battery, bulb, buzzer, motor, switch, voltage N.B.

	Offspring, sexual reproduction, vary, characteristics, suited, adapted, environment, inherited, species, fossils		Children do not need to understand what voltage is but will use volts and voltage to describe different batteries. The words "cells" and "batteries" are now used interchangeably.
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Common Misconceptions			
	Biology	Chemistry	Physics
Year 6	Living things and their habitats <i>Some children may think:</i> all micro-organisms are harmful mushrooms are plants. Animals including humans <i>Some children may think:</i> your heart is on the left side of your chest the heart makes blood the blood travels in one loop from the heart to the lungs and around the body when we exercise, our heart beats faster to work the muscles more some blood in our bodies is blue and some blood is red we just eat food for energy		Light <i>Some children may think:</i> we see objects because light travels from our eyes to the object. Electricity <i>Some children may think:</i> larger-sized batteries make bulbs brighter a complete circuit uses up electricity components in a circuit that are closer to the battery get more electricity.

all fat is bad for you
all dairy is good for you
protein is good for you, so you
can eat as much as you want
foods only contain fat if you can
see it
all drugs are bad for you.

Evolution and inheritance

Some children may think:

adaptation occurs during an
animal's lifetime: giraffes' necks
stretch during their lifetime to
reach higher leaves and animals
living in cold environments
grow thick fur during their life
offspring most resemble their
parents of the same sex, so that
sons look like fathers
all characteristics, including
those that are due to actions
during the parent's life such as
dyed hair or footballing skills,
can be inherited
cavemen and dinosaurs were
alive at the same time.

SMSC in Science	
Spiritual	Social
Children: Wonder what is special about life and awe at the scale of living things from the smallest micro organism to the largest tree and the interdependence of all living things and materials on Earth. Appreciate the beauty of the natural world and reflect on/wonder about its wonders, e.g. the enormity of space and the beauty of natural objects or phenomenon, plants, animals, crystals, rainbows and the Earth from space etc. Show respect for the different opinions expressed by others, for example regarding creation. Staff will also promote teaching styles which: value pupils' questions and give them space for their own thoughts, ideas and concerns; enable pupils to make connections between aspects of their learning; encourage pupils to relate their learning to a wider frame of reference - for example, asking why?, how? And where as well as what?	Children: Work co-operatively and develop team working skills in practical work and to share the results to improve reliability. Develop team working skills and take responsibility in that team. Take responsibility for their own and others' safety. Consider the benefits and drawbacks of scientific and technological developments and the social responsibilities.
Moral	Cultural
Children: Take responsibility for their actions, e.g. in respect of property, care of the environment and develop codes of behaviour. Become increasingly curious, to develop open mindedness to suggestions of others and to make judgements on evidence not prejudice.	Children: Think of scientific discoveries as part of our culture as great as music and films with credit given to scientific discoveries made by other cultures. See Science as a contemporary activity with developments being made all over the modern world by both men and women in many different cultures (now and in the past).

Use their understanding of the world in a positive manner.

Understand that moral dilemmas are often involved in scientific developments. When considering the environment, the use of further natural resources and its effect on future generations is an important moral consideration.

Look into future options for the production of electricity, alternative fuels and methods to reduce pollution with discussions about how these can improve peoples' lives and the environment in general.

Investigate the historical impact of scientists from around the world linked to famous discoveries.

British Values

Children:

Learn how citizens can influence decision making for example human impact on the environment.

Develop the ability to take full and active part in practical lessons but keep to the rules to keep safe and others safe.

Recognise that some of the most important scientific discoveries have come from other parts of the world.

Respect the views of others (and freedom of others to hold different beliefs) for example in issues such as climate change, deforestation etc.