

SCIENCE

At Riverside Primary School, Science is taught through topics which link to other subjects of the curriculum wherever possible - within a themed approach to learning - but can also be taught discretely as a stand alone subject.

Early Years Foundation Stage

Within the Foundation Stage (Nursery and Reception), the Early Years Foundation Stage Framework is followed. The 'Science' aspect of the curriculum is followed through the area – 'Understanding the World: The World'.

Knowledge and Understanding

Themes are planned to follow the interests of the children. Through these, the children learn about the similarities and differences between places, objects, materials and living things. They talk about the features of their own environment and how environments might be different. They make observations of animals and plants.

Key Stage 1

The principal focus of science teaching in key stage 1 is to enable pupils to experience and observe phenomena, looking more closely at the natural and humanly constructed world around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information. They should begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways. Most of the learning about science should be done through the use of first-hand practical experiences, but there should also be some use of appropriate secondary sources, such as books, photographs and videos.

'Working scientifically' must always be taught through the Programme of Study and clearly related to the teaching of substantive science content Pupils should read and spell scientific vocabulary at a level consistent with their increasing word-reading and spelling knowledge at key stage 1.

Lower Key Stage 2 – years 3 and 4

The principal focus of science teaching in lower key stage 2 is to enable pupils to broaden their scientific view of the world around them. They should do this through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying

out simple comparative and fair tests and finding things out using secondary sources of information. They should draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out.

‘Working scientifically’ must always be taught through the Programme of Study and clearly related to substantive science content. Pupils should read and spell scientific vocabulary correctly and with confidence, using their growing word-reading and spelling knowledge.

Upper Key Stage 2 – years 5 and 6

The principal focus of science teaching in upper key stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. At upper key stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings.

‘Working and thinking scientifically’ must always be taught through the Programme of Study and clearly related to substantive science content. Pupils should read, spell and pronounce scientific vocabulary correctly.

NURSERY

In Nursery, children will complete the following as part of their 'Understanding of the World':

Ourselves and our Family

Children will explore family members, comparing similarities and differences between family members.

Seasonal Changes

Children will become familiar with the four seasons. They will learn about growth, decay and changes that happen over the year.

Plants

Children will grow their own plant, showing care and concern for it and observing changes over time.

The environment

Children will ask questions and comment on their local environment, discussing plants, animals and natural and found objects.

Materials

Children will start to learn about recycling materials and using materials to make products.

Sound

Children will explore and use different instruments, investigating how sound can be changed.

RECEPTION

In Reception, children will complete the following as part of their 'Understanding of the World':

Ourselves and our Family

Children will explore similarities and differences between families, cultures and traditions.

The environment

Children will be able to talk about their environment, including features. They will also discuss how environments differ. In addition, children will recognise different ways in which the environment is affected by human activity.

Seasonal Changes

Children will discuss changes between seasons, including observing trees for signs of change. They will begin to recognise seasonal patterns.

Healthy Lifestyle

Children will understand and learn about the need to eat a variety of food and how this, physical exercise, having the right amount of sleep and good hygiene contribute to good health.

Floating and Sinking

Children will learn what is meant by the terms 'floating' and 'sinking'. They will investigate objects and materials, commenting on what they observe.

Materials

Children will recognise the basic properties of materials in relation to houses and other buildings. They will learn the properties of materials and begin to suggest some of the purposes of the materials.

Sound

Children will learn the names of a variety of musical instruments and they will explore the different sounds the instruments make.

YEAR 1

Knowledge and Content

Plants

The children will learn to identify a variety of common garden and wild plants. They will find out the difference between deciduous and evergreen trees. They will identify the main parts of plants and trees. Pupils will explore the difference between things which are living and dead and things which have never been alive.

Animals, including humans

Children will learn the main external body parts of humans and the senses of sight, hearing, smell, touch and taste. They will identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. They will learn the main body parts of these animals. Children will be taught the difference between carnivores, herbivores and omnivores and will name animals in each category.

Everyday Materials

The children will learn to tell the difference between an object and the material it is made from. They recognise and name some common materials and will learn about their properties. They will group materials based on their properties.

Seasonal Changes

The children will take part in activities to observe how the seasons change. They will observe and describe the types of weather associated with each season. They will learn about how the length of the day changes according to the season.

Working Scientifically

In the range of contexts described above, the children will learn how to ask questions and start to decide how they might find answers to them. They will use first hand experience to answer questions. They will collect and record simple data and use simple equipment. They will describe their findings using scientific language.

YEAR 2

Knowledge and Content

Living Things and their Habitats

Children will differentiate between things which are living, dead and those that were never alive. They will learn that most living things live in habitats most suited to their needs. They will interpret a simple food chain and identify and name different sources of food.

Animals, including humans

Children will match offspring to adults and they will explore the basic needs of all animals for survival. They will learn to describe the importance for humans of exercise, eating the right amounts of different types of food and hygiene.

Everyday Materials

Children will widen their knowledge of materials, naming common materials and identifying that some of them are found naturally. They will use their knowledge of simple properties to group materials. Children will develop their understanding of the uses of materials and how they are chosen on the basis of their simple properties. They will explore how the shape of some materials can be changed.

Plants

Children will observe and describe how seeds and bulbs grow into plants. Children will investigate growing plants, exploring the conditions plants need to grow and stay healthy, namely: suitable temperature, water and light. Children will also explore the impact when one or more of these conditions is changed.

Working Scientifically

Through studying the content listed, the children will learn that they need to collect evidence through making observations and measurements when they are trying to answer a question. They will ask questions and decide how to find answers and begin to consider whether a test is fair. They will follow instructions to ensure their own and others' safety. They will record simple observations and measurements and communicate these in different ways. They will make simple comparisons and identify patterns in evidence collected. The children will compare what happened in an

investigation with what they thought would happen and will be able to explain to others what they did.

YEAR 3

Knowledge and Content

Living things and their Habitats

The children will learn the parts of a flowering plant and their functions. They will find out what a plant needs to live and grow and how this varies from plant to plant. They will learn how water is transported in plants. The children will learn about the importance of flowers in the life cycle of plants, including pollination, seed formation and seed dispersal.

Animals including humans

They learn that humans and other animals cannot make their own food; they get nutrition from the food they eat. The children will learn the importance of an adequate and varied diet for keeping them healthy. They will learn that some animals, including humans, have skeletons and muscles and that these provide support, protection and movement.

Rocks and Soils

They learn to describe and group rocks and soils on the basis of their characteristics including appearance, texture and permeability. They will learn the materials soils are made from. The children will learn, in simple terms, how fossils are formed.

Forces

The children learn about the forces of attraction and repulsion between magnets and about the forces of attraction between magnets and magnetic materials. They will compare and group materials based on whether they are attracted to a magnet. They will learn that magnets have two poles. The children will make observations into how different objects move on different surfaces.

Light

Children will learn that they need light in order to see things. They find out how light travels from a source, that it cannot travel through some materials, and about the formation of shadows. Children learn that light is reflected from some surfaces. Children will look for patterns in the way shadows change.

Working Scientifically

Through the above content, the children will develop their investigative skills. They will learn that it is important to test ideas using evidence from observations and measurements. They will begin to

ask questions which can be answered scientifically. They will think about what might happen in an investigation, and make an investigation a fair test. They will use simple equipment appropriately and safely. They will make careful observations and measurements. They will use a wide variety of methods including diagrams, drawing tables and bar charts to communicate their findings. They will draw conclusions from the information they have collected and use this to make further predictions. They will suggest improvements to their investigations.

YEAR 4

Knowledge and Content

Living things and their habitats

Pupils will recognise that living things can be grouped in a variety of ways and they will use classification keys to help group, identify and name a variety of living things in their local and wider environment. They will also recognise that environments can change and that this can sometimes pose dangers to living things.

Animals, including humans

Pupils will learn the simple functions of the basic parts of the digestive system in humans. In addition, they will identify the different types of teeth in humans and their simple functions. Pupils will construct and interpret a range of food chains identifying prey, predator and producers.

States of Matter

In this unit, pupils will learn to compare and group materials together, according to whether they are solids, liquids or gases. They will identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature and 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.

Sound

Pupils will explore how sound is made associating some with something vibrating. They will recognise that vibrations from sounds travel through a medium to the ear and that sounds will get fainter as the distance increases. Children will find patterns between the pitch of a sound and features of the object that produced it and between the volume of a sound and the strength of the vibrations that produced it.

Electricity

Pupils will identify common appliances which run on electricity and construct a simple electrical circuit including various components. They will recognise some common conductors and insulators, and associate metals with being good conductors. They will be able to explain 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.

Working Scientifically

Pupils will ask relevant questions and plan different types of scientific experiments to answer questions. When conducting experiments, they will make systematic and careful observations using a range of equipment, including thermometers and data loggers and take accurate measurements using standard units where appropriate. Pupils will record findings using simple scientific language, drawings and labelled diagrams as well as keys, bar charts and tables. The data gathered, will enable pupils to answer a range of questions. They will use oral and written methods as well as presentations to communicate their findings to others. When making conclusions, pupils will use straightforward scientific evidence to answer questions or to support their findings and use their results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.

YEAR 5

Knowledge and Content

Animals including Humans

The children will learn about the changes humans undergo as they develop to old age. They will describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. Pupils will describe the life process of reproduction in some plants and animals.

Properties and Changes of Materials

The children will compare and group everyday materials according to different properties. The children learn that some materials are better electrical conductors than others. Pupils will give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. They will begin to learn the differences between solids, liquids and gases in terms of how they flow and whether they maintain their shape and volume. They learn how to separate solid particles of different sizes and how to separate insoluble materials from water. They will learn that some materials dissolve in water and how the solid can be recovered from the solution. They will learn to identify reversible changes.

Earth and Space

They learn that the Sun, Earth and Moon are roughly spherical in shape and how the position of the Sun appears to change during the day and how this affects shadows. They will learn how day and night are caused. Children learn about the orbits of the Earth and moon.

Forces

The children will learn that gravity is a force which pulls objects towards the Earth. They will find out about the effects that air resistance, water resistance and friction have on movement. They will investigate how levers, pulleys and gears can be used to make a smaller force have more impact.

Working Scientifically

Through the above topics, the children will develop scientific investigation skills. They will learn that it is important to test ideas by using evidence from observations and measurements. They will further develop skills in asking questions which can be investigated scientifically and decide how to find answers to these questions. They will begin to decide the sources of information (first hand experience or other sources) they will use to answer their questions. They will think about what might happen in an investigation and will decide what equipment to use. They will make investigations a fair test. The children will use equipment safely and will make careful observations and measurements which they will record in a variety of ways, including through ICT. They will start to make comparisons and identify patterns in their own observations and measurements and will begin to draw conclusions from this. They will decide whether the results agree with the predictions made. They will repeat measurements where needed and comment on the reliability of the data they have collected. The children will use their scientific knowledge and understanding to explain observations or measurements.

YEAR 6

Knowledge and Content

Living Things and their Habitats

Pupils will 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. They will give reasons for classifying plants and animals based on specific characteristics.

Evolution and Inheritance

Children will recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. Pupils will identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.

Animals including humans

Children will identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. They will recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. In addition they will learn to describe the ways in which nutrients and water are transported within animals, including humans.

Light

Pupils will learn that light travels in straight lines. They will use this knowledge to explain that objects are seen because they give out or reflect light into the eye as well as to explain why shadows have the same shape as the objects that cast them.

Electricity

The children will construct circuits and investigate how changing the number of components can make bulbs brighter or dimmer. They represent circuits using drawings and conventional symbols, and make circuits based on given drawings and diagrams using these conventional symbols.

Working Scientifically

Through the above topics, the children will develop scientific investigation skills. They will learn that it is important to test ideas by using evidence from observations and measurements. They will consolidate skills in asking questions which can be investigated scientifically and decide how to find answers to these questions. They will decide the sources of information (first hand experience or other sources) they will use to answer their questions. They will think about what might happen in an investigation and will decide what equipment to use and the suitable evidence to collect. They will make investigations a fair test by changing one factor and measuring or observing the effect while keeping other factors the same. The children will use equipment safely and will make careful observations and measurements which they will record in a variety of ways, including through ICT. They will make comparisons and identify simple patterns or associations in their own observations and measurements and will draw conclusions from this. They will decide whether the results agree with the predictions made and whether further predictions are possible. The children will use their scientific knowledge and understanding to explain observations or measurements. They will review their work and the work of others and describe its significance and limitations.

Meeting the needs of pupils with SEN

The Science curriculum is differentiated to meet the needs of all pupils. When planning for differentiation the following is considered:

- Curriculum content and resources including visual resources.
- Use of ICT to reduce barriers to learning where possible
- Resources to support pupils with sensory issues eg ear defenders, enlarged print, appropriate seating arrangements, areas of low distraction
- Additional adult support is used to ensure pupils are able to participate in all aspects of the lesson including discussions, group work, role play, experiments and recording. Pupils are supported in expressing their views as well as their feelings and emotions.