# Science Curriculum

OFFORD
PRIMARY SCHOOL

# Science Overview

| | Year A | Year B |
|---|---|---|
| Year 1/2 | Year 1 Plants (Biology)<br><br>Year 1 Seasonal Changes (Physics)  | Year 1 Animals including humans (Biology)  |
| | Year 1 Materials (Chemistry)<br><br>Year 2 Use of everyday materials (Chemistry)  | Year 2 living things and their habitats (Biology)  |
| | Year 2 Plants (Biology)  | Year 2 animals including humans (Biology)  |
| Year 3/4 | Year3 Rocks (Chemistry)  | Year 3 and 4 Animals including humans (Biology)  |
| | Year 4 Living things and their habitats (Biology)  | Year 4 States of matter- (Chemistry)  <br><br>Year 3 Plants (Biology)  |
| | Year 3 Forces and magnets (Physics)  <br><br>Year 4 Electricity (Physics) | Year 3 Light (Physics)  <br><br>Year 4 Sound (Physics) |
| Year 5/6 | Yr6 Living things and their habitats (Biology)  <br><br>Year 6 Electricity (Physics) | Year 5 Properties and changes of materials (Chemistry).  <br><br>Yr6 Light (Physics). |
| | Year 5 Forces- (Physics)  | Year5 Living things and their habitats (Biology).  <br><br>Year5 Animals including humans- (Biology). |
| | Yr6 Animals including humans (Biology)  | Yr5 Earth and Space (Physics)  <br><br>Yr6 Evolution and inheritance (Biology) |

# Science Vision Statement

**Intent**

The 2014 National Curriculum for Science aims to ensure that all children:

- 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 skills required to understand the uses and implications of science, today and for the future.

We understand that it is important for lessons to have a skills-based focus, and that the knowledge can be taught through this. At Offord Primary School, we encourage children to be inquisitive throughout their time at the school and beyond.
The Science curriculum fosters a healthy curiosity in children about our universe and promotes respect for the living and non-living things. We believe science encompasses the acquisition of knowledge, concepts, skills and positive attitudes. Throughout the programmes of study, the children will acquire and develop the key knowledge that has been identified within each unit and across each year group, as well as the application of scientific skills. We ensure that the Working Scientifically skills are built-on and developed throughout children's time at the school so that they can apply their knowledge of science when using equipment, conducting experiments and explaining concepts confidently and continue to ask questions and be curious about their surroundings.

**Implementation**

Teachers create a positive attitude to science learning within their classrooms and reinforce an expectation that all children can achieve high standards in science. Science will be taught in planned and arranged topic blocks by the class teacher. This is a strategy to enable the achievement of a greater depth of knowledge. Through our planning, we involve problem solving opportunities that allow children to find out for themselves. Children are encouraged to ask their own questions and be given opportunities to use their scientific skills and research to discover the answers. This curiosity is celebrated within the classroom. Planning involves teachers creating engaging lessons, involving a range of resources that aid understanding of conceptual knowledge. Teachers use their understanding of the national curriculum to assess previous and current knowledge to identify those children with gaps in learning and build on what children already know. This is clearly set out in Knowledge Organisers for each unit, that are used by the teachers with the students for regular quizzing and knowledge acquisition. As the children's knowledge and understanding increases, and they become more proficient in selecting, using scientific equipment, collating and interpreting results, they become increasingly confident in their growing ability to come to conclusions based on real evidence. Working Scientifically skills are embedded into lessons to ensure these skills are being developed throughout the children's school career and new vocabulary and challenging concepts are introduced through direct teaching. This is developed through the years, in-keeping with the topics. We ask that at least two full investigations are written up over the course of an academic year to embed the importance of, and understanding of, the whole process. In other lessons the children may be concentrating on a selective part of the investigation process (i.e. considering fairness and

identification of variables as the element they will record). Opportunities to learn and practise specific working scientifically skills and the opportunities for the whole process pieces, needs to be carefully planned across the whole year's units for each year group. Teachers demonstrate how to use scientific equipment, and the various Working Scientifically skills in order to embed scientific understanding.

**Impact**

The successful approach at Offord Primary School results in a fun, engaging, high-quality science education, that provides children with the foundations and knowledge for understanding the world. Our engagement with the local environment ensures that children learn through varied and first-hand experiences of the world around them. From this exposure to a range of different scientists from various backgrounds, all children feel they are scientists and capable of achieving. Children at Offord Primary School enjoy science, and this results in motivated learners with sound scientific understanding.

# KS1 Scientific enquiry

| | Observing over time | Pattern seeking | Research | Identifying and classifying | Comparative testing | Fair testing. |
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| Year 1 units of study | | | | | | |
| Animals including humans | How does my height change over the year? | Do you get better at smelling as you get older? | | How can we organise all the zoo animals? | Is our sense of smell better when we can't see? | |
| Everyday materials | What happens to shaving foam over time? | | | Which materials are waterproof? | Which materials are the most absorbent? | |
| Plants | How does a plant change over a week? | | | How can we sort/ group different leaves? | | |
| Seasonal changes | How does the temperature change throughout the year? | Do bigger trees lose their leaves first in autumn? | | How would you group plants/trees based on which season you are most likely to see them? | In which season does it rain the most?<br><br>In which seasons do we get the most hours of day light? | |
| Year 2 units of study | | | | | | |
| Everyday materials | Would a paper boat float forever? | | How are plastics made? | | Which materials would be the best for the roof of….? | |
| Animals including humans | How do chicks/tadpoles change over time? | | | What do the young of different animals look like? What features do they share?<br><br>Identify and group different types of food. | Do different types of exercise have different effects on my body? | |
| Living things and their habitats | What conditions do woodlice (insects) prefer to live in? | Which habitat do worms prefer – where can we find the most worms? | How does the habitat of the artic compare to the habitat of the rainforest? | How would you group things to show which are living, dead or have never been alive? | | |
| Plants | What happens to my seed after I have planted it?<br><br>Keep a seed diary and write about the changes observed over the term. | Do bigger seeds grow into bigger plants? | How can we identify the trees that we observed on our tree hunt? | | Do cress seeds grow quicker inside or outside?<br><br>Do bulbs grow quicker than seeds? | |

# Lower KS2 Scientific enquiry

| | Observing over time | Pattern seeking | Research | Identifying and classifying | Comparative testing | Fair testing. |
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| Year 3 units of study | | | | | | |
| Animals including humans | | | | How do skeletons of different animals compare? | | How does the angle that your elbow is bent effect the circumference of your upper far? |
| Forces and magnets | If we magnetise a pin, how long does it stay magnetised for? | Does the size and shape of a magnet affect how strong it is? | | Which materials are magnetic? | Which magnet is the strongest? | |
| Plants | What happens to celery when it is left in a glass of coloured water? | | What are all the different ways that seeds disperse? | | Does the same seed need the same conditions to grow?<br><br>Compare different seeds to see what conditions seeds need to grow. | |
| Light | When is our classroom the darkest?<br>Is the Sun the same brightness all day? | | How does the Sun make light? | | Which materials allow the most light to pass through? | How does the distance between an object and a screen effect the size of the shadow? |
| Rocks | How does tumbling change a rock over time? | | Who was Mary Anning and what did she discover? | | Which soil absorbs the most water? | How does adding different amounts of sand to soil affect how quickly water drains through it? |
| Year 4 units of study | | | | | | |
| States of matter | How does the level of water in a glass change when left on the windowsill?<br><br>Water cycle in a bag. | Is there a pattern in how long it takes different sized ice lollies to melt? | How does the water cycle work in nature? | | Do all liquids freeze at the same temperature? | How does the surface area of a container of watrer affect how long it takes to evaporate. |
| Animals including humans | How does an egg shell change when it is left in different drinks? | | How do dentists fix broken teeth?<br><br>How does food travel through our digestive systems? | How can we organise our teeth into groups? | What effect does sugar have on the body compared to carbohydrates. | |
| Living things and their habitats | | Where in our school is the most polluted? | Can we find other animals to add complexity to our classification key?<br><br>Study an environmentalist and their input to the scientific community. | Can we use the classification keys to identify all animals? | | Does the amount of light affect how many woodlice move around? |
| Sound | | | | | Which material is best to use for muffling sound? | How does the length of a guitar string/tuning fork affect the pitch of the sound?<br><br>How does the volume of a drum change as you move it further away from it |
| Electricity | How long does a battery light a torch for? | | | How would you group these electrical devices base on where the electricity comes from? | Which material is the best conductor of electricity? | How does the thickness of a conducting material affect how bright the lamp is? |

# Upper KS2 Scientific enquiry

| | Observing over time | Pattern seeking | Research | Identifying and classifying | Comparative testing | Fair testing. |
|---|---|---|---|---|---|---|
| Year 5 units of study | | | | | | |
| Animals including humans<br><br>Living things and their habitats | | Present data about the height and weight of babies. What patterns are there? Explain these patterns.<br><br>Can you spot and explain patterns in the graph below about the life expectancy of animals? | What impact did the work of Jane Goodal have on our understanding of animal reproduction? | Can you identify all the stages in the human life cycle?<br><br>What is the difference between the life cycle of an insect, mammal and plant? | | |
| Forces | | To test the amount of friction of different materials.<br><br>To investigate the effects of pulleys levers and gears. | | | | To test difference between the weight and mass of objects.<br><br>To test effect of air resistance on different materials. |
| Properties and changes of materials | How does a container of saltwater change over time?<br><br>How does a nail in saltwater change over time? | | | Identify the properties of materials and why these are appropriate for the job they carry out. | Which type of sugar dissolves the fastest? | How does the temperature of tea affect how long it takes for a sugar cube to dissolve? |
| Earth and space. | How does shadow length change over the day? | Is there a pattern between the size of a planet and the time it takes to travel around the Sun? | What unusual objects did Jocelyn Bell Burnell discover? | Can you observe and identify all the phases in the cycle of the Moon? | | |
| Year 6 units of study | | | | | | |
| Animals including humans | | | Research into scientists who have helped us to understand the impact of lifestyle on the heart for example: Christian Barnard or William Harvey | Watch a heart dissection. Identify the parts of the heart that have been discussed. | Collect the classes heart rates through counting their BPM.<br>Compare these. Why could they be different.<br>Can you draw any conclusions e.g.: people who do more sport have a lower heart rate? | |
| Living things and their habitats | Mould growth in different environments over a week. | | | Throughout the unit children will classify different livings thigs using classification key and the Linnaean system. | During the mould investigation children will change where the bread goes. They are comparing the effects different environments have. | |
| Light | | Is there a pattern to how bright it is in school over the day? Is it the same in every classroom? | | Can you identify all the colours of light that make white light when mixed together? What colours do you get if you mix different colours of light together? | Which material is most reflective? | How does the angle that a light ray hits a plane mirror affect the angle at which it reflects off the surface? |
| Evolution and inheritance | | Is there a pattern between the size and shape of a bird's beak and the food it will eat? | What happened when Charles Darwin visited the Galapagos islands? | Compare the skeletons of apes, humans and Neanderthals.<br><br>How are certain animals adapted to their environments? | | |
| Electricity | | Explain how the number & voltage of cells in a circuit links to the brightness of a lamp or the volume of a buzzer. | | | | |