St Paul’s Science Progression Statements

Science Intent Statement

At St Paul’s CE Primary school we will “Start children off on the way they should go…” by enabling children to:

- 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 completing investigations that help them to answer scientific questions about the world around them
- become equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future.

Science: Animals, including humans

EYFS:

- Explore the natural world around them.
- Describe what they see, hear and feel whilst outside.
- Recognise some environments that are different to the one in which they live.

Key Stage 1:

- 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.
- 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.

Lower Key Stage 2:

- Identify that humans and animals cannot make their own food; they get nutrition from what they eat.
- Identify that animals, including humans, need the right types of nutrition.
- Identify that humans and some other animals have skeletons and muscles for support, protection and movement. ·
- Describe the simple functions of the basic parts of the digestive system in humans.
- Identify the different types of teeth in humans and their simple functions.
- Construct and interpret a variety of food chains, identifying producers, predators and prey.

Upper Key Stage 2:

- Identify and name the main parts of the human circulatory system.
- 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 and exercise on the way bodies function.
- Recognise the impact of drugs and lifestyle on the way bodies function.
- Describe the changes as humans develop to old age.
- Recognise that living things produce offspring of the same kind and how they vary from parents (Y6 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. (Y6 Evolution and inheritance).
- Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. (Y6 Evolution and inheritance).

Year 7:

- Variation, Continuous and discontinuous.
- Adaptations.
- Adolescence
- Reproductive systems.
- Fertilisation and implantation.
- Development of the foetus.
- The menstrual cycle.

Science: Living things & their habitats

EYFS:

- Explore the natural world around them.
- Describe what they see, hear and feel whilst outside.
- Recognise some environments that are different to the one in which they live.

Key Stage 1:

- Explore and compare the differences between things that are living, dead, and things that have never been alive.
- Identify and name a variety of plants and animals in their habitats, including microhabitats.
- 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.
- Describe how living things in a habitat depend on each other.
- Describe the adaptations of animals and how these suit the environments they inhabit.
- 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.

Lower Key Stage 2:

- Group living things 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 change that that this can sometimes pose dangers to living things (locally and globally).
- Construct and interpret a variety of food chains, identifying producers, predators and prey. (Y4 - Animals, including humans)

Upper Key Stage 2:

- Describe the life process of reproduction in some plants and animals.
- Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.
- Give reasons for classifying plants and animals based on specific characteristics.
- 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.
- Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. (Y6 - Evolution and inheritance)

Year 7:

Food chains and webs, What can disrupt food chains.

What is an Ecosystem.

Resources that plants and animals compete for.

Name and describe the parts of a flower.

What is fertilisation and pollination.

Methods of seed dispersal.

Science: Plants

EYFS:

- Explore the natural world around them. (Reception – Living things and their habitats)
- Recognise some environments that are different to the one in which they live. (Reception – Living things and their habitats)
- Understand the effect of changing seasons on the natural world around them. (Reception – Seasonal changes)

Key Stage 1:

- Identify and name a variety of common wild plants.
- Identify and name a variety of common garden plants.
- Identify and name a variety of deciduous and evergreen trees.
- Identify and describe the basic structure of a variety of common flowering plants.
- Identify and describe the basic structure of trees.
- Observe and describe how seeds and bulbs grow into mature plants.
- Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.

Lower Key Stage 2:

- 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).
- Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.
- Investigate the way in which water is transported within plants.

Upper Key Stage 2:

- Describe the **life process of reproduction in some plants** and animals. (Y5 - 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. (Y6 - Living things and their habitats)
- Give reasons for **classifying plants** and animals based on specific characteristics. (Y6 - Living things and their habitats)

Year 7:

Resources that plants and animals compete for.

Name and describe the parts of a flower.

What is fertilisation and pollination.

Methods of seed dispersal.

Science: Properties of materials

EYFS:

Use all their senses in hands-on exploration of natural materials. Explore collections of materials with similar and/or different properties.

Talk about the differences between materials and changes they notice.

Key Stage 1:

Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock.

Distinguish between an object and the material from which it is made.

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 discuss the uses of everyday materials.

Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.

Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.

Find out about people who have developed new materials.

Lower Key Stage 2:

- 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).
- Associate the rate of evaporation with temperature.
- Identify the part played by evaporation and condensation in the water cycle.
- Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. (Y3 - Rocks)
- Describe in simple terms how fossils are formed when things that have lived are trapped within rock. (Y3 - Rocks)
- 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. (Y3 - Forces and magnets)

Upper Key Stage 2:

- Compare and group together everyday materials on the basis of their properties, including their hardness, transparency and response to magnets.
- Compare and group together everyday materials on the basis of their thermal conductivity.
- Compare and group together everyday materials on the basis of their electrical conductivity.
- Know that some materials will dissolve in liquid to form a solution.
- Describe how to recover a substance from a solution.
- Compare and group together everyday materials on the basis of their solubility.
- 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 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.

Year 7:

What materials are made up of.

The different states of matter: What happens in melting, freezing and boiling, difference between evaporation and boiling.

What diffusion is.

The difference between pure substances and mixtures.

Solutions and solubility.

How to separate substances by filtration, distillation and chromatography.

Science: Light

EYFS:

(Seasonal Changes)

Observe the effect of changing seasons on the natural world around them.

Key Stage 1:

(Seasonal Changes)

- Observe and describe the changes across the 4 seasons.
- Observe and describe the weather in each season.
- Observe and describe how the day length varies with each season.
- Explain how animals and other living things adapt to the changing seasons.

Lower Key Stage 2:

- Recognise that we 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 our 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.

Upper Key Stage 2:

- 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.
- Use the idea of the Earth's rotation to explain day and night and the apparent movement of the Sun across the sky. (Y5 - Earth and space)

Year 7:

Light waves.

Describe reflection and refraction.

Parts of the eye.

Science: Sound

Year 7:

Sources of sound.

Define amplitude, loudness and frequency.

Differences between frequency and pitch.

Parts of the ear.

Light waves.

Upper Key Stage 2:

(Our Solar System)

- 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.

Lower Key Stage 2:

- 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.

Key Stage 1:

- Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. (Y1 - Animals, including humans)
- Investigate our 5 senses and how we use them to understand the world around us.

EYFS:

- Describe what they see, hear and feel whilst outside.

Science: Forces

EYFS:

Explore how things work.

Explore and talk about different forces they can feel.

Key Stage 1:

- Identify twist, push and pull forces in everyday activities eg. the park.
- Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. (Y2 - Uses of everyday materials)

Lower Key Stage 2:

- Observe that some forces need contact between two objects.
- Compare how things move on different surfaces to investigate the force of friction.
- Observe that magnetic forces can act at a distance.
- Observe how magnets attract or repel each other and attract some materials and not others.
- Describe magnets as having two poles
- Predict whether two magnets will attract or repel each other, depending on which poles are facing.
- 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.

Upper Key Stage 2:

- Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.
- Explain the effects of gravity on a falling object (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.

Year 7:

Describe what forces do.

Identify balanced and unbalanced forces.

Investigate factors affecting speed.

Describe distance time graphs.

Explain the difference between mass and weight.

Science: Electricity

EYFS:

Explore how things work.

Key Stage 1:

- *Understand the potential danger of electricity.*
- *Understand how to use electrical items safely.*
- *Understand that some objects that need electricity to work.*
- *Observe that some objects are plugged in and some have batteries.*

Lower Key Stage 2:

- Identify common appliances that run on electricity (mains and battery).
- Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.
- Identify whether or not a bulb will light in a simple series circuit, based on whether or not the bulb is part of a complete loop with a battery.
- Understand that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.
- Identify some common conductors and insulators and associate metals with being good conductors.

Upper Key Stage 2:

- Use recognised symbols when representing a simple circuit in a diagram.
- 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.
- Investigate renewable sources of electricity.

Year 7:

Food and fuels.

Energy resources.

Energy and Power.

Conservation of energy.

Energy dissipation.

Science: Working scientifically

Year 7:

How to plan a scientific investigation.

Identify hazard symbols.

Describe risks in an investigation.

Upper Key Stage 2:

- Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
- Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.
- Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
- Use test results to make predictions to set up further comparative and fair tests.
- Report and present 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 scientific evidence that has been used to support or refute ideas or arguments.

Lower Key Stage 2:

- Ask relevant questions and use different types of scientific enquiries to answer them
- Set up simple practical enquiries, comparative and fair tests
- Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment eg. thermometers and data loggers.
- Gather, record, classify and present data in a variety of ways to help answer 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
- Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- Identify differences, similarities or changes related to simple scientific ideas and processes
- Use straightforward scientific evidence to answer questions or to support their findings.

EYFS:

Key Stage 1:

Ask simple questions and recognise that they can be answered in different ways

Observe closely, using simple equipment

Perform simple tests

Identify and classify different objects to create groups

Use observations and ideas to suggest answers to questions

Gather and record data to help answer questions.