

Bowhill Primary School Curriculum Statement Science

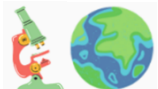
Why we teach Science	The purpose of the Science Curriculum at Bowhill is to empower students to comprehend the world around them through a scientific lens. By instilling a deep-rooted curiosity, passion, and thirst for discovery, our curriculum equips children with essential skills and knowledge that will serve them well as they progress into secondary education and beyond. Throughout their journey in our science curriculum, students will engage with a series of units designed to nurture their curiosity and develop a robust foundational knowledge of scientific principles. They will be encouraged to ask questions, conduct investigations, and develop a sense of wonder about the natural world. Our curriculum aims to build disciplinary literacy among students, enabling them to effectively communicate their scientific understanding through diagrams, written explanations, and other means of expression. As children progress through our school, they will deepen their understanding and proficiency in scientific communication, demonstrating increasing depth and complexity in their explanations. Ultimately, our science curriculum aims to inspire a lifelong love for science and a deep appreciation for the complexities of the natural world. By providing students with a rich and engaging learning experience, we strive to foster a generation of scientifically literate individuals who are equipped to contribute positively to society and address the challenges of the future with confidence and competence.
How we teach Science	At Bowhill, we use the Primary Knowledge Curriculum to teach science, which emphasises incremental knowledge building. Throughout their learning journey, students have numerous opportunities to revisit and reinforce subject content at strategic points, ensuring a cumulative and thorough understanding of scientific knowledge and skills. Our curriculum encourages students to apply their scientific knowledge to investigations, fostering a deeper understanding of disciplinary knowledge over time. We prioritise teaching substantive scientific knowledge before engaging students in enquiry, allowing them to comprehend the underlying principles before conducting experiments or observations. Essential skills such as data gathering, recording and interpreting findings are developed progressively, equipping students with the ability to articulate their scientific understanding clearly. Our curriculum emphasises the development of disciplinary knowledge through structured scientific enquiry where children will develop a variety of skills including observation, pattern-seeking, classification, fair testing, and research using secondary sources. Through these enquiries, our children not only deepen their understanding of scientific processes but also gain insight into the nature and methods of science as a discipline. This holistic approach to science education at Bowhill ensures that students develop the skills, knowledge, and critical thinking abilities necessary for success in science and beyond.
What we want children to learn	We aim to provide children with a solid foundation in scientific understanding and enquiry. Central to this is the development of scientific enquiry skills, which are essential for exploring and understanding the natural world. From our reception classes, children are encouraged to observe, question, and investigate scientific phenomena, fostering curiosity and critical thinking. Our children are introduced to key scientific concepts and vocabulary across the disciplines of biology, chemistry, and physics. They learn about living things and their habitats, properties and changes of materials, and the fundamental forces and motion governing objects. Furthermore, children explore concepts related to Earth and space, including the solar system, the Earth's rotation and orbit, and the impact of celestial bodies on our planet. Through this exploration, they gain a deeper understanding of their environment and the universe beyond. Integral to our science curriculum is our emphasis on working scientifically. This involves not only acquiring scientific knowledge but also understanding the methods and processes of science itself. Our children learn to plan and conduct scientific investigations, analyse data, and draw evidence-based conclusions. These practical skills are developed through hands-on activities and experiments as part of our opportunities-based curriculum, allowing children to engage directly with scientific concepts and phenomena. By providing a rich and varied learning experience, our curriculum seeks to nurture a lifelong appreciation for science and its role in understanding and shaping our world.

Science Core Concepts

Physics	Biology	Chemistry	Our World	Working Scientifically
				

EYFS	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
EYFS	Science is an integral part of the reception curriculum, as it lays the foundation for our children's understanding of the natural world and fosters crucial skills such as observation, exploration, and critical thinking. Teaching science in the early years is essential because it cultivates curiosity and an innate sense of wonder about the world around us. By engaging in hands-on activities and experiments, our youngest children develop a deeper understanding of scientific concepts and principles, setting the stage for future scientific enquiry. Understanding the World: - Children explore, observe, and find out about people, places, technology, and the environment. - They talk about the features of their own immediate environment and how environments might vary from one another. - Children make observations of animals and plants and explain why some things occur, and talk about changes. Expressive Arts and Design: - Children use what they have learnt about media and materials in original ways, thinking about uses and purposes					
KS1	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Aims Year 1	In Year 1 children embark on a captivating journey of discovery, exploring fundamental aspects of the natural world. They begin by delving into the intricacies of the human body, learning to identify and name different body parts while understanding the functions of the five senses and gaining insight into sensory impairment. Moving on, they explore the needs of animals, including classification, reproduction, and caring for both animal offspring and pets. In the spring term they delve into the fascinating realm of seasons and weather, understanding the characteristics of each season, interpreting weather patterns, and learning about natural phenomena such as floods and hurricanes. Children then move on to learn about environmental responsibility, including the Earth's natural resources, conservation efforts, recycling practices, and methods of pollution prevention. Moreover, they investigate the essentials of plant life, from growth requirements to the parts and functions of plants, and explore topics such as food production, flowers, seeds, and the distinction between deciduous and evergreen plants. Finally, they explore materials and magnets, understanding material classification and the principles of magnetic attraction. Through these engaging topics, children in Year 1 develop a solid foundation in scientific inquiry and understanding, fostering a lifelong curiosity about the world around them					
Year 1	The Human Body 	Animals and their Needs 	Seasons and Weather 	Taking Care of the Earth 	Plants 	Materials and Magnets 

Aims Year 2	In Year 2, children extend their knowledge of the human body, exploring the skeletal and muscular systems, the importance of exercise, maintaining a healthy diet, and understanding the functions of the digestive and circulatory systems. Additionally, they learn about preventing illness, the role of germs in causing diseases, and methods of maintaining personal hygiene. They will explore living things in their environments, studying various habitats such as rainforests, deserts, meadows, and underground habitats. They investigate food chains, the biodiversity of oceans and undersea habitats, and the impact of habitat destruction and damage on ecosystems. In the spring term they will begin exploring electricity, learning about circuits, conductive and non-conductive materials, and safety rules associated with electrical devices. They also explore the life cycle of plants, studying seeds, bulbs, the role of water, light, and temperature in plant growth, and the characteristics of healthy plants. This term they will continue their work on materials and matter, comparing different materials, exploring changes in materials through processes such as heating or cooling, and learning foundational concepts of atoms, matter, and the properties of solids, liquids, and gases. In the summer term children will embark on an astronomical journey, exploring our solar system, the orbit and rotation of celestial bodies, including the sun, moon, planets, stars, and constellations.					
Year 2	The Human Body 	Living Things in their Environments 	Electricity 	Plants 	Materials and Matter 	Astronomy 

LKS2	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Aims	In Years 3 and 4, children explore a diverse range of scientific topics, including the human body, cycles in nature, properties of light, plant functions, geological concepts, forces and magnets, and more. They learn about the digestive system, dental health, and the importance of a balanced diet, alongside understanding the skeletal and muscular systems' roles. Additionally, they investigate natural cycles such as seasonal changes and life cycles of plants and animals, as well as delve into light properties, including shadows and reflection. Children will also study plant functions, rock formation, forces, and magnets, deepening their understanding of scientific principles.					
Year 3/4 YEAR A	Cycles in Nature 	The Human Body 	Ecology 	Light 	Plants 	Sound 
Year 3/4 YEAR B	The Human Body 	Rocks 	Classification of Plants and Animals 	Forces and Magnets 	Electricity 	States of Matter and the Water Cycle 
UKS2	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Aims	In Years 5 and 6, children explore the human body's development, including growth stages, adolescence, and puberty, alongside investigating the intricacies of the reproductive and endocrine systems. Additionally, they delve into material science, examining properties such as solubility, conductivity, and reversible changes, while also exploring the life cycles of various organisms and the forces shaping our world, including gravity and friction. In addition, children will learn about astronomical concepts like the Big Bang theory, the Solar System, and meteorological phenomena, such as weather patterns. Their understanding deepens as they focus on key areas such as the circulatory system, classification of living things, electricity, light properties, reproduction, and evolution. They explore the heart, blood vessels, and aging processes, while also learning about vertebrates, electrical concepts, and light transmission. Furthermore, they investigate reproduction processes in plants and animals and delve into evolutionary theories, including adaptation and the contributions of notable figures like Charles Darwin.					
Year 5/6 YEAR A	The Human Body 	Materials 	Meteorology 	Electricity 	Reproduction 	Evolution 
Year 5/6 YEAR B	The Human Body 	Light 	Classification of Living Things 	Life Cycles 	Forces 	Astronomy 

EYFS – All Units		
Early Learning Goals	1. Understanding the World People and Communities: • Children talk about past and present events in their own lives and in the lives of family members. • They know about similarities and differences between themselves and others, and among families, communities, and traditions. The World: • Children know about similarities and differences in relation to places, objects, materials, and living things. • They talk about the features of their own immediate environment and how environments might vary from one another. • They make observations of animals and plants and explain why some things occur, and talk about changes. Technology: • Children recognize that a range of technology is used in places such as homes and schools. • They select and use technology for particular purposes. 2. Communication and Language Understanding: • Children follow instructions involving several ideas or actions. • They answer ‘how’ and ‘why’ questions about their experiences and in response to stories or events. 3. Physical Development Health and Self-care: • Children know the importance of good health, physical exercise, and a healthy diet. • They talk about ways to keep healthy and safe. • They manage their own basic hygiene and personal needs successfully, including dressing and going to the toilet independently.	
	Planning See EYFS Planning	Resources

Year 1 National Curriculum Coverage and Expected Outcomes

National Curriculum Knowledge	Autumn:				
	• identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense • 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)				
	Spring:				
Year 1	Summer:				
	• observe changes across the 4 seasons • observe and describe weather associated with the seasons and how day length varies				
	• identify and name a variety of common wild and garden plants, including deciduous and evergreen trees • identify and describe the basic structure of a variety of common flowering plants, including trees • 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				
Year 1	The Human Body				
	Lesson Series	End points	Vocabulary		
Outcomes	1. Introduction to Our Body and Our Senses 2. Eyes and Sight 3. Ears and Hearing 4. Touch, taste and smell 5. Understanding Sensory Impairment 6. Assessment	• We have five senses: sight, hearing, touch (feeling), taste, smell. • Our eyes use light that enters the eye to enable us to see. • Light does not come out of the eye. • Parts of the eye and what their purpose is. (e.g. the eyelashes, eyelids and cornea protect the rest of the eye). • Sounds travel through our ears to send messages to our brain. • Our senses send messages to our brains. • Some people have problems with their senses • I know my senses help me to understand the world around me. • To identify, name, label and draw the basic parts of the human body. • To identify and label parts of our body relating to our senses.	deaf blind illness speak read write sensory impairment touch taste smell skin tongue	taste buds eye iris eyelid eyelash pupil vision reflection glasses contact lenses telescope microscope	nose scent sweet salt bitter sour ear eardrum hearing aid vibration/vibrate te sound wave
Planning and Resources	Planning (resources are embedded links within the planning) PKC Human Body Year 1				
Working Scientifically	• Identifying and classifying • Using their observations and ideas to suggest answers to questions • Gathering data to help in answering questions • Performing simple tests				

	Observing closely				
Year 1	Animals and their needs				
	Lesson Series	End Points	Vocabulary		
Outcomes	1. Common animals 2. Grouping animals: fish, amphibians, reptiles, birds and mammals 3. Grouping animals: carnivores, herbivores and omnivores 4. Animals as pets 5. Describing animals 6. Assessment	Common animal types: bird, fish, amphibian, reptile and mammal. Scientists group animals according to their features. - Amphibians are cold-blooded animals that live in water and on land. They lay eggs underwater. - Mammals are warm-blooded animals that give birth to live young. Animals can be grouped on what they eat: herbivores, carnivores and omnivores. - Pets have needs that humans fulfil. - Fish have gills to help them breathe, fins to help them swim and scales to protect their bodies.	Bird Fish Amphibians Reptiles Mammals Invertebrates shelter medicine water responsibility scientific	sorting grouping features legs wings fur tail underwater amphibian (incisors, canine, molars)	carnivore herbivore omnivore diet suitable pets domestic wild food space
Planning and Resources	Planning (resources are embedded links within the planning) PKC Animals and their needs Year 1				
Working Scientifically	- Using their observations and ideas to suggest answers to questions - Identifying and classifying - Recording data to help in answering questions - Asking simple questions and recognising that they can be answered in different ways				
Year 1	Seasons and Weather				
	Lesson Series	End points	Vocabulary		
Outcomes	1. The four seasons 2. Tools to record the weather 3. Using a graph to show information about the weather 4. Clouds and what they tell us: cirrus, cumulus and stratus 5. Weather forecasting 6. Extra lesson: Dangerous weather around the world 7. Assessment task: Identifying and describing weather	We have four seasons; spring, summer, autumn and winter Our weather is warmer during the spring and summer and cooler during the autumn and winter - Our days of sunlight are longest in the summer and shortest in the winter Know that tools (rain gauge, temperature and weather vane) are used to gather data about the weather - Data is information that we can represent using graphs - There are different types of cloud and that clouds can indicate the weather we are about to experience - Recognise weather symbols used in weather forecasting and explain the importance of accurate forecasts - Scientists that study the weather are called meteorologists - Some weather can be dangerous, for example, hurricanes	season seasonal spring summer autumn winter wind rain sun snow axis orbit tilt	rainfall accurate Clouds: cirrus (curl) stratus (layers) cumulus (pile) cloud graph measure information record hurricane	droplet float dark fluffy storm forecast predict future scientist meteorologist prepare extreme danger/dangerous flood

Planning and Resources	Planning (resources are embedded links within the planning) PKC Seasons and Weather Year 1				
Working Scientifically	• asking simple questions and recognising that they can be answered in different ways • observing closely, using simple equipment • performing simple tests • identifying and classifying • using their observations and ideas to suggest answers to questions • gathering and recording data to help in answering questions				
Year 1	Taking Care of the World				
	Lesson Series	End Points	Vocabulary		
Outcomes	1. Taking Care of the Earth 2. Earth's Natural Resources 3. Logging 4. Pollution 5. Recycling 6. Assessment	• People are causing pollution that is damaging the earth • A natural resource is something that is found in nature that people can use • A manufactured resource is something people have created to use • Some natural resources cannot be easily replaced (non-renewable) • Some natural resources can be easily replaced (renewable) • Logging is cutting down trees • Logging causes damage to the environment • Pollution occurs when an environment is damaged by waste • We can reduce the amount of pollution we create • When something is reused, it is recycled • We recycle items to reduce the amount of waste	Earth world resources natural logging flooding pollution manufactures renewable	erosion recycle grazing biodiversity contamination chemicals rubbish waste fumes landfill conservation	non-renewable fossil fuels deforestation construction extinction materials purpose
Planning and Resources	Planning (resources are embedded links within the planning) PKC Taking Care of the Earth Year 1				
Working Scientifically	• Asking simple questions and recognising that they can be answered in different ways • Identifying and classifying • Using their observations and ideas to suggest answers to questions • Gathering and recording data to help in answering questions				

	Lesson Series	End Points	Vocabulary		
Outcomes	1. What plants need 2. Parts of plants 3. Seeds 4. Deciduous and evergreen plants 5. Plants we eat 6. Assessment	- Plants need the right temperature, light and water to grow Most plants grow from seeds - If seeds do not get the right conditions, they may not grow into healthy plants The roots of a plant act as an anchor, fixing the plant into the ground. They also absorb water from the soil. The stem of a plant grows above the ground. The leaves and flowers grow from it. - A plant's leaves absorb sunlight and turn it into energy that the plant uses to grow. - Plants spread their seeds in order to make new plants - When plants make seeds to make new plants, we call this reproducing - Evergreen trees keep their leaves all year round - Deciduous trees drop their leaves during autumn time and grow fresh leaves in spring - We eat different parts of plants including roots, stem, leaves and sometimes the flowers - Some plants are dangerous to eat and could make us ill - We need a variety of fruit and vegetables in our diet	plants temperature light grow water germinate seeds healthy botanist	roots anchor absorb stem leaves flower reproduce disperse survive gravity	pepper pot wind seed evergreen deciduous autumn spring annual oak fir poisonous nutrients edible
Planning and Resources	Planning (resources are embedded links within the planning) PKC Plants Year 1				
Working Scientifically	- Asking simple questions and recognising that they can be answered in different ways - Observing closely, using simple equipment - Performing simple tests - Identifying and classifying - Using their observations and ideas to suggest answers to questions - Gathering and recording data to help in answering questions				
Year 1	Materials and Magnets				
	Lesson Series	End Points	Vocabulary		
Outcomes	1. Everyday Materials 2. Properties of Materials 3. Uses of Materials 4. Magnets 5. Investigation 6. Assessment	- Objects around us are made from types of materials. Some everyday materials that objects are made from include wood, plastic, glass and metal. - Each material can be used to make many different things, for example plastic can be made into cups, plates, toys, chairs. - Properties of materials are things we can measure, see or feel. Materials have different properties that make them	material wood plastic glass metal rock soft/hard dark/bright transparent/o	waterproof/abs orbent thick/thin bendy/stiff shiny/dull properties purpose select suited	use magnet attract repel force invisible magnetism plan investigate

		useful for different tasks. - Some materials will be better suited to certain purposes than others. Certain materials are attracted to magnets. - We cannot see the force of magnetism.	paque rough/smooth	predict record conclusion
Planning and Resources	Planning (resources are embedded links within the planning) PKC Materials and Magnets Year 1			
Working Scientifically	- Asking simple questions and recognising that they can be answered in different ways - Observing closely, using simple equipment - Performing simple tests - Identifying and classifying - Using their observations and ideas to suggest answers to questions - Gathering and recording data to help in answering questions			

Year 2 National Curriculum Coverage and Expected Outcomes

National Curriculum Knowledge	Autumn: - 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 - differences between living, dead and 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 microhabitats						
	Spring: - Observe and describe how seeds and bulbs grow to mature plants - Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy						
	Summer: - 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						
Year 2	The Human Body						
	Lesson Series	End Points			Vocabulary		
Outcomes	1. Animals, including humans, survival and offspring 2. The Skeletal System, The Muscular System and Exercise 3. The Digestive System and Healthy Eating 4. The Circulatory System 5. Germs, diseases and preventing illness 6. Assessment lesson	Animals need water, food and air to survive. - Our skeleton is made up of bones. - Our muscles help us to move. - Digestion means breaking down the food we eat. - Our bodies take things (nutrients) we need out of the food we eat. The heart is a muscle inside the body. - The heart pumps blood around the body. Blood circulates (goes around and around) the body. - Germs can make us unwell. - We take care of our bodies through exercising, eating a healthy diet, keeping clean and resting.			survive offspring drought pollution skeleton bones skull spine rib kneecap nutrition circulation blood cells	muscle organs protect joint digestion stomach mouth tongue chew blood energy waste	heart lungs veins arteries oxygen pump hygiene exercise balanced diet healthy bacteria
Planning and Resources	Planning (resources are embedded links within the planning) PKC The Human Body Year 2						
Working Scientifically	- Asking simple questions asking simple questions and recognising that they can be answered in different ways - Identifying and classifying - Using their observations and ideas to suggest answers to questions - Gathering and recording data to answer questions						

Year 2	Living Things in Their Environment				
	Lesson Series	Knowledge Objectives	Vocabulary		
Outcomes	1. Dead or Alive 2. What is a habitat? 3. Rainforest and Desert habitats 4. Meadow habitats 5. Underground habitats 6. Assessment 7. Additional optional lessons	• Things can be living, dead or never been alive. • Living things move, grow, need air and reproduce. • Dead things were once alive but are no longer alive. • A habitat is the name given to a place where animals or plants live. • Rainforests are hot and moist. • Deserts are dry and hot or cold. • Some animals live in underground habitats and are adapted to living underground. • A food chain describe 'who eats what' within a habitat. • A food chain can consist of producers, consumers and predators.	alive dead inanimate breathe move reproduce eat deciduous evergreen habitat	badger fox mole worm damp tunnel burrow food energy producer consumer predator food chain	microhabitat rainforest tropical desert Sahara Desert Gobi Desert Antarctica camel cactus survive adapt underground
Planning and Resources	Planning (resources are embedded links within the planning) PKC Living Things and their Environments				
Working Scientifically	• using their observations and ideas to suggest answers to questions • identifying and classifying • gathering and recording data to help in answering questions • observing closely, using simple equipment • asking simple questions and recognising that they can be answered in different ways				
Year 2	Electricity				
	Lesson Series	End Points	Vocabulary		
Outcomes	1. Introduction to Electricity 2. Safety 3. Exploring Circuits (A) 4. Exploring Circuits (B) 5. Investigating Conductive and non-conductive materials 6. Assessment	• Identify things that use electricity • A battery is a store of electrical energy • Electricity is energy that we store and use to make things work • Electricity can be dangerous • An electrical circuit is a loop that allows electricity to travel around it • An electrical circuit must have wires and a battery • If a circuit is broken, electricity will not be able to flow around it • Materials that allow electricity to pass through them are conductors • Materials that do not allow electricity to pass through them are insulators • Many, but not all, metals conduct electricity	electricity energy appliance mains battery store useful dangerous safety	caution danger electric shock frayed plug socket wire circuit	flow bulb buzzer current conduct insulate pass through plastic wood rubber

Planning and Resources	Planning (resources are embedded links within the planning) PKC Electricity Year 2				
Working Scientifically	• asking simple questions and recognising that they can be answered in different ways • observing closely, using simple equipment • performing simple tests • identifying and classifying • using their observations and ideas to suggest answers to questions • gathering and recording data to help in answering questions				
Year 2	Plants				
	Lesson Series	Knowledge Objectives	Vocabulary		
Outcomes	1. Plants around us 2. Seeds and bulbs 3. Comparative test 1 4. Comparative test 2 5. Food and Farming 6. Assessment - How does a seed work?	• Know there are many different types of plants • Seeds and bulbs grow into mature plants • A seed can grow into a flowering plant • When a seed germinates, it changes from a seed to a seedling • Some plants create bulbs that live underground, and their leaves grow up through the soil • Plants need light and water to grow • Plants often grow well in the Spring when the temperatures get warmer and there is often rain • Some plants (crops) are grown for food • Crops are harvested, packaged and transported for people to buy and eat	ash tree aspen tree silver birch oak tree sweet chestnut tree daisy bramble ivy	cow parsley seed bulb germinate sprouting tulip onion	daffodil comparative test cress observe record predict crops pests harvest package transport
Planning and Resources	Planning (resources are embedded links within the planning) PKC Plants Year 2				
Working Scientifically	• asking simple questions and recognising that they can be answered in different ways • observing closely, using simple equipment • performing simple tests • identifying and classifying • using their observations and ideas to suggest answers to questions • gathering and recording data to help in answering questions				

Year 2	Materials and Matter				
	Lesson Series	Knowledge Objectives	Vocabulary		
Outcomes	1. Materials and their uses 2. George de Mestral and Velcro 3. Matter under the microscope 4. Changing Solid Objects 5. Liquids and their properties 6. Assessment	• Everyday materials include wood, metal, plastic, glass, brick, rock, paper and cardboard. • Every material has its own properties – these can include being hard, soft, opaque, shiny, bendy. • Materials are used for a purpose depending on their properties. • Inventors need to think about the best materials to use for their inventions. • Scientists use a microscope to look closely at very small things. • Sometimes, materials look very different when we look at using a microscope. • Everything around us is made from tiny building blocks we cannot see called particles. • Solids have a definite shape. • The shape of some solids can be changed by squashing, bending, twisting and stretching. • The particles in a solid are tightly packed together and have a strong bond. • Liquids can be poured. • The shape of a liquid depends on the container it is being held in. • Water can be a solid and can also be a liquid.	materials properties purpose soft hard shiny dull opaque	transparent strong flimsy engineer inventor scientists magnify microscope particles solid liquid	shape squash bend twist stretch matter container pour bonds
Planning and Resources	Planning (resources are embedded links within the planning) PKC Materials and Matter Year 2				
Working Scientifically	• Asking simple questions and recognising that they can be answered in different ways • Observing closely, using simple equipment • Performing simple tests • Identifying and classifying • Using their observations and ideas to suggest answers to questions • Gathering and recording data to help in answering questions				

Year 2	Astronomy				
	Lesson Series	End Points	Vocabulary		
Outcomes	1. Introduction to Astronomy 2. Model the Solar System 3. Orbit and Rotation 4. The Moon and its Phases 5. Constellations 6. Assessment	• The Sun is a star at the centre of our solar system. • There are eight planets in our solar system: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune. • Planets travel around the Sun. We call this journey an orbit. • As the planets orbit the Sun, they also spin around. We call this rotation. • Night and day occur due to the Earth rotating. • The Moon orbits the Earth. • The Moon reflects the light of the Sun. • As the Moon’s position changes, we can see different parts of it. • A constellation is a group of stars that, when seen from Earth, form a pattern. • People have given constellations names and have told stories that imagine how the constellations were formed. • Astronomers have studied the stars for many years, learning from each other and making new discoveries. • Scientists, including astronomers, study space to find out more about what lies beyond our planet. • The International Space Station orbits earth and allows scientists to find out more about space. • Scientists have sent a rover to Mars to look for signs of life long ago	planet Mercury Venus Earth Mars Jupiter Saturn Uranus Neptune Pluto (dwarf planet) solar system spherical orbit sun	rotate day night axis seasons moon waxing waning new moon crescent constellation star	pattern The Great Bear Plough Orion Perseverance robot mission space exploration astronaut rover
Planning and Resources	Planning (resources are embedded links within the planning) PKC Astronomy Year 2				
Working Scientifically	• Asking simple questions and recognising that they can be answered in different ways • Identifying and classifying • Using their observations and ideas to suggest answers to questions				

Year 3/4 National Curriculum Coverage and Expected Outcomes Year A

National Curriculum Knowledge

Autumn:

- Year 3: 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
- Year 3: Identify that humans and some other animals have skeletons and muscles for support, protection and movement.
- Year 4: Describe the simple functions of the basic parts of the digestive system in humans
- Year 4: Identify the different types of teeth in humans and their simple functions
- identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
- explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal

Spring:

- 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
- 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
- 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
- Find patterns in the way that the size of shadows change
- Recognise that shadows are formed when the light from a light source is blocked by an opaque object

Summer:

- 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
- 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
- predict whether 2 magnets will attract or repel each other, depending on which poles are facing

Year 3/4
Autumn 1 A

Cycles in Nature

Lesson Series

End Points

Vocabulary

Outcomes

1. The Four Seasons (prior learning)
2. Seasonal Cycles in Plants
3. Life Cycle of a Plant
4. Animal Migration
5. Life Cycle of a Frog

- The natural environment changes as the seasons change.
- We have four seasons: spring, summer, autumn and winter.
- **We have seasons because the Earth is titled as it makes its journey around the sun.**
- **Plants can change through the seasons with different life cycle stages for each season.**

Cycle
Seasons
Earth
Orbit
Axis
Sun

Leaves
Flower
Pollen
Anther
Ovule
Reproduce

Stem/Trunk
Shoot
Seed Dispersal
Hibernate
Migrate/Migration

	6. Assessment	- Plants grow, live and reproduce. - Flowering plants produce pollen. - When fertilised, pollen can join with the ovule to grow into a seed and then eventually a new plant. - Some animals migrate when the seasons change. The life cycle of a frog.	Tilt Planet Northern Hemisphere Root	Germination Bulb Seed Fruit	South/North Seasonal Tadpoles Frogspawn Mature Metamorphosis
Planning and Resources	Planning (resources are embedded links within the planning) PKC Cycles in Nature Year 3				
Working Scientifically	- asking relevant questions and using different types of scientific enquiries to answer them - recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables - reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions - using straightforward scientific evidence to answer questions or to support their findings - gathering, recording, classifying and presenting data in a variety of ways to help in answering questions - identifying differences, similarities or changes related to simple scientific ideas and processes - setting up simple practical enquiries, comparative and fair tests - making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers - using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions				
Year 3/4 Autumn 2 A	The Human Body				
	Lesson Series	Knowledge Objectives	Vocabulary		
Outcomes	1. The Muscular System 2. The Skeletal System 3. The Nervous System 4. The Digestive System and Nutrition 5. Preparing to Eat (Teeth) 6. Assessment	To know that we can control our voluntary muscles, but we do not control our involuntary muscles. - To know our bones help us to move and protect some parts of our bodies To know that the brain is the centre of the nervous system. To understand animals get nutrition from what they eat (Y3) and describe the functions of parts of the digestive system in humans (Y4) - To understand how the brain and mouth start the digestive process	Bicep Control Contract Relax Endoskeleton Intestine Nerves Spinal Cord Incisors Canines Premolars Molars	Heart Exoskeleton Skull Cranium Ligaments Joint Spinal Column Ribs Pelvis Rib Cage Salivary Glands Taste Buds	Nutrition Vitamins Minerals Balanced Diet Digest Saliva Oesophagus Stomach Small Intestine Large Intestine
Planning and Resources	Planning (resources are embedded links within the planning) PKC Human Body Year3/4				
Working Scientifically	- recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables - reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions				

Year 3/4 Spring 1 A	Ecology				
	Lesson Series	End Points	Vocabulary		
Outcomes	1. Living Things and Habitats 2. Natural Cycles 3. Web of Living Things 4. Air Pollution - A Human Threat to the Environment 5. Ecology in our Local Areas 6. Assessment	• There are seven life processes which living things have in common • A habitat is the natural environment or home of an animal, plant or other organism • Living things depend on each other within their habitat • A producer makes their own food using sunlight, water and nutrients • A consumer eats other living things to gain their energy • A decomposer breaks down the remains of dead living things into smaller pieces which leaves nutrients in the soil • An ecosystem is the interaction of organisms in their environment • Ecosystems can be delicately balanced so if one organism is added or removed it can have a negative impact on other organisms • Pollution is any substance that is introduced to an environment that can damage or affect quality of life • Understand the human impact on their local area	Living thing Habitat Microhabitat Polar Rainforest Desert Producer Consumer	Decomposer Cycle Energy Organisms Predator Prey Ecosystem Web	Exotic Native Pollution Environment Plastic Man made Emissions Smog Filter Chemicals
Planning and Resources	Planning (resources are embedded links within the planning) PKC Ecology Year 4				
Working Scientifically	• asking relevant questions and using different types of scientific enquiries to answer them • setting up simple practical enquiries, comparative and fair tests • making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • gathering, recording, classifying and presenting data in a variety of ways to help in answering questions • recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • identifying differences, similarities or changes related to simple scientific ideas and processes • using straightforward scientific evidence to answer questions or to support their findings.				

Spring 2 A	Lesson Series	End Points	Vocabulary		
Outcomes	1. Light and Dark 2. Transparent and Opaque Surfaces 3. Mirrors and Reflection 4. Part 1: Shadows 5. Part 2: Finding Patterns in Changing Shadows 6. Assessment	• Light enables us to see things • Darkness is the absence of light • The sun is an important source of light for life on earth • Light travels in straight lines • Transparent material allows light to pass through it • Opaque material blocks light from passing through it • Mirrors reflect light • Mirrors of different shapes reflect light differently • A shadow is created when an object blocks the path of light • The sun appears to move across the sky as our planet revolves on its axis • Shadows change in size and shape throughout the day	Light Darkness Absence Source Natural Artificial	Absorb Translucent Plane Concave Convex Shadow Predict Record Observe	Retina Protect Transparent Opaque Transmit Reflect Investigate Measure Conclude
Planning and Resources	Planning (resources are embedded links within the planning) PKC Light Year 3				
Working Scientifically	• asking relevant questions and using different types of scientific enquiries to answer them • setting up simple practical enquiries, comparative and fair tests • making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, • including thermometers and data loggers • gathering, recording, classifying and presenting data in a variety of ways to help in answering questions • • recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • identifying differences, similarities or changes related to simple scientific ideas and processes • using straightforward scientific evidence to answer questions or to support their findings				
Year 3/4 Summer 1 A	Plants				
	Lesson Series	End Points	Vocabulary		
Outcomes	1. Botany and Flowering Plants 2. Requirements for Life and Growth 3. Water Transportation in Plants 4. Pollination in Flowering Plants 5. Seed Dispersal 6. Assessment 7. Optional Lesson: George Washington Carver	• Flowering plants all have roots, a stem or trunk, leaves and flowers, but do not all look the same • A botanist is a scientist who studies plants • Plants need air, light, water, nutrients from soil and room to grow • Plants need differing amounts of things in order to thrive • Water moves from the roots of a plant upwards via the stem • Plants absorb water from the soil to help them live and grow • Plants with larger root systems can take more water from	Thrive Wilt Hydrangea Sunflower Cactus (Cacti) Absorb Roots Stem Transport Seed Formation	Pollen Pollinator Reproduce Seed Anther Stigma	Germination Disperse Gravity Dandelion Sycamore Acorns Poppies botanist function feature

		- the soil Pollination is needed for flowering plants to reproduce - Flowering plants can only produce seeds if pollen is transferred from the anther to the stigma - Insects are essential for pollination Plants spread their seeds in different ways (wind, animals, gravity)	
Planning and Resources	Planning (resources are embedded links within the planning) PKC Plants Year 3		
Working Scientifically	- asking relevant questions and using different types of scientific enquiries to answer them - setting up simple practical enquiries, comparative and fair tests - making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers - using straightforward scientific evidence to answer questions or to support their findings.	- gathering, recording, classifying and presenting data in a variety of ways to help in answering questions - recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables - reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions - identifying differences, similarities or changes related to simple scientific ideas and processes	
Year 3/4 Summer 2 A	Sound		
	Lesson Series	End Points	Vocabulary
Outcomes	1. What is sound? 2. Speed of sound 3. Qualities of sound - Pitch and Volume 4. Human Voice 5. Ears – How we Hear 6. Assessment	Sound is caused by a back and forth movement called vibration - Sound waves move out from a vibrating object Sound can travel through different types of matter (solid, liquid, gas) - Sound is fainter the further from the source it is - Pitch is how high or low a sound is and relates to the speed of vibrations - Volume is how loud or quite a sound is and relates to the strength of the vibrations - Louder sounds are made by bigger vibrations - Quieter sounds are made by smaller vibrations - Faster vibrations make higher-pitched sounds - Slower vibrations make lower-pitched sounds We hear through soundwaves entering the ear, travelling through it and the messages sent to the brain	Vibration Soundwaves Matter Gases Liquids Solids Volume Vibrate Vibrations Larynx Cartilage Ear canal Ear drum Ear bones Hammer Loud Quiet Pitch High Low Vocal cord Voice box
Planning and Resources	Planning (resources are embedded links within the planning) PKC Sound Year 4		

Working Scientifically

- asking relevant questions and using different types of scientific enquiries to answer them
 - setting up simple practical enquiries, comparative and fair tests
 - making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
 - gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
 - recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
 - using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
 - identifying differences, similarities or changes related to simple scientific ideas and processes
 - using straightforward scientific evidence to answer questions or to support their findings.

Year 3/4 National Curriculum Coverage and Expected Outcomes Year B

National Curriculum Knowledge	Autumn: • Year 3: 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 • Year 3: Identify that humans and some other animals have skeletons and muscles for support, protection and movement. • Year 4: Describe the simple functions of the basic parts of the digestive system in humans • Year 4: Identify the different types of teeth in humans and their simple functions • 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					
	Spring: • recognise that environments can change and that this can sometimes pose dangers to living things • construct and interpret a variety of food chains, identifying producers, predators and prey • 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					
	Summer: • 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 (°C) • identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature • 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					
Year 3/4 Autumn 1 B	The Human Body					
	Lesson Series	End Points		Vocabulary		
Outcomes	1. The Muscular System 2. The Skeletal System 3. The Nervous System 4. The Digestive System and Nutrition 5. Preparing to Eat (Teeth) 6. Assessment	• To know that we can control our voluntary muscles, but we do not control our involuntary muscles. • To know our bones help us to move and protect some parts of our bodies • To know that the brain is the centre of the nervous system. • To understand animals get nutrition from what they eat (Y3) and describe the functions of parts of the digestive system in humans (Y4) • To understand how the brain and mouth start the digestive process		Bicep Control Contract Relax Endoskeleton Intestine Nerves Spinal Cord Incisors Canines	Heart Exoskeleton Skull Cranium Ligaments Joint Spinal Column Ribs Pelvis Rib Cage	Nutrition Vitamins Minerals Balanced Diet Digest Saliva Oesophagus Stomach Small Intestine Large Intestine

			Premolars Molars	Salivary Glands Taste Buds
Planning and Resources	Planning (resources are embedded links within the planning) PKC Human Body Year3/4			
Working Scientifically	- recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables - reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions			
Year 3/4 Autumn 2 B	Rocks			
	Lesson Series	End Points	Vocabulary	
Outcomes	1. Sorting rocks 2. How Rocks are Formed 3. Permeability 4. Fossils 5. Soil 6. Assessment	Rocks have different names and can be sorted into groups according to their properties - There are three main groups of rock called sedimentary, igneous and metamorphic - Sedimentary rocks are formed by layers of sediment under the sea - Metamorphic rocks are formed under immense heat and pressure - Igneous rocks are formed by volcanoes - Rocks can have small air spaces in them allowing water to pass through them - If a rock allows water to pass through, it is called permeable rock - If a rock doesn't allow water to pass through, it is called impermeable rock Fossils are formed when rock forms around things that once lived - Fossils are rare and take thousands of years to form - Scientists who study fossils are called palaeontologists - Soil is made from rocks and organic matter Organic matter is made from the decaying remains of living things	Rock Mineral Hard Soft Smooth Crumbly Observation Geologist Sediment	Layers Sedimentary Metamorphic Pressure Earth's Crust Igneous Volcano Magma Lava Permeable Impermeable Fossil Fossilised Palaeontologist Buried Soil Decay Organic Matter Sandy Chalky Clay
Planning and Resources	Planning (resources are embedded links within the planning) PKC Rocks Year 3			
Working Scientifically	- Asking relevant questions and using different types of scientific enquiries to answer them - Setting up simple practical enquiries, comparative and fair tests - Making systematic and careful observations and, where appropriate, - Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables - Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions			

	- taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers - Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions - Using straightforward scientific evidence to answer questions or to support their findings.		- Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions - Identifying differences, similarities or changes related to simple scientific ideas and processes		
Year 3/4 Spring 1 B	Classification of Plants and Animals				
	Lesson Series	End Points	Vocabulary		
Outcomes	1. Introduction to classification 2. Classes of vertebrates: Fish and Amphibians 3. Classes of vertebrates: Reptiles, Birds and Mammals 4. Classes of invertebrates: Insects, Arachnids and Molluscs 5. Classification of plants 6. Assessment	A vertebrate is an animal with a backbone. An invertebrate is an animal without a backbone. Scientists sort living things using a process called classification. - Fish are cold-blooded vertebrates that live in water and have gills. - Amphibians are cold-blooded vertebrates that live both in water and on land. - Reptiles are cold-blooded vertebrates with scaly skin. - Birds are warm-blooded vertebrates with feathers that can fly. - Mammals are hairy, warm-blooded vertebrates that breathe air. - Insects are invertebrates with six legs and three body parts. - Molluscs are invertebrates with a soft body, and some have shells. - Arachnids are invertebrates with eight legs and two body parts. - Plants are classified into two main groups: flowering and non-flowering. - Non-flowering plants grow from spores instead of seeds.	Living things Classification Classify Sorting Vertebrates Invertebrates Backbone Internal skeleton	Cold-blooded Warm-blooded Gills Amphibians Lungs Scales Metamorphosis Reptiles Birds	Mammals Feathers Features Invertebrate Arachnid Mollusc Insects Abdomen Thorax
Planning and Resources	Planning (resources are embedded links within the planning) PKC Classification of plants and animals Year 4				
Working Scientifically	- recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables - identifying differences, similarities or changes related to simple scientific ideas and processes - asking relevant questions and using different types of scientific enquiries to answer them - using straightforward scientific evidence to answer questions or to support their findings - reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions				
Year 3/4 Spring 2 B	Forces and Magnets				
	Lesson Series	End Points	Vocabulary		

Outcomes	1. Forces (Gravity) 2. Friction 3. Magnet 4. Magnetic Poles and Fields 5. Investigating the strength of magnets 6. Assessment	• A force is a push or a pull. • Gravity is a force that makes objects fall to the ground. • The effect of a force is to make something move, or change speed, direction or shape. • We can change the amount of force we use when we push and pull things. • Friction is the force between two surfaces. • Rough surfaces create greater friction. • Smooth surfaces create less friction. • Magnetic force is an invisible push or pull force. • When a magnet pushes an object away, we say it repels it. If a magnet pulls an object towards it, we say it attracts it. • A lodestone is a naturally occurring rock that has magnetic properties • A magnet has two opposite poles: the north and south pole. • A magnetic field is the space around a magnet where the magnetic force can be felt. • Larger magnets are often, but not always, the strongest. • Magnetic strength can be weakened over time.	Force Push Pull Contact Force Gravity Magnetism Friction	Heat Reduce Increase Magnet Metal Iron Lodestone	North South Attract Repel Pole Magnetic Field Magnetic Force Strength Strong Weak
Planning and Resources	Planning (resources are embedded links within the planning) PKC Forces and Magnets Year 3				
Working Scientifically	• asking relevant questions and using different types of scientific enquiries to answer them • setting up simple practical enquiries, comparative and fair tests • making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, • including thermometers and data loggers • gathering, recording, classifying and presenting data in a variety of ways to help in answering questions • using straightforward scientific evidence to answer questions or to support their findings.		• recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • identifying differences, similarities or changes related to simple scientific ideas and processes •		

Year 3/4 Summer 1 B	Electricity		
	Lesson Series	End Points	Vocabulary

Outcomes	1. Electrical Safety 2. Parts of a circuit 3. Switches 4. Thomas Edison and Lewis Latimer 5. Investigating conductive and non-conductive materials 6. Assessment • Electricity can be very dangerous. • We can use electricity safely by not putting fingers in plug sockets, not using electrical items with wet hands and checking that wires are not frayed. • An electrical circuit is a loop that allows electricity to travel around it. • An electrical circuit must have wires and a battery. • If a circuit is broken, electricity will not be able to flow around it. • A switch opens and closes a circuit. • Opening a circuit prevents electricity from flowing. • Thomas Edison invented the first lightbulb suitable to use in homes. • Lewis Latimer invented a lightbulb that could last for a long time. • Materials that allow electricity to pass through them are conductors. • Materials that do not allow electricity to pass through them are insulators. • Many (but not all) metals conduct electricity.	Dangerous Safety Caution Danger Electric shock Frayed Plug socket Wire circuit Electricity Electrician Buzzer Switch Component Conductor filament Thomas Edison Lewis Latimer Conduct Insulate Insulator Flow Battery Wire Bulb Cell Pass through Plastic Wood Rubber	
Planning and Resources	Planning (resources are embedded links within the planning) PKC Electricity Year 4		
Working Scientifically	• Asking relevant questions and using different types of scientific enquiries to answer them • Setting up simple practical enquiries, comparative and fair tests • Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, • including thermometers and data loggers • Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions	• Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • Identifying differences, similarities or changes related to simple scientific ideas and processes • Using straightforward scientific evidence to answer questions or to support their findings	

Summer 2 B	Lesson Series	End Points	Vocabulary
Outcomes	1. States of Matter 2. Evaporation 3. Condensation 4. Precipitation 5. The Water Cycle 6. Assessment: The Water Cycle	• There are three main states of matter: solids, liquids and gases. • Water exists in all these states of matter in nature. • Water can change into each state in both directions - we call this the Water Cycle. • Water evaporates from all water sources (e.g. puddles, lakes, oceans). • When water evaporates, it becomes water vapour. • The amount of water in the air is called humidity. • Condensation is when water vapour turns back into liquid. • High in the sky, the air is cooler and turns vapour back into water droplets. • There is always water vapour in the air and the temperature changes its appearance. • Clouds are formed of millions of water droplets and their shape, size and colour can tell us what weather will be like. • When water droplets get large enough, often in dark cumulonimbus or nimbostratus clouds, they precipitate and fall as rain, sleet, hail or snow. • Precipitation returns water to the surface of the earth as part of the water cycle.	Humidity Gravity Nimbostratus Evaporate Stratus Rain Water vapour Cumulus Snow Liquid Cirrus Hail Gas Cumulonimbus Sleet Condenses Collection Vapour Groundwater Droplets Reservoir Precipitation Water source Condensation
Planning and Resources	Planning (resources are embedded links within the planning) PKC States of matter and the Water Cycle Year 4		
Working Scientifically	• Asking relevant questions and using different types of scientific enquiries to answer them • Setting up simple practical enquiries, comparative and fair tests • Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions		

Year 5/6 National Curriculum Coverage and Expected Outcomes Year A

National Curriculum Knowledge	Autumn:					
	• Describe the changes as humans develop to old age • 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 • 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					
	Spring:					
	• 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 • explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object • identify the effects of air resistance, water resistance and friction, that act between moving surfaces • Recognize that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect					
Year 5/6 Autumn 1 A	Summer:					
	• 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					
	The Human Body					
	Lesson Series		End Points		Vocabulary	
Outcomes	1. Gestation and Infancy 2. Adolescence and Puberty 3. Slowing Down 4. Growth in Humans and Animals 5. Preparation for Assessment (research and scientific drawing) 6. Assessment	• Recognise the first stages of human growth: gestation, birth and infancy. • Humans have a gestation period of nine months. • Human body experiences changes as it goes through puberty. • Hormones released into the bloodstream cause physical, mental and emotional changes. • Physical and mental changes happen to the body from adulthood to old age. • All living things follow a life cycle of birth, growth, reproduction and death.		Growth Gestation Puberty Old age Conception Offspring	Menstruation Ageing Lifespan Metabolism Wean Growth stage Life expectancy Life cycle	Embryo Adolescence Hormones Reproduction
Planning and Resources	Planning (resources are embedded links within the planning) PKC Human Body Year 5					
Working	• recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs					

Scientifically	- reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations - identifying scientific evidence that has been used to support or refute ideas or arguments - planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary					
Year 5/6 Autumn 2 A	Materials					
	Lesson Series	End Points	Vocabulary			
Outcomes	1. Properties of materials 2. Which material is best? 3. Solubility - which materials are most soluble/what solubility means 4. Separating mixtures - sieving, filtering, evaporating 5. Reversible changes - dissolving, mixing, change of state 6. Assessment	Materials can be grouped according to their properties. - A property is something that describes a material. - Some properties are visible; others can be found by testing. - Thermal conductivity means heat can be transferred through a material. - Materials are selected for uses that suit their properties. A solution is a mixture of a solid in a liquid. - Dissolving is a process where one substance becomes incorporated with another to form a solution. - A solvent is a substance that can dissolve other substances. - Some substances are soluble; some are not. - There are methods for separating mixtures: sieves, filters, magnetism, evaporation. All changes are either reversible or irreversible.	Property	dissolving	Strong	
			Material	Solution	Flexible	
			Transparent/transparency	Solvent	Thermal conductor	
			Opaque	Solute	Fair	
			Shiny, dull	Solubility	Control	
			Conductor	Substance	Temperature	
			Conductivity	Separate	Thermometer	
			Insulator, insulation	Sieve	Stopwatch	
			Hard/hardness	Filter	Mixture	
			s	Magnet	Dissolve, Change	
			Soluble	Evaporate	Reaction	
			Insoluble	Reversible		
				Irreversible		
Planning and Resources	Planning (resources are embedded links within the planning) PKC Materials Year 5					
Working Scientifically	- Identifying scientific evidence that has been used to support or refute ideas or arguments - Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations - Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs					
	- Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary - Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate - Using test results to make predictions to set up further comparative and fair tests					

Year 5/6 Spring 1 A	Meteorology				
	Lesson Series	End Points	Vocabulary		
Outcomes	1. Meteorology and the Atmosphere 2. The Ozone Layer 3. Air Movement 4. Cold and Warm Fronts 5. Thunder and Lightning 6. Assessment	- Meteorology is the study of the weather. The atmosphere is made up of several layers of air which protect Earth from the Sun's energy. The atmosphere is essential for life on Earth. Ozone is a gas that absorbs some of the sun's UV radiation. - By using certain harmful chemicals, humans created a hole in the ozone layer over Antarctica. - Since the harmful chemicals were banned, the hole in the ozone layer has been repairing. - Our climate is called a maritime climate, because it is largely influenced by the sea. - The polar maritime and the tropical maritime air masses bring wetter weather from the sea. - The polar continental and the tropical continental air masses bring drier weather from land. - The boundary where warm and cold air meet is called a front. - Warm fronts are symbolised by a line with red semi-circles. - Cold fronts are symbolised by a line with blue triangles. - When electrical charge builds up and moves through the atmosphere, it creates a flash of light and sound. - Light travels faster than sound, so we often see lightning before we hear thunder.	Meteorology Atmosphere Troposphere Stratosphere Mesosphere Thermosphere Exosphere Ozone Anemometer Synoptic chart Warm front Cold front Boundary Cumulonimbus Ice crystals Electrical charge	Polar maritime Returning polar maritime Tropical continental Tropical maritime	Ozone layer Depletion Ultraviolet Air mass Maritime climate Arctic maritime Polar continental
Planning and Resources	Planning (resources are embedded links within the planning) PKC meteorology Year 5				
Working Scientifically	- Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs - Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations - Identifying scientific evidence that has been used to support or refute ideas or arguments				

Year 5/6 Spring 2 A	Electricity						
	Lesson Series	Lesson Series			Lesson Series		
Outcomes	1. Simple Series Circuits 2. Voltage 3. Switches 4. Planning an Investigation 5. Investigation 6. Assessment	• Electricity can flow from one place to another - this is called electrical current • We can control the flow of electricity in a circuit • Circuit components need electricity to work • Circuits components turn electrical energy into different energy forms • Voltage is the pressure from a battery that pushes electricity around a circuit • The voltage of a battery or the number of batteries can change the brightness/volume of components • Switches control the flow of electricity in a circuit • A switch creates makes a circuit complete or incomplete • Making a gap in a circuit prevents electricity from flowing			Electricity	Switch	Insulator
					Circuit	Complete circuit	Conductor
			Current	Incomplete	Series circuit		
			Electrical	circuit	Short circuit		
			current	Kill switch			
			Components	Design			
			Energy	Problem solve			
				Purpose			
Planning and Resources	Planning (resources are embedded links within the planning) PKC Electricity Year 6						
Working Scientifically	• planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • using test results to make predictions to set up further comparative and fair tests • reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations • identifying scientific evidence that has been used to support or refute ideas or arguments						

Year 5/6 Summer 1 A	Reproduction		
	Lesson Series	End Points	Vocabulary

Outcomes	1. Asexual reproduction 2. Sexual reproduction in non-flowering plants 3. Sexual reproduction in flowering plants 4. Reproduction in animals 5. Growth stages 6. Assessment	• Asexual reproduction does not require a male and female and doesn't alter genetic information. • Asexual reproduction is when an organism simply copies itself. • Some plants and some simple animals reproduce asexually. • Most flowering plants reproduce by combining a male and female gamete (pollen and ovule) to make a fertilised egg that grows into an embryo. • The embryo or baby plant is protected inside a seed. • Most flowering plants clothe their seeds with fruit. • Fruit protect and keep seeds moist. • Fruits help with seed dispersal. • Animals can have male cells (sperm produced in testes) or female cells (eggs produced by ovaries). • When an egg is fertilised by sperm it is called a zygote. • The zygote develops into an embryo and then a foetus. • When a foetus can live outside the mother, it is born. • Gestation is the period of time that a living thing develops before it is born. • Different animals have different gestation periods. • Different species of animal have different ways of looking after their young.	Reproduce Asexual Cell division Cloning/clone Regeneration Gamete Fertilisation Embryo Seed	Germinate Sepals Stamens Anther Pistil Ovary Pollination Pollen	Sexual reproduction Sperm Zygote Foetus Development Birth Life cycle Zoologist
Planning and Resources	Planning (resources are embedded links within the planning) PKC Reproduction Year 6				
Working Scientifically	• Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations • Identifying scientific evidence that has been used to support or refute ideas or arguments				

Year 5/6 Summer 2 B	Evolution		

Outcomes	1. Fossils and Mary Anning 2. Inheritance 3. Adaptation 4. Charles Darwin 5. Alfred Wallace 6. Assessment	• Fossils are the remains of organisms. • A small percentage of life on earth is preserved as a fossil, most organisms decompose. • Fossils provide evidence for evolution. • Inheritance is passing on characteristics from a parent to their offspring. • There are differences in characteristics within an individual species, known as variation. • Evolution is the change in inherited traits. • Animals and plants that adapt well to an environment have more chance of surviving. • Adaptation plays an important part in evolution as species change over time. • Charles Darwin spent years observing, comparing and analysing many specimens of plants and animals. • Animals and plants that adapt well to an environment have more chance of surviving, this is called natural selection. • Alfred Wallace explored the Amazon, collecting species of beetles, butterflies and birds. • He created an imaginary line, known as the Wallace Line	Prehistoric Sedimentary rock Fossil Organism Palaeontologis t Mary Anning Offspring Inheritance Environmental Variation Mutation	DNA Adapt Adaptation Biomes Habitat Evolution Natural selection	Species Anthropology Naturalist Extinct Placental mammal Marsupial mammals
Planning and Resources	Planning (resources are embedded links within the planning) PKC Evolution Year 6				
Working Scientifically	• reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations • identifying scientific evidence that has been used to support or refute ideas or arguments				

Year 5/6 National Curriculum Coverage and Expected Outcomes Year B

National Curriculum Knowledge	Autumn: - Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. - Describe the ways in which nutrients and water are transported within animals, including humans. - recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function - Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals - Give reasons for classifying plants and animals based on specific characteristics					
	Spring: - 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 the variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off positions of switches - Use recognised symbols when representing a simple circuit in a diagram - 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					
	Summer: - describe the life process of reproduction in some plants and animals - 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.					
Year 5/6	The Human Body and the Circulatory System					
Autumn 1 B	Lesson Series	End Points		Vocabulary		
Outcomes	1. The Heart: Circulation of the Blood 2. Blood Vessels and Transport 3. Blood Pressure and Heart Rate 4. Heart Rate - an Investigation 5. Heart Rate - an Investigation continued 6. Assessment 7. Optional extra lesson: components of blood	The heart pumps blood around the body. - The left atrium and left ventricle carry oxygenated blood which is pumped around the body. - The right atrium and right ventricle carry deoxygenated blood which is pumped out to the lungs. All cells in our body need oxygen. - Arteries carry oxygenated blood from the heart to cells. - Veins carry deoxygenated blood from the cells back to the heart. Heart rate increases when you exercise as cells use more oxygen. - Drugs and poor health can affect how well the heart works		Arteries Veins Capillaries Nutrients Diffusion Waste products Blood pressure Pulse Oxygen Diet Exercise	atrium (atria) ventricle(s) valves aorta pulmonary circuit systemic circuit	Drugs Alcohol Red blood cells White blood cells Haemoglobin Platelets Plasma

Planning and Resources	Planning (resources are embedded links within the planning) PKC Human Body Year 6				
Working Scientifically	- Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs - Using test results to make predictions to set up further comparative and fair tests - Identifying scientific evidence that has been used to support or refute ideas or arguments - Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary - Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations				
Year 5/6 Autumn 2 B	Light				
	Lesson Series	End Points	Vocabulary		
Outcomes	1. How Light Travels 2. How We See 3. Shadows and Their Shapes 4. The Colour of Light 5. Making a Periscope 6. Assessment	- Light enables us to see by entering our eyes Light travels in straight lines Some light sources are natural, and some are artificial The iris helps the pupil to open and close - Inside the retina, light rays become electrical signals which are sent to the brain - Shadows are always the same shape as the object that made them - The size of shadows can change but the outline shape stays the same as the object - Light from the sun is made up of the colours of the rainbow - When light travels through a prism, the glass slows it down and changes its course - Different colours are slowed down different amounts when going through a prism - A periscope uses reflects an image out of sight using light and mirrors	Illumination Artificial Source Darkness Optic nerve Cornea Iris Measure Record Prism	Refract Refraction White light Rainbow Periscope Reflect Mirror	Pupil Lens Muscles Retina Hypothesis Shadow
Planning and Resources	Planning (resources are embedded links within the planning) PKC Light Year 6				
Working Scientifically	- planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary - using test results to make predictions to set up further comparative and fair tests - recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs - reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations - identifying scientific evidence that has been used to support or refute ideas or arguments				

Year 5/6 Spring 1 B	Classification of Living Things				
	Lesson Series	End Points	Vocabulary		
Outcomes	1. Classifying organisms 2. Cells: Plant and Animal cells 3. Taxonomy 4. Vertebrates 5. Invertebrates 6. Assessment	• Living things are classified into five main kingdoms. • Members of each kingdom share features unique to that group. • The five kingdoms are plants, animals, fungus, protist and prokaryote. • Cells are tiny building blocks that make up all living things. • There are two main types of cell: animal and plant. • Taxonomy is a way of grouping organisms. • Organisms are divided into kingdoms and then further divided into smaller groups. • Organisms are divided into kingdoms, phylum, class, order, family, genus, species. • Vertebrates are classified into five groups: fish, amphibians, reptiles, birds and mammals. • Invertebrates are classified into groups, which include insects, arachnids and molluscs.	Classification Taxon Taxonomy Organism Plants Animals Protist Fungi Bacteria Prokaryotes Unicellular Multicellular Cell Plant Animal Vertebrates	Cell membrane Cytoplasm Nucleus Vacuole Mitochondria Cell wall Chloroplast Chlorophyll Kingdom Phylum (phyla) Class Order Family Genus (genera) Species	Fish Amphibians Reptiles Birds Mammals Cold-blooded Warm-blooded Offspring Invertebrate Arachnid Mollusc Insect Cnidarian Arthropod Annelid
Planning and Resources	Planning (resources are embedded links within the planning) PKC C;assification of Living Things Year 6				
Working Scientifically	• Identifying scientific evidence that has been used to support or refute ideas or arguments • Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations • Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs				
Year 5/6 Summer 1 B	Forces				
	Lesson Series	End Points	Vocabulary		
Outcomes	1. Forces Including Gravity 2. Air Resistance, Water Resistance and Friction 3/4. Guided Investigation: Paper Drop 5. Pulleys, Gears and Levers 6. Assessment	• A force is either a push or pull • A force can cause an object to increase speed, decrease speed, change direction or change shape • Gravity is a force that pulls objects towards the centre of the earth • Friction occurs when two objects move against each other • Air resistance is a kind of friction that slows down objects moving through the air • Water resistance is a kind of friction that slows down objects moving through water	Force Push Pull Increase Decrease Gravity Friction Air resistance Water resistance	Buoyancy Surface area Time Speed Scientific enquiry Fair test Dependent variable Independent	Record Results Data Water resistance Lever Pulley Gear Fulcrum Pivot

		• Upthrust is the force that can keep objects afloat • Changing the shape of an object affects the forces that act upon them • Increasing the surface area of something increases the amount of air resistance acting upon it • In a fair test, specific variables are controlled • Simple machines can allow a smaller force to have a great effect • A lever uses a long pole and a pivot point to increase a force • Pulleys use a rope running over a pulley wheel to increase a force • • Gears use cogs with teeth to increase the force	Streamline Parachute Upthrust Float Control variable	variable
Planning and Resources	Planning (resources are embedded links within the planning) PKC Forces Year 5			
Working Scientifically	• planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • using test results to make predictions to set up further comparative and fair tests • reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations • identifying scientific evidence that has been used to support or refute ideas or arguments			
Year 5/6 Summer 2 B	Astronomy			
	Lesson Series	End Points	Vocabulary	
Outcomes	1. The Big Bang and the Expanding Universe 2. Gravity 3. Our Solar System 4. The Moon 5. Our Galactic Neighbourhood 6. Assessment	• Astronomers believe the universe started with the Big Bang 14 billion years ago and that the universe is still expanding today • Galaxies are groups of stars held together by gravity • Our galaxy is the Milky Way and our nearest neighbour is Andromeda galaxy • Gravity is the force which pulls all objects towards each other • Although all objects attract all others by the force, gravity, it is too weak to notice unless one object (like the Earth) is huge • The Earth's gravity holds us to the Earth's surface; the	Astronomy Theorise The Big Bang Universe Matter Galaxy Space Light year Gravity Force Mass Black hole	Pluto Ceres Terrestrial Jovian Satellite Celestial The Moon Waning Waxing Crescent Gibbous Neil Armstrong

		Sun's gravity holds the Earth in orbit around it • The Sun is at the centre of our solar system • Our solar system contains 8 planets, 4 terrestrial planets and 4 Jovian planets • There are trillions of smaller rocks called asteroids, as well as dwarf planets like Pluto and Ceres • The moon is the Earth's natural satellite • The moon is a planet, it does not make its own light • Depending on the position of the Sun, we see all, part or none of the Moon; these are known as the phases of the Moon • Neil Armstrong and Buzz Aldrin were the first humans to land on the moon • Our home supercluster is called Laniakea and contains over 100,000 galaxies	Solar system	Buzz Aldrin Milky Way
Planning and Resources	Planning (resources are embedded links within the planning) PKC Astronomy Year 5			
Working Scientifically	• Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • Identifying scientific evidence that has been used to support or refute ideas or arguments			