

Science Curriculum at Roundwood Primary School

Where we are going

You need to:

- Have an interest in and enthusiasm for science (**curiosity**)
- Possess knowledge of biology, chemistry and physics and an understanding of the uses and implications of science, today and for the future. (**curiosity and respect**)
- Display confidence and competence in practical and investigative skills (**resilience and curiosity**)
- Make detailed observations, draw conclusions and justify explanations (**resilience and courage**)

Who we are

We have a number of nearby museums that children can visit including natural history museums in Oxford and Tring, National Space Centre in Leicester, Think Tank Museum in Birmingham and History of Science Museum in Oxford. A number of children will have also visited the National History and Science Museums in London as well as attending relevant exhibitions.

Throughout history, Oxford has made a significant contribution to science from the medieval period onwards and through the university and industry continues to be at the forefront of scientific discoveries.

Both schools are located within the countryside, so the children have access to a diversity of plant and animal life for the children to explore and investigate. Within the school grounds we have a large school field, a wooded area and mini allotment.

There is also an extensive variety of zoos and wildlife parks within close proximity to Buckingham and most children will have visited many of these.

RPS children attend science fairs in both Year 2 and Year 5 which is organised by the local grammar school giving them a practical and hands on experience.

Buckingham is an expanding town and as a result, the children are exposed to a changing environment and the impact that has on living things.

Vocabulary

Plants - Deciduous, Evergreen trees, Leaves, Flowers (blossom), Petals, Fruit, Roots, Bulb, Seed, Trunk, Branches, Stem, Seeds, Bulbs, Water, Light, Temperature, Growth, Air, Light, Water, Nutrients, Soil, Reproduction, Transportation, Dispersal, Pollination, Flower

Animals including Humans - Fish, Reptiles, Mammals, Birds, Amphibians (+ examples of each)

Herbivore, Omnivore, Carnivore, Leg, Arm, Elbow, Head, Ear, Nose, Back, Wings, Beak

Fish, Reptiles, Mammals, Birds, Amphibians (+ examples of each)

Herbivore, Omnivore, Carnivore, Leg, Arm, Elbow, Head, Ear, Nose, Back, Wings, Beak

Survival, Water, Air, Food, Adult, Baby, Offspring, Kitten, Calf, Puppy, Exercise, Hygiene, Movement, Muscles, Bones, Skull, Nutrition, Skeletons, Mouth, Tongue, Teeth, Oesophagus, Stomach, Small Intestine, Large Intestine, Herbivore, Carnivore, Canine, Incisor, Molar, Foetus, Embryo, Womb, Gestation, Baby, Toddler, Teenager, Elderly, Growth, Development, Puberty

Circulatory, Heart, Blood Vessels, Veins, Arteries, Oxygenated, Deoxygenated, Valve, Exercise, Respiration

Materials - Wood, Plastic, Glass, Paper, Water, Metal, Rock, Hard, Soft, Bendy, Rough, Smooth

Hard, Soft, Stretchy, Stiff, Shiny, Dull, Rough, Smooth, Bendy, Waterproof, Absorbent, Opaque, Transparent, Brick, Paper, Fabrics, Squashing, Bending, Twisting, Stretching Elastic, Foil, Fossils, Soils, Sandstone, Granite, Marble, Pumice, Crystals, Absorbent, Solid, Liquid, Gas, Evaporation, Condensation, Particles, Temperature, Freezing, Heating, Hardness, Solubility, Transparency, Conductivity, Magnetic, Filter, Evaporation, Dissolving, Mixing

Living Things and their Habitats - Living, Dead, Habitat, Energy, Food chain, Predator, Prey, Woodland, Pond, Desert, Vertebrates, Fish, Amphibians, Reptiles, Birds, Mammals, Invertebrates, Snails, Slugs, Worms, Spiders, Insects, Environment, Habitats, Mammal, Reproduction, Insect, Amphibian, Bird, Offspring, Classification, Vertebrates, Invertebrates, Micro-organisms, Amphibians, Reptiles, Mammals, Insects, Fossils, Adaptation, Evolution, Characteristics, Reproduction, Genetics

Earth and Space - Earth, Sun, Moon, Axis, Rotation, Day, Night, Phases of the Moon, star, constellation

Light - Light, Shadows, Mirror, Reflective, Dark, Reflection, Refraction, Reflection, Light, Spectrum, Rainbow, Colour

Sound - Volume, Vibration, Wave, Pitch, Tone, Speaker

Forces - Magnetic, Force, Contact, Attract, Repel, Friction, Poles, Push, Pull, Air resistance, Water resistance, Friction, Gravity, Newton, Gears, Pulleys

Electricity - Cells, Wires, Bulbs, Switches, Buzzers, Battery, Circuit, Series, Conductors, Insulators, Amps, Volts, Cell, parallel, series, resistance, component, input/output, ammeter, voltmeter, current

RPS Science Journey

Early Years

Children are naturally inquisitive and as we all know, full of questions! We support our children to connect and think critically, we help them to foster a love and fascination of their outside world, which will last them a lifetime. Children firstly learn about the things that are important to them and relevant in their lives. Their immediate family, community and cultural background. Once they have a secure base in this they can go on to develop knowledge and experience of the wider community and living and non- living things. Children at the expected level of development will: - Explore the natural world around them, making observations and drawing pictures of animals and plants; - Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class; - Understand the effect of the changing seasons on the natural world around them.

In Early Years we learn to understand the world by going outdoors. Outdoor learning encompasses all that children do, see, hear or feel in their outdoor space. This includes the experiences that practitioners create and plan for, the spontaneous activities that children initiate, and the naturally occurring opportunities linked to the seasons, weather and nature. Nature has the ability to calm and soothe our children, to help them to play together successfully, to engage with their activities on a deeper level and offers them a sense of wonderment and joy that manmade resources just can't match. It's about playing exploring, noticing and understanding nature in a tactile way from a child's perspective.

In Year 1

Working Scientifically

Children begin their journey as a practicing Scientist in Key Stage 1. We start the foundation of how to work scientifically through teaching our children how to ask questions, knowing they can be answered in different ways. We encourage them to look closely and use equipment to do this. They begin to start testing and learn the initial elements of a fair test. As well as this, they look at naming, grouping and observing in order to collect and record data. We teach the children that these skills help us to answer scientific questions.

Animals including Humans

In Year 1, children will be taught to understand that animals can be identified and classified in a variety of different ways. They will be taught categories such as mammals, reptiles and amphibians, learning how a crow, for example, scientifically differs from a dolphin. After being able to spot and name an assortment of common animals, students will go on to learn the terms carnivore, herbivore and omnivore. Here, through classifying and labelling activities, children will come to understand the common traits which attribute each animal to one of these categories. Then, with this new knowledge, children can begin to compare different species to each other, noting both similarities and differences in appearance, behaviour and life cycles. Moving into the units work on humans, the Year 1 focus is on different parts of the body and what they are for. Children will learn to name, draw and label the basic parts of a human, understanding how the many different functions work in unison to keep a person healthy. Children will then go on to attribute different parts of the body to each of the five senses, understanding how different yet important the eyes job is in comparison to, for example, the tongue. Children will be invited to explore tasting and listening activities, making this learning a hands-on and fun experience for the class.

Materials

Children's introduction to this vast topic begins with being able to name a variety of everyday materials. Students will use terms such as wood, plastic, glass, metal, water, and rock, and be able to physically hold and manipulate examples of each type. Then, children will be invited to describe each of these everyday materials, being encouraged to explore the different vocabulary which comes out through group discussion. The children's learning will then be moved onto the idea of grouping these different materials. What is similar when comparing glass to metal? What is different? How would the children divide up the physical examples before them into their groups? How do their groupings differ to their classmates, and why? Could they improve their groupings once new, trickier to classify materials are introduced into the lesson? Eventually, using the words they have shared and new vocabulary that have been taught, children will come to a class agreement on how to best group their many examples, clearing up any misconceptions along the way. A

final learning point for the unit is the ability to tell the difference between an object and the material from which it is made. Through further physical explorations with examples of each, children will be taught to separate objects such as chairs from wood, cars from metal, and books from paper.

Plants

In this unit, the focus is on learning new vocabulary and applying it correctly to a variety of plant life. Children will be taught the correct names for many common wild and garden plants, then go on to find examples of each type in the surrounding outdoor area. Building on this, students will be taught the terms deciduous and evergreen, using sorting and categorising activities to correctly group examples of each. Children will then learn to name and describe the basic structure of a variety of flowering plants, including trees commonly found in their part of the world. Students will be taught words such as petal, root and stem, and be able to correctly identify them both on diagrams and on actual examples collected from the surrounding area.

Seasonal Changes

Seasonal Changes builds on from the work children completed during their time in Early Years when exploring the natural world around them. This topic focuses on the differences between each of the four seasons, and how this might typically affect their daily lives. By the end of the unit, children will understand when each season occurs, how this changes the climate, effects plant and animal life, and how the days get both longer and shorter. The concepts taught in the classroom will be applied to the children's real lives around them, as students will be invited to bring in and wear appropriate examples of their clothing for each of the four very different times of the year.

In Year 2

Working Scientifically

In Year 2, children continue to develop their skills as practicing Scientists. They progress their skills of how to work scientifically through understanding how questions influence tests, knowing they can be answered in different ways. We develop their skills in looking closely and using different types of equipment. They continue applying their skills in testing and demonstrate the elements of a fair test. In different topics, they look at naming, grouping and observing in order to collect and record data.

Animals including Humans

Building on from the Animals including Humans unit in Year 1, here children will begin to learn more about their own bodies and, more specifically, how to look after them. Students will learn the basic needs of all animals and humans, understanding what is required for survival and the dangers of not looking after one's self. Through the Learning Question 'Why does our diet need to be balanced?', children will be taught the importance of exercise, eating healthily and also keeping clean. Students will come to understand the basic life cycles of living creatures, and, through the Learning Question 'Why do all animals have babies?', be taught that animals and humans have offspring which eventually grow into adults.

Living Things and their Habitats

Progressing from the Animals including Humans topic, children will go on to learn the differences between things that are living, things that are dead, and things that have never been alive. Through the Learning Question 'How can I tell if this is alive or dead?', student will understand and classify which things belong to each category and why. Building on this, children will then look into the relationship between a living thing and its habitat. Through the Learning Question 'What is my local habitat like?', children will come to understand that most living things live in habitats which suit them and have a synonymous relationship in which the environment and the living creatures depend on each other for survival. Then, through the Learning Question 'Where do we fit into the food chain?', children will be taught about simple food chains, displaying how animals get their food from plants and other animals through labelled diagrams and practical exploration of their local environment.

Materials

Building on from the Year 1 unit on identifying different everyday materials, Year 2's topic focuses on the question: 'Why would I choose a particular material for a particular job?' Children will be given the chance to experiment with a wide variety of materials, classifying their different properties, and then testing them out in an array of practical scenarios. Using simple terms like hard, bendy, waterproof and stretchy, children will show for themselves why, for example, screwdrivers are made out of metal whilst tires are made out of rubber. With this secure understanding, students will then be introduced to the idea that objects made from

some materials can be changed. Using the simple introduction of ice changing into water, children will then be assisted in the exploration of melting wax. Here, they will be invited to reshape the heated wax, and then witness over time how the material will harden again in its new form. Building on from this experiment, children will be invited to work in groups to try to collect other examples of where they have seen materials changing into other forms in the world around them.

Plant

In this topic, children will be taught how seeds and bulbs eventually grow into plants. Through the Learning Question 'What are the best conditions to grow a plant in?', students will have the opportunity to plant and grow their own bulbs, taking careful observations of the changing results. Building on this, children will approach the Learning Question 'What happens if a plant do not get all the things they need?' Here, students will look into the different factors needed to grow healthy plants, and how to sustain them over long periods of time. Children will have the opportunity to experiment with different variables in the growing of their own plants, including changing the amounts of water, light and temperature. Using the Learning Question 'Do plants and trees all have the same parts?', children will take their new understanding of exactly what plants need to survive, and further their knowledge by exploring how the different components of the plant all work together to allow this to happen.

In Year 3

Working Scientifically

Moving into Year 3, children begin to extend their skills in simple, practical enquiries. They concentrate on setting-up comparative and fair tests. Using observations, they take measurements using standard units and a range of equipment (including thermometers and data-loggers). Becoming more accurate scientists, our children gather, record, classify and present data in a variety of ways to help in answering questions. Once our children have carried out experiments, they now have the knowledge to record their findings using scientific language, drawings, labelled diagrams, keys, bar charts and tables. Extending on their knowledge from Key Stage 1, Year 3 can report on findings from enquiries using both spoken and written explanations. As well as this, they are beginning to draw simple conclusions and make predictions for new values, suggesting improvements and raising further questions. They can add to this by forming simple hypotheses which relate scientific ideas and evidence.

Animals including Humans

During this topic, children will explore the concepts of nutrition and a healthy diet through the learning question 'What happens if animals do not get the right amount of nutrition?' They will identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food. Children will consolidate that they get nutrition from what they eat, and will even be lucky enough to sample some food in their lessons – some tasty, some healthy, and some *not so much!* Through the learning questions 'How do bones and muscles work together to create movement?' and 'How does the length of your femur affect how far you can jump?', children will learn all about skeletons and muscles. They will look into why humans are made like this, comparing their bodies to animals without skeletons, and then will have fun trying out their predictions of the best jumpers in their class! Will it be the student with the longest legs?

Forces and Magnets

In the study of Forces, children will compare how things move differently on different surfaces. Through the learning questions 'How do forces act on different objects?' and 'Which surface creates the most friction for a toy car?', students will explore friction and its constant effect on the busy world around us. Moving on to magnets, children will see that although forces like friction require contact between two objects, magnetic forces actually act at a distance. Through practical tests, children will compare and group materials on the basis of whether they are attracted to a magnet, and identify a variety of magnetic materials. With their new knowledge on the behaviour of magnetic poles, children will approach the learning question 'Which magnet is the strongest?' Here, children will have the opportunity to experiment with the fun and eye-catching tricks that can be performed by manipulating magnets and metals.

Light

In this unit, children will be introduced to the core concept that darkness is the absence of light. Students will learn that light is needed in order to see anything, and have the opportunity to experiment with torches on different reflective surfaces. They will conduct an investigation into the learning question 'Can I see without light?', with children trying their best to create absolute darkness inside their own classroom! Moving

on from this, students will have the opportunity to experiment with shadows, understanding that they are created when a light source is blocked by a solid object. Children will address the learning question 'How do shadows change size?', being given the chance to manipulate the size and shape of shadows through different variables. Finally, the class will learn the terms translucent, transparent and opaque, experimenting with how each type of material affects the subsequent shadows it creates.

Plants

Building on from the children's previous work, this Year 3 unit delves into more detail regarding the different parts of a flower. Using the learning question, 'How do flowering plants reproduce?', children will explore pollination, seed formation and seed dispersal. Here, students will learn to understand and appreciate the complicated role that the environment and other wildlife plays in the continuing life cycle of plants and flowers. With children's new knowledge of how each part of the plant works in unison to keep their species alive, student will then have fun with the learning question: 'How can I prove that water is transported all around a plant?' Through discussion and experimentation, children will plan and carry-out a practical enquiry in which food colouring is added to the water of various flowers. Using their skills of recording results and drawing conclusions, the children will watch as the dye is drawn up through the stem until the colour of the flowers slowly transform before their eyes!

Rocks

During this unit, children will use the Learning Question 'How can I group these different types of rocks?' as a starting point to group various types of rocks on the basis of their appearance and simple physical properties. Then, tying in with the Year 3 History topic on The Stone Age, students will look into the formation of fossils through the Learning Question 'How are fossils formed?' Here, through the inspection of various real-life examples, children will come to understand how living creatures throughout history are trapped in rock and can still be discovered and studied to this day. Children will then be able to put their new knowledge of different types of rocks into practice by addressing the Learning Question 'How much water will pass through different types of soil?' Here, children will learn that different soils are made from rocks and organic matter, having the opportunity to collect water through a variety of examples. Through practical enquiry, children will find out which types of soil are effective and which, like sand, are not.

In Year 4

Working Scientifically

By Year 4, our children can now ask relevant questions and use different types of scientific enquires to answer them. They are now confident in setting-up simple practical enquires they can make systematic and careful observations and take accurate measurements using standard units and a wider range of equipment. They are beginning to independently gather, record, classify and present data in variety of ways. Year 4 continue to report their findings in the form of presentations and displays. They can now use their results to raise further scientific questions, identifying differences, similarities or changes related to scientific ideas. They are now beginning to support their findings using scientific evidence.

Animals including Humans

During the Animals including Humans topic, students will focus on two main areas of the human body: teeth and the digestive system. Using a variety of sources, children will look into the different types of teeth in the human mouth, exploring the function each kind performs in the daily act of eating and digesting. Children will then follow the journey of food from the mouth, all the way down into the human stomach, and back out again at the other end! Armed with this new understanding of how food is consumed and metabolised, children will then explore the relationship between different types of predators, producers and prey in the animal kingdom. Children will look into a variety of food chains, understanding which attributes assign each animal their place in the different groups.

Electricity

In Year 4, children will have lots of opportunities to experiment with different components of electrical circuitry. Using batteries, bulbs, switches and buzzers, children will learn how to use simple series circuits to achieve a variety of outcomes, including what happens when the circuit is not correctly assembled. Students will then go on to correctly draw and label these circuits using universal symbols for each piece of the equipment they have used. Using their skills of predicting and group discussions, children will make educated guesses about the lighting of bulbs in various situations, then go on to test their hypothesis and accurately record the results. Using all of this new knowledge, students will construct circuits which test the

conducting or insulating properties of various materials, going on to apply their findings to the real world around them.

Living Things and their Habitats

Building on Year 4's Animal including Humans unit, children will then go on to learn different classification keys to help them group, identify and name a variety of living things. Children will understand and demonstrate that life on Earth can be grouped together in a variety of different ways, including vertebrates or non-vertebrates, seed-producing or non-seed producing plants, or, determined by which habitat they populate. Students will then go on to learn how these habitats can change over time, discussing the many factors which can lead to these massive shifts in climate and terrain. Building on this awareness, children will then look into how these changes in environments can have detrimental effects on the many living things which live there, even causing certain species to eventually become extinct.

Sound

During this unit, children will learn all about the relationship between sound and vibration. Building on students understanding of atoms, the children will conduct different experiments which demonstrate how the source of a sound vibrates the particles in the air all the way to a human's ear drum. Using Decibel Meters, children will explore how to create different volumes of sound. They will then go on to explore how this decreases over set distances, recording their findings as a measurement of decibels. Progressing on their work on the human body, children will also conduct a study into the ear drum. Children will use their technical drawing skills to accurately label and understand this particularly delicate and complex piece of human anatomy, then linking this new knowledge to their interaction with the world around them.

States of Matter

Here, children will gain a basic understanding of how everything in the known universe is made up of matter. Students will explore the structure of atoms making up solids, liquids and gases, and how most states of matter will fall under these three main categories. Advancing this, children will then go on to discuss trickier examples, like gels, foams, mists and pastes. In their enquires, students will explore the weight of different fizzy drinks and how this can be changed, as well as which temperatures will melt solid lumps of chocolate. Building on Key Stage 2's ever growing Scientific vocabulary, children will use terms like evaporation, condensation and precipitation in their study of the water cycle. They will go on to produce labelled technical drawings, then use this new understanding to conduct studies on temperature, using thermometers to measure degrees Celsius.

In Year 5

Working Scientifically

As the children enter upper Key Stage 2, their skills as scientists move into more advanced areas of Working Scientifically. The children can now plan a variety of different types of Scientific enquiry, and moreover, they can now recognise controlling variables where necessary. When taking measurements, they can now do this with increasing accuracy and precision, taking repeat readings when appropriate. By now, pupils can record data and results of increasing complexity. Children do this by using a range of scientific diagrams, including scatter graphs, line graphs and classification keys. The children use their results to make predictions in order to set-up further tests. When discussing their findings, they now include causal relationships and explanations of how reliable their information is. Finally, pupils are now able to independently identify Scientific evidence that has been used to support or refute ideas.

Materials

Building on the children's work on solids, liquids and gases in Year 4, this Year 5 unit explores the properties and changing states of different materials in greater depth. Students will compare and group together everyday materials based on their properties, conducting tests with such categories as solubility, transparency and conductivity. Children will then be able to give evidence on how each of these everyday materials, such as metals, wood and plastic, is therefore best suited for its particular use. Throughout the topic, students will learn the difference between reversible and irreversible changes, having the opportunity to experiment on mixtures with different separating techniques, such as filtering, sieving and evaporation. Children will be invited to dissolve solids in carefully planned fair tests, going on to create solutions, and then hypothesising about how to separate these materials back into their original form. Finally, the children will learn that some changes result in the formation of new materials, and that this kind of change is not usually reversible. Here, children will safely witness burning and the action of acid on bicarbonate of soda.

Earth and Space

In this unit, children will be taught about Earth's place in our Solar System. Through a variety of sources, students will look into the complicated relationship between the Sun, the Earth and the Moon, and then compare their movements through space to the other planets which share our portion of the universe. Children will then go on to understand how these great movements in space affect conditions back on our planet. They will learn how the rotation of the Earth control the cycles of night of day, and how this relates to behaviour of the Sun seemingly moving across the sky. During this exciting topic, Children will be lucky enough to have a day visit to the National Space Centre. Here they will be able to see all of their studies in action, being treated to live demonstrations from experts, as well as having the opportunity to have hands-on experience with the fascinating equipment of space travel.

Forces and Magnets

During the study of Forces and Magnets, students will further their general understanding of gravity. Children will have the opportunity to create parachutes for lego figures, experimenting and decided not only which material creates the most air resistance, but also why? Moving on from this, children will then investigate the forces of friction and water resistance. Students will have the opportunity to build and race small boats in a tank of water, experimenting with which materials and shapes travel through the water quicker. In their study of friction, children will look into the simple brake mechanisms of push bikes. Here, they will coat a playing card in different material and hold it against a spinning wheel, conducting a study into which material creates the most friction and why. Finally, children will have the chance to experiment with levers, pulleys and gears. Through hands-on investigations, students will realise that with the right mechanism, a smaller force can have a greater effect.

Living Things and their Habitats

Here, the children will take all of their previous knowledge on Living Things and their Habitats, and move it into more advanced studies of the reproduction process of some plants and animals. From seed dispersal to frog spawn, students will have the opportunity to witness and record the processes which keep the many, many diverse species of life on planet Earth alive and prospering. During their study of life cycles, children will build on their ability to classify living things in different ways, including which characteristics make a creature a mammal, an amphibian, an insect or a bird. Then, children will compare the life cycles of each group respectively, celebrating the vast and complicated beauty of how so many different types of life can all coexist harmoniously across the many different habitats of our planet.

Animals including Humans

In this short unit, children will describe the changes as humans develop into old age. The students will have the opportunity to compare different stages in a human's life, noting the key differences through milestone moments such as being a baby, moving through puberty as a teenager, and finally slowing down in active movement as the bones and joints grow tired in later life. This unit will tie-in with the Year 5 PSHCE topic during the same term, as the students look into the changes happening in their own bodies.

In Year 6

Working Scientifically

As the children finalise their time as Scientists at Roundwood Primary School, they are now competent in planning all types of Scientific enquiry. Their measurements are accurate, and children understand the need to take repeat readings when appropriate. They continue to use and record complex data, using a range of methods. From this, they can report and findings, including causal relationships, both in oral and written forms. Alongside this, children are able to use scientific evidence to support their findings. By now, children can evaluate their own and other people's scientific ideas, using a range of evidence from a variety of sources. In order to be Secondary ready, the children are able to use scientific language and ideas to explain, evaluate and communicate their methods and findings.

Animals including Humans

During this topic, children will learn to understand the functions of the heart and blood inside their own bodies. The class will conduct a series of experiments which chart their own changing heart rates, recording how this effects their breathing and ability to perform physical activities. Children will make predictions about their circulatory system by addressing such learning questions as: "If I stand on my head, will all the blood rush to my brain?" Pupils will then go on to test their hypothesis, recording each other's heart rate and

temperate, eventually proving that circulation is still happening throughout their bodies despite being upside-down!

Electricity

During this unit, pupils will experiment safely with currents and voltage in a variety of tests which mimic the extensive use of electricity in the world around us. Pupils will investigate differences between parallel and series circuits, addressing the learning question: "Why doesn't one switch turn off all the lights in the house?" Children will then be able to test out their predictions by building their own versions of each circuit, replicating the wiring in their own homes. By the end of this unit, the children will pull together all of their learning by building their own model burglary system. This will utilise all of the equipment they have experimented with throughout the term, including batteries, switches, lights and buzzers.

Light

Throughout this unit, Year 6 will discover how to record and manipulate light in a variety of different ways. Across a series of practical experiments, the children will explore if light will travel forever, how it behaves through prisms and mirrors, and how it can be bent and changed with various apparatus. In the study of refraction and reflection, pupils will address the learning question: "How can I alter the direction of light?" Here, children will enjoy manipulating light through various viscous materials, including water, saline solution, and even jelly. The results the children discover will show them how light is used and controlled in the real world around them.

Evolution and Inheritance

The study of Evolution will take Year 6 into exciting areas of Science, questioning the very nature of what it is to be a living creature in the modern world. Children will explore ideas of the future of both animals and mankind, supposing and predicting further evolutions of different living species. Through the study of fossils, pupils will address the learning question: "Is there evidence of evolution from fossils?" Using this new knowledge, children will then debate the future of evolution on our planet. Looking across the history of such studies throughout time, pupils will explore of the work of the great theorists of evolution, focusing of the extensive works of the late Charles Darwin. By the end of the topic, children will have a much more in depth understanding of not only why their body is the way it is, but also the whole of the living world around them.

Living Things and their Habitats

Building on pupils' knowledge from Year 4, this topic will have children explore how we make sense of the world and organise the very complex system that is the animal and plant kingdom. Children will look into the universal classification system, learning how the same Latin terminology is used throughout the world. In groups, children will approach the learning question: "Is there a perfect living thing to fit each habitat?" Based on their findings, pupils will go on to design the perfect plants and animals for each environment on planet Earth. Alongside this exploration of 'perfect' designs, children will also study the nature of extinction, asking themselves: "Why do living things become extinct?" With this new knowledge, children will have a better appreciation of our role as human beings in this fragile ecosystem.

Links with other subjects

Geography – local area studies; deforestation; earthquakes and volcanoes.

Mathematics – units of measurement; results tables; interpreting data.

History – Stone Age fossils; Roman sun dials; space exploration.

Music – seasons; electronic music; human body.

Art – observational drawings; collages made from natural materials; textiles.

As a scientist leaving RPS

I will be able to:

Work scientifically

- describe and evaluate their own and others' scientific ideas using evidence from a range of sources
- ask their own questions about the scientific phenomena that they are studying, and select the most appropriate ways to answer these questions, recognising and controlling variables where necessary
- use a range of investigations, i.e. observing changes over time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests, and finding things out using a wide range of secondary sources
- use a range of scientific equipment to take accurate and precise measurements or readings, with repeat readings where appropriate

- record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- draw conclusions, explain and evaluate their methods and findings, communicating these in a variety of ways
- raise further questions that could be investigated, based on their data and observations

Science subject knowledge

Animals, including humans

- name and describe the functions of the main parts of the digestive, musculoskeletal and circulatory systems
- describe and compare different reproductive processes and life cycles in animals
- describe the effects of diet, exercise, drugs and lifestyle on how the body functions

Plants

- name, locate and describe the functions of the main parts of plants, including those involved in reproduction and transporting water and nutrients
- describe the requirements of plants for life and growth

Living things and their habitats

- use the observable features of plants, animals and micro-organisms to group, classify and identify them into broad groups, using keys or other methods, including those in our local environment and the wider world
- understand food chains and how plants and animals are interdependent in our local environment and the wider world
- explain how environmental changes may have an impact on living things, e.g. endangered species such as the great crested newt, flooding in Buckingham
- use the basic ideas of inheritance, variation and adaptation to describe how living things have changed over time and evolved and provide evidence for evolution

Materials

- group and identify materials in different ways according to their properties, based on first-hand observation; and justify the use of different everyday materials for different uses, based on their properties
- describe the characteristics of different states of matter and group materials on this basis; and describe how materials change state at different temperatures, using this to explain everyday phenomena, including the water cycle
- identify and describe what happens when dissolving occurs in everyday situations; and describe how to separate mixtures and solutions into their components
- identify, with reasons, whether changes in materials are reversible or not

Waves – light and sound

- use the idea that light from light sources, or reflected light, travels in straight lines and enters our eyes to explain how we see objects and the formation, shape and size of shadows
- use the idea that sounds are associated with vibrations, and that they require a medium to travel through, to explain how sounds are made and heard
- describe the relationship between the pitch of a sound and the features of its source; and between the volume of a sound, the strength of the vibrations and the distance from its source

Forces

- describe the effects of simple forces: air and water resistance, friction, magnetic forces and gravity
- identify simple mechanisms, including levers, gears and pulleys, that increase the effect of a force

Electricity

- use simple apparatus to construct and control a series circuit, and describe how the circuit may be affected when changes are made to it; and use recognised symbols to represent simple series circuit diagrams

Earth and space

- describe the shapes and relative movements of the Sun, Moon, Earth and other planets in the solar system; and explain the apparent movement of the sun across the sky in terms of the Earth's rotation and that this results in day and night

Significant scientists

- will have studied a significant scientist during every term linked to scientific studies. For example: Year 1 – Ken Watkins; Year 2 – George Washington Carver; Year 3 - Mary Anning; Year 4 – Alexander Graham Bell; Year 5 – Isaac Newton; and Year 6 - Charles Darwin.

Memory Makers

I will have experienced

- A wide range of practical scientific experiments, like growing my own plants in Key Stage 1 and recreating the human digestive system in Key Stage 2
- The opportunity to test out my predictions, and then create new and improved experiments based upon my findings
- A rich variety of Science themed school trips, including a visit to the farm in Key Stage 1 and the National Space Centre in Key Stage 2
- Meeting interesting visitors in school from a wide range of scientific background, including a local farmer in Key Stage 1 and a reptile & arachnid expert in Key Stage 2 (armed with a bird eating tarantula and ten-foot-long python!)
- An action-packed Science Week, where every day includes science themed activities and demonstrations
- Having my work displayed in the classroom and on whole school displays
- Sharing and celebrating my work in front of the whole school in Science themed assemblies
- Using a wide range of exciting scientific equipment for a host of different purposes
- Witnessing Science in action in my local community, having completed, for example, pond dipping and bird watching activities
- Meeting real life scientists, having had the opportunity to witness and ask questions on the nature of their work
- Visiting a Secondary School and joined in with Key Stage 3 Science, all ran and taught by Young Leaders

Because I went to RPS

- I have developed a genuine love and appreciation for Science
- I understand how the Science Curriculum applies to the world around me, knowing the purpose and value of Scientific concepts
- I am confident in correctly using a wide range of scientific vocabulary
- I have developed a natural interest in the pursuit of Science as a potential profession in later life
- I have an appreciation and knowledge of famous scientists, understanding the impact they have had on the world around me