



## Tunbury Primary School

### **SCIENCE POLICY**

This policy reflects Tunbury Primary School's values and philosophy to the teaching and learning of Science.

#### **Purpose of study**

A high-quality science education should inspire in pupils a curiosity and fascination about the world and natural phenomena that will remain with them for the rest of their lives. It is an enquiry-led subject, which is concerned with the pursuit of better investigative strategies to deepen knowledge and understanding of the world around us.

At Tunbury Primary School we want our pupils to ask questions about the world in which they live and make predictions, form hypothesis, carry out fair tests and formulate conclusions. We strive to develop their knowledge and understanding of important scientific ideas, processes and skills and encourage them to relate these to their everyday experiences.

Teaching equips pupils with knowledge in the four strands of:

- scientific enquiry
- life processes and living things
- materials and their properties
- physical processes

This scheme contains 28 units of study. Each of these units of study has been assigned to a particular Year group inline with the guidance from the National Curriculum (2014). Suggestions have been made as to possible best times of year to study some of the units, as well as when different aspects of learning within a unit will need to be taught at different times across a year.

We strive to make the children confident learners, to explore values and ideas through Science. The lessons are practical, using a range of activities that will take the pupils on a learning journey that supports the progression in key scientific knowledge and concepts, from Year 1 to Year 6.

#### **Aims**

The national curriculum for science aims to ensure that all pupils by the end of each key stage, know, can apply and understand the matters, skills and processes specified in the relevant programmes of study.

The national curriculum for science aims to ensure that all pupils:

- 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 the scientific knowledge required to understand the uses and implications of science, today and for the future

#### ➤ **Year 1:**

##### **Animals including humans**

- Identify and name a variety of common animals that are birds, fish, amphibians, reptiles 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 (birds, fish, amphibians, reptiles and mammals, and including pets).
- Identify, name draw and label the basic parts of the human body and say which parts of the body is associated with each sense.

### **Everyday materials**

- Distinguish between an object and the material from which it is made.
- Identify and name a variety of everyday materials, including wood, plastic, glass, 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 physical properties.

### **Plants**

- identify seasonal and daily weather patterns in the United Kingdom and the location of hot and cold areas of the world in relation to the Equator and the North and South Poles.
- use basic geographical vocabulary to refer to:
  - key physical features, including: beach, cliff, coast, forest, hill, mountain, sea, ocean, river, soil, valley, vegetation, season and weather.
  - key human features, including: city, town, village, factory, farm, house, office, port, harbour and shop.

### **Seasonal change**

- enable pupils to experience and observe phenomena, looking more closely at the natural and humanly-constructed world around them
- encourage to be curious and ask questions about what they notice

### **➤ Year 2:**

#### **Animals including humans**

- Notice that animals, including humans, have offspring which grow into adults
- Find out about and describe the basic needs of animals, including humans, for survival (water, food and air)
- Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.

#### **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.

#### **Plants**

- Observe and describe how seeds and bulbs grow into mature plants
- Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.

#### **Living things and their habitats**

- Explore and compare the differences between things that are living, dead, and things that have never been alive

- Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other.
- Identify and name a variety of plants and animals in their habitats, including micro-habitats
- Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.

➤ **Year 3:**

**Animals including humans**

- Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat
- Identify that humans and some animals have skeletons and muscles for support, protection and movement.

**Forces and magnets**

- 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 magnetic materials
- Describe magnets as having two poles
- Predict whether two magnets will attract or repel each other, depending on which poles are facing.

**Rocks**

- Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties
- Describe in simple terms how fossils are formed when things that have lived are trapped within rock
- Recognise that soils are made from rocks and organic matter.

**Plants**

- Identify and describe the functions of different parts of plants; roots, stem, 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 ways in which water is transported within plants.
- Explore the role of flowers in the life cycle of flowering plants, including pollination, seed formation and seed dispersal

**Light**

- Recognise that they need light in order to see things and that dark is the absence of light
- Notice that light is reflected from surfaces
- Recognise that light from the sun can be dangerous and that there are ways to protect their eyes
- Recognise that shadows are formed when the light from a light source is blocked by a solid object
- Find patterns in the way that the sizes of shadows change.

➤ **Year 4:**

**Animals including humans**

- Describe the simple functions of the basic parts of the digestive system in humans
- Identify the different types of teeth in humans and their simple functions
- Construct and interpret a variety of food chains, identifying producers, predators and prey.

**States of Matter**

- Compare and group materials together, according to whether they are solids, liquids or gases
- Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)
- Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.

**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 dangers to living things

**Electricity**

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

**Sound**

- Identify how sounds are made, associating some of them with something vibrating
- Recognise that vibrations from a sound 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.

➤ **Year 5:**

**Animals including humans**

- Describe the changes as humans develop from birth to old age.

**Properties and changes of materials**

- Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets
- Understand 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 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.

**Living things and their habitats**

- Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird
- Describe the life process of reproduction in some plants and animals.

**Forces and magnets**

- 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
- Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.

**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

➤ **Year 6:**

**Animals including humans**

- Identify and name the main parts of the human circulatory system, and explain 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.

### **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 idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye
- Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes
- Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them

### **Electricity**

- 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.

### **Evolution**

- 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.

### **Teaching and Learning Styles:**

The expectations are that Learning and teaching styles will differ from each lesson and will address the needs and wants of the children and the needs and wants of the subject being taught. At Tunbury Primary School we utilise many learning and teaching styles. Science will be taught through themed based lessons alongside and within other curriculum subjects, e.g, Literacy, Mathematics, Computing, as well as in discrete science lessons.

Throughout each and every unit of study the emphasis is on the children learning by doing. In accordance with the constructivist theory of learning, the units encourage the teachers to provide activities that will enable the children to test their previously held ideas. In doing so, they will also be encouraged to develop a bank of skills and an understanding of the processes required to be able to do good science. In every unit of work the most suitable aspects of the statutory requirements for Working Scientifically have been selected. Each of these requirements will be thoroughly covered throughout both of the Key Stages.

Each unit of study contains a section outlining the most appropriate scientific vocabulary to be used when studying that particular area of science. This will help children to become familiar with, and use, technical terminology accurately and precisely.

### **Science planning:**

Science is planned for in year group teams and is cross curricular where appropriate. Termly planning should follow the long term overview for the year group and should ensure that the *Kent Scheme of Work for Primary Science 2014* is followed. Short term planning should be maintained in planning folders, with annotations to identify progress on individual lesson plans.

### **Assessment and recording:**

Formative assessment is the basis for assessment in science. Work, where appropriate, will be recorded in science books but evidence will also be photographic and on classroom displays. When marking, it is important to assess the piece of work according to the Learning Intention and to indicate to the child whether they have used the success criteria to achieve this. A follow on/next steps question or comment should be given to children where appropriate and time allocated for these to be answered.

For each of the units an assessment record sheet has been created. Each of these sheets will allow teachers to record children's achievements during their studies for both the knowledge aspects within a particular unit, and some of the requirements from Working Scientifically. These record sheets, and the intended learning objectives included in the units of study will enable the teachers to identify what the children need to know or be able to do next, as well as support them at different times in the year to make summative judgements as to the children's attainment.

### **Resources:**

Resources are held in the science trays in the year 4 area; in the science cupboard found in the computing suite corridor and in the outside stockroom. When finished with, resources should be placed back here to allow other year groups access to them.

### **Equal opportunities:**

All children must have regular access to science appropriate to their stage of development. Challenge for all is integral to our teaching and we aim to encourage all pupils to reach their full potential through the provision of varied opportunities.

Work must be differentiated to aid children's learning. We use a range of strategies to support pupils. A few of these, particularly relevant to geography are:

- An adult to accompany pupils with aural or visual impairment on visits
- The use of large scale formats, always colour highlighted, for pupils with particular special needs
- Awareness of the problems colour keys provide for colour-blind pupils
- Provision of key vocabulary specific to the learning
- Modified text passages as expected in other curriculum areas
- Different levels of written or oral questions for pupils investigating photographic or other visual materials
- Modified graphs, e.g. the use of ICT to graph data, axes provided and labeled
- Written frameworks to be provided to help the child scaffold their answers.

In addition, gifted and talented children should be given open-ended tasks to allow them to form scientific questions of their own and search out the answers.

We recognise that our curriculum planning must allow pupils to gain a progressively deeper understanding and competency as they move through our school.

**Community Links:**

Science at Tunbury Primary School contributes to the community through the Eco Council which promotes the study and development of the school site and direct locality. This is in order for children to have an understanding of their local environment; to develop a sense of pride in their community ensuring they are willing and able to protect it, for future generations.

**Monitoring and review:**

The Science subject leader and class teacher is responsible for monitoring the standards of the children's work and the quality of teaching in science.

The subject leader is responsible for supporting colleagues in the teaching of science, for being informed about current developments in the subject and for providing a strategic lead and direction for the subject in the school. The Science subject leader will maintain a monitoring programme to assess science standards across the school, for all year groups and will relay findings back in writing where appropriate.