Science Curriculum
Knowledge Informed; Skills Rich.

Vision

Penpol pupils are curious, creative and courageous learners. Our school community believes in authenticity as the foundations of deep-rooted learning. Through our rich and relevant Science curriculum, we nurture community-minded, forward-facing international citizens of the future.

At Penpol school, our vision is to ignite pupil's curiosity and encourage them to confidently discover the world around them, so that they develop a deeper understanding of the world we live in.

Through our practical and enjoyable curriculum, we aim to inspire and excite our children and foster a thirst for knowledge.

In addition, the teaching of science will promote and develop transferable skills such as observation, communication and teamwork and allow mathematical skills to be developed.

Curriculum Intent: Why do we teach Science at Penpol Primary School?

At Penpol Primary School, we recognise the importance of Science in every aspect of daily life. As one of the core subjects taught in primary school, we give the teaching and learning of Science the prominence it requires. We follow the 2014 National Curriculum for Science, which aims to ensure that all children:

- Develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics.
- Develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them.

- Are equipped with scientific skills required to understand the uses and implications of science, today and for the future.

Our school curriculum, along with our vision and values, support to shape and inspire our science curriculum. Children will **grow** their scientific vocabularyas well as their skills. We want our children to leave Penpol School knowing that it is possible for them to achieve their aspirations having developed attitudes of curiousity, creativity, co-operation, perseverance, resilience, responsibility and integrity in thinking.

Implementation: How is Science taught at Penpol School?

At Penpol Primary School, Science is taught weekly and is incorporated into the topic-based curriculum, where possible. During the Spring term, each year groups' topic is based on a science concept. The science curriculum embodies a clear progression framework which ensures that children are continually building on their prior learning as they systematically develop their understanding of key ideas and their scientific skills. The long-term plan (see below) has been designed to contain a sequence of knowledge and concepts, through the specific disciplines of biology, physics and chemistry, on a year-by-year basis to ensure progress in the concepts of science to ensure that children develop secure understanding. The concepts are taught in the order identified in the long-term plan below and are not organised by half term as the content for each module varies in length. We use STEM and Bath Spa resources to plan our own as programme of study which enhances our quality first teaching. This ensures that children systematically develop their knowledge of big ideas and their scientific skills, for example:

Year 1- Digging for Dinosaurs
Year 2- Busy Bees
Year 3- Mine craft
Year 4- Magic Matters
Year 5- Space
Year 6- Light it up.

The scientific area of learning is concerned with increasing pupils' knowledge, understanding of our world and with developing skills associated with science as a process of enquiry. It will develop the natural curiosity of the child, encourage respect for living organisms and the physical environment and provide opportunities for critical evaluation of evidence. Science is encouraged to be hands on, investigative and fun and is celebrated through SCIENCE WEEK and other important days/events throughout the year.

We also use a variety of other resources to support the planning and teaching of science:

• _Knowledge organisers for each topic which outlines prior knowledge, future knowledge and vocabulary children will master throughout the topic.

Impact: What will we see from the teaching of Science?

The impact from planning and teaching a high-quality science curriculum is that children will not only acquire the appropriate age-related knowledge linked to the science curriculum, but also skills which equip them to progress from their starting points, and within their everyday lives. Our aim for science is to increase the skills needed to navigate an ever-changing world of science and technology by immersing our children with scientific enquiry skills, key scientific knowledge and investigative skills. We aim to create a culture of high scientific aspirations, which will allow our students a platform to develop their scientific learning and careers, and to articulate their understanding of key scientific concepts.

	Life systems	Ecosystems	Forces	Matter	As a Scientist.
EYFS		Changes in the natural world and seasons.		Changing states of matter	
Year 1	Animals Inc Humans Identifying and name a variety of animals. Identify and name animals that are carnivores, herbivores and omnivores. Describe and compare the structures of animals. Identify, name, draw and label the basic parts of the human body.	Plants Identify and name wild and garden plants, including deciduous and evergreen trees. Identify and describe structures of flowering plants, including trees. Seasonal changes. Observe changes across the four seasons. Observe and describe weather associated with the seasons and the length of day.		Everyday materials. Distinguish between an object and the material it is made from. Identify and name everyday materials. Describe the simple properties of materials. Compare and group materials based on their properties.	I am asking questions. I am observing carefully. I am using science equipment. I am performing simple tests. I am identifying and classifying (sorting). I am gathering and recording data.
Year 2	Animals inc Humans Notice that animals and humans have offspring that grow into adults. Find out about and describe the basic needs if animals and humans to survive. Describe the importance for humans to exercise, eat the right food and hygiene.	Plants – Observe and describe how seeds and bulbs grow into plants Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. Living things and their habitats. Explore and compare the difference between things that are living, dead and things that have never been alive Identify that most living things live in a habitat which they are suited. Describe how different habitats provide the basic needs of the kind of animals or plants, and how they depend upon each other. Identify and name a variety of plants and animals in their habitat. Describe how animals obtain food from plants and other animals. Explore simple food chains.		Uses of everyday materials. Identify and compare the uses of a variety of everyday materials and their uses. Find out how solid objects made from some materials can be changed by squashing, bending etc.	I am asking questions and answering them.? I am using my observations and ideas to answer questions. I am using science equipment. I am performing tests. I am identifying and classifying (sorting). I am gathering and recording data to answer questions.
Year 3	Animals inc 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 the food they eat. Identify that humans and some animals have skeletons and muscles for movement, protection and support.	Plants- Identify and describe different parts of flowering plants. Explore the requirements of plant life and growth. Investigate the way water is transported within a plant. Explore the parts of a flowers play in the life cycle of flowering plants.	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 light from a light source is blocked by an opaque object. Find patterns in the way that the size of shadows change. Forces and Magnets Compare how things move on different surfaces.	Rocks Compare and group together different kinds of rocks on the basis of their appearance and simple properties. Describe in simple terms how fossils are formed when thing that have lived are trapped within rock. Recognise that soils are made from rocks and organic matter.	I am asking questions and answering them.? I am using my observations and ideas to answer questions I am using science equipment I am performing tests. I am identifying and classifying (sorting). I am gathering and recording data to answer questions.

			Notice that some forces need contact between 2 objects, but magnetic forces can attack 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 that magnets have two poles. Predict whether 2 magnets will attract or repel each other depending on which poles are facing.		
Year 4	Animals inc Humans Describe the simple functions of the basic parts of the human digestive system. Identify the different types of teeth in humans and their simple functions. Construct and interpret a variety of food chains, including producers, predators and prey.	Living things and their habitats. Recognise that living things can be grouped in a variety of ways. Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. Recognise that environments can change and that this can sometimes pose danger to living things.	Sound Identify how sounds are made, associating some of them with something vibrating. Recognise that vibrations from sound travel through a medium to the ear. Find patterns between the pitch of a sound and features of an object that produced it. Find patterns between the volume of a sound and the strength of the vibrations that produced it. Recognise that sound gets fainter as the distance from the sound source increases. Electricity Identify common appliances that run on electricity. Construct a simple series electrical circuits identify 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 metal as being good conductors.	State of Matter Compare and group materials together, according to whether they are solid 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. Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.	I am asking relevant questions and using scientific enquiry to answer them. I am setting up practical, comparative and fair tests. I am identifying variables. I am taking accurate measurements using a range of equipment. I am gathering, recording, classifying and presenting data in a variety of ways. I am recording my findings using scientific language, drawings, labelled diagrams, and keys. I am drawing simple conclusions. I am using scientific evidence to support my findings.
Year 5	Animals inc Humans Describe the changes as humans develop to old age.	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 processes of reproduction in some plants and animals.	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	Properties and changes of material. Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity 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 test, for the particular uses of everyday materials, including metals, wood and plastic.	I am planning different types of scientific enquires to answer questions. I am taking accurate measurements. I am taking repeated readings. I am recording data and results using diagrams, tables, keys and graphs. I am reporting and presenting my findings. I am drawing conclusions and suggesting improvements I am using scientific evidence to answer questions and support my findings

			gravity acting between the Earth and the falling object. Identify the effects of air resistance, water resistance and friction that act between moving forces. Recognise that some mechanisms, including levers, pulley and gears, allow a smaller force to have a greater effect.	Demonstrate that dissolving, mixing and changes of state are reversible changes. Explain that some changes result in h formation of new materials, and that this this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.	
Year6	Animals inc Humans Identify and name the main parts in the circulatory system, and describe the function of the heart, blood vessels and blood. Recognise the impact of diet, exercise, drugs and lifestyle on the way their body's function. Describe the way 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.	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.	Light Recognise that light appears to travel in straight lines. Use the ideas 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 source to object 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 Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in a circuit. Compare and give reasons for the variations in how components function, including the brightness of a bulb, the loudness of buzzers and the on/off switches. Use recognised symbols when representing a simple circuit in a diagram.		I am planning different types of scientific enquires to answer questions. I am selecting appropriate techniques, apparatus and materials to use in scientific enquires. I am taking accurate measurements using a range of equipment and take repeat readings when necessary. I am recording data and results using labelled diagrams, tables, classification keys, bar charts, line and scatter graphs. I am reporting and presenting my findings. I am evaluating data and showing awareness of errors. I am drawing conclusions and suggesting improvements. I am using scientific evidence to answer questions and support my findings.

Science Overview 2021/22

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Reception	Ourselves. Lifecycles, growth.	Let's celebrate. Seasons	Weather	Growing	All around the world. Habitats	Under the sea.
Year 1	Everyday Materials	Seasonal Changes	Dinosaurs			
Year 2	Use of everyday materials		Bees			
Year 3	Animals including Humans- Movement		Rock	Magnets	Habitats	light

Year 4	Animals including Humans- Digestion.	Animals including Humans- Digestion.	State of Matter	Sound	Habitats.	Electricity
Year 5	Living things and their habitats.	Properties of Materials	Space			
Year 6	Living things and their habitats.	Animals including Humans-	Electricity	Light	Evolution	