Science at Gwinear.

"The important thing is to never stop questioning" (Albert Einstein)

Our Vision Statement.

We believe through study in science, children gain an understanding of the phenomena they observe in the world around them which is vital to their role as the future custodians of our planet. We believe our study in biology, chemistry and physics should encourage children answer their own questions through exploration and experimentation. Children remember best experiences that inspire awe and wonder. As such, we believe science teaching should stimulate excitement and intrigue that leads to questioning and exploration. Our science programme focusses not only on the acquisition of scientific knowledge but also on the development of skills that promote effective scientific enquiry; the methods, processes and uses of science and their real – world application. Common misconceptions are identified at the outset and children learn the importance of predicting outcomes and evaluating the validity of their results. Science is a subject through which children begin to understand the impact of advances in human technology over time and, crucially, its impact on the natural world.

Gwinear School Concepts and Skills Progression

Writing skills should be taught when linked to projects where possible to ensure real world application.

Skills Progression – Statutory Requirements for Y5/6

During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- decide how to turn ideas into a form that can be tested; plan different types of scientific enquiries to answer and ask questions, including recognising and controlling variables where necessary
- measure accurately using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- recording data and results of increasing complexity choosing appropriate scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- using test results to make predictions, identify patterns and set up further comparative and fair tests
- reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations
- identify and suggest scientific evidence that has been used to support or refute ideas or arguments.

YEAR 5/6 **Curriculum Content** **Content in red is in addition to National Curriculum content.**	**Animals inc humans.** Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function describe the ways in which nutrients and water are transported within animals, including humans.	**Electricity** Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches use recognised symbols when representing a simple circuit in a diagram.	**Light** Recognise that light appears to travel in straight lines use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.	(Revision)	**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** Revisit MR GRENS 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. That plants are Producers and create their own food by photosynthesis A by product of photosynthesis is the net production of oxygen – importance of plants in relation to greenhouse gasses
	Properties and changes of materials Compare and group together everyday materials on the basis of their properties,	(Sound)	**Earth and Space** Describe the movement of the Earth, and other planets, relative to the Sun in the solar system	**Forces** Identify the effects of air resistance, water resistance and friction, that act between moving surfaces		**Living things and their habitats** Describe the changes as humans develop to old age. Describe the differences in the life

	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 □ explain that some changes result in the formation of new		□ 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.	□ Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object		cycles of a mammal, an amphibian, an insect and a bird □ describe the life process of reproduction in some plants and animals. Recognise importance of insects, animals for the life cycle of a plant and begin to understand concepts of dependence and competition

	materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.					

Skills Progression – Statutory Requirements Y3/4

During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

 ask and answer relevant questions and demonstrate how scientific enquiry supports understanding

 set up simple practical enquiries, comparative and fair tests and make predictions

 making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, choosing a range of equipment to measure temperature, force, length and time

 gather, record, classify and present data in a variety of ways to help in answering questions

 record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables

 report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions; suggest how different variables effect conclusions.

 use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions i Identify differences, similarities or changes related to simple scientific ideas and processes.

 use straightforward scientific evidence to answer questions or to support their findings.

YEAR 3/4 Curriculum Content	**Living things and their habitats** (classification) 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	**Animals including humans** describe the simple functions of the basic parts of the digestive system in humans identify the different types of teeth in humans	**States of matter** compare and group materials together, according to whether they are solids, liquids or gases observe that some materials change state when they are heated or cooled, and measure or research	**Sound** identify how sounds are made, associating some of them with something vibrating recognise that vibrations from sounds travel through a medium to the ear	**Electricity** identify common appliances that run on electricity construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs,	

	local and wider environment recognise that environments can change and that this can sometimes pose dangers to living things. Understand how humans have impacted on environments in negative ways with specific case studies. Understand how humans can act in a positive way to promote biodiversity.	and their simple functions construct and interpret a variety of food chains, identifying producers, predators and prey.	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 Reference and link to Global warming effects: sea level rises, ice pack reduction and increasing volatile weather patterns	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. **How sound travels- miners communication studies**	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 –**evolution in electricity** Recognise some common conductors and insulators, and associate metals with being good conductors.	

	Animals including humans identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat Photosynthesis Understand that plants make their own food and need sunlight to be able to do this identify that humans and some other animals have skeletons and muscles for support, protection and movement.	**Magnetism** compare how things move on different surfaces notice that some forces need contact between two objects, but magnetic forces can act at a distance observe how magnets attract or repel each other and attract some materials and not others compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some	**Rocks, fossils and soils.** 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. – **mining: tin, arsenic, copper** **Recognise and group rocks and soils on the basis of their characteristics including appearance, texture and permeability.**	**Light and shadows** recognise that they need light in order to see things and that dark is the absence of light notice that light is reflected from surfaces recognise that light from the sun can be dangerous and that there are ways to protect their eyes recognise that shadows are formed when the light from a light source is blocked by a solid object find patterns in the way that the size of shadows change.	**Plants** identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers explore the requirements of plants for life and growth (air, light, water, nutrients from soil, 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	-

		magnetic materials ▯ describe magnets as having two poles ▯ predict whether two magnets will attract or repel each other, depending on which poles are facing. **Earths poles**			pollination, seed formation and seed dispersal.	

Skills Progression – Statutory Requirements Y1/2

During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

▯ ask simple questions and recognising that they can be answered in different ways
▯ observe closely, using simple equipment
▯ explore, using the senses of sight, hearing, smell, touch and taste as appropriate.
▯ perform simple tests and show understanding it needs to be fair
▯ identify and classifying objects, materials and living things; notice patterns and relationships
▯ use their observations and ideas to suggest answers to questions
▯ gather, record and communicate data in a range of ways to help in answering questions; including block graphs, tables and drawings
▯ make simple predictions; say what they think might happen
▯ follow simple instructions to control risks to themselves and others

YEAR 1/2 Curriculum Content	**Living things and their habitats** ▯ explore and compare the differences between things that are living, dead, and	**Everyday materials -and their uses Shaping materials** ▯ identify and compare the suitability of a	**Animals and humans. Exercise, nutrition, reproduction** ▯ notice that animals, including humans, have offspring which grow into adults	**-Electricity** Construct a simple circuit to light a bulb Add a switch	**Plants Seeds, bulbs, and plants** ▯ observe and describe how seeds and bulbs grow into mature plants	**Climate Change** Know how gasses in the atmosphere affect climate. Understand impact of climate change on weather patterns

	things that have never been alive Characteristics of living things MR GRENS identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other identify and name a variety of plants and animals in their habitats, including micro-habitats describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food. Begin to understand how humans can affect habitats	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.	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.		find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.	Know common causes for increasing greenhouse gasses. Understand how plants help reduce greenhouse gasses. Know how humans can reduce production of greenhouse gasses
	Animals Identify and name some common	**Everyday materials**	**Plants** Including common flowers and trees and their basic structure	**Seasonal changes**		

	animals. Know their structure. Know main human body parts. identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals identify and name a variety of common animals that are carnivores, herbivores and omnivores describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.	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.	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.	observe changes across the four seasons observe and describe weather associated with the seasons and how day length varies.		
	Skills Progression During Reception (EYFS) children are taught to use the following processes and skills through a combination of child and adult led first hand learning experiences. Engaging in scientific concepts through the teaching of the Early Years Curriculum content: • Commenting and asking questions about their familiar world. • Talking about things they have observed in the natural environment. • Discuss why things happen and how things work.					

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Develop and understanding of growth, decay and changes over time.
Show care and concern for living things.
Looking closely at similarities, differences, patterns and change.

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<tr><td>FOUNDATION STAGE
From understanding of the world ELG</td><td colspan="4">Children to know about similarities and differences in relation to places, objects, materials and living things. They can talk about the features of their own immediate environment and how environments might vary from one another. They will make observations of animals and plants and explain why some things occur and talk about changes.</td></tr>
<tr><td>Overarching topics

(These scientific skills will be taught throughout the curriculum yearly, responding to children`s interests and needs. Although, in depth learning will take place in the following topics).</td><td>Inside Out
Developing an understanding of growth and decay and changes over time.
(Exploring our bodies – how our bodies work/growing older/ the effects of exercise and healthy eating).</td><td>Celebrations
Looking closely at similarities, differences, patterns and change.
(Children to explore the differences and similarities of traditional celebrations around the world).</td><td>Out of this World / People who help me
Commenting and asking questions about their familiar world.
Discuss why things happen and how things work.
Looking closely at similarities, differences, patterns and change.
(Exploring the world around us – investigating space and our solar system. Discussing space travel, using materials to build their own space vehicles, exploring how the work. Looking closely at the similarities and differences in the planets).</td><td>The Wonders of the world (land & sea)
Commenting and asking questions about their familiar world.
Talking about things they have observed in the natural environment.
Show care and concern for living things and the environment.
Develop an understanding of growth, decay and changes over time.
Looks closely at similarities, differences, patterns and change.
(Children to make observations of the world around them, investigating plant growth, local environments and living things. Children to grow their own plants and take of them. Children to investigate different landscapes, making maps to explore the environments. Children to discuss changes over time in the world around us).</td></tr>
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