

Lancasterian Primary School

Science Policy



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3	March 2022	Governors	+2 years	March 2024

Introduction

At Lancasterian Primary School we believe that scientific knowledge is built up through scientific enquiry at its heart. Science is a practical way of finding reliable answers to questions we may ask about the world around us. Science in our school is about developing children's ideas and ways of working that enable them to make sense of the world in which they live, through investigation as well as using and applying process skills.

Principles of teaching and learning in Science

At Lancasterian we believe that science teaching and learning is going well when the following are happening:

1. Children are learning through investigative, practical and engaging activities.
2. Children have good quality resources to help their investigations.
3. Children's previous learning is built upon and they can make connections about the world around them.
4. Children are asking questions and thinking about how they could be answered.
5. Children are working scientifically to observe record and discuss their findings.
6. Children can explain what they have found out using their scientific knowledge and vocabulary.
7. Children can reflect on how they have learnt using metacognition.

Working Scientifically

Working scientifically is not confined to Science lessons. Teachers ensure that their 'Working Scientifically' posters are on display and they refer to them where appropriate. The key skills the children will develop through 'working scientifically' are:

- Exploring
- Researching
- Classifying
- Fair Testing
- Observing over time

- Pattern Seeking

Each science lesson is based around an explicitly taught scientific enquiry skill and they reinforce all science teaching across the school.

Planning and Teaching

Science is taught discretely in blocked weeks, within two or three week blocks. This allows children to become scientists for these weeks, fully immersing themselves in their topic. Teachers cover the content and programme of study specified from the National Curriculum outlined in the school science curriculum which ensures progression across the school. Included in this curriculum is an overview showing the different topics and learning objectives to be covered in each year group (appendix 4). Alongside this, teachers have various support documents which can be used to plan from such as objectives to be covered and suggested lesson ideas, question starters and concept cartoons. All of these are designed to support scientific enquiry. Please see Appendices 1 and 2 examples.

The school's support documents and overview document can be found in:

Staff Hub/planning/[current year] Science/support documents

Each teacher needs ensures they are covering the objectives for their year group. Each lesson and LO show the respective science area: biology, chemistry and physics, and should be discussed with the children to build their foundation knowledge of these specific subjects.

The order in which topics are covered have been decided to allow for cross-curricular links and strong building of knowledge. There is one block which is dedicated to an environmental/current affairs topic to deepen children's learning in these areas. This curriculum has been written for the teachers with LOs to follow and ideas for lessons as well as links to previous learning (appendix 5).

Outdoor Learning

All classes are encouraged to plan for one outdoor science lesson per half term in order to fully utilise school space, engage with the physical needs of children and bring scientific concepts to life. The Science and Community Learning Leaders have produced a document to support teachers with planning for this. Ideas for lessons, links to websites and the cross-curricular links can be found for each topic ensuring teachers are confident in delivering lessons outside the classroom. An example of this can be found in appendix 3. With the development of the school's garden area, year groups can now utilise this for hands on learning and enquiry, linking in with science topics such as living things and their habitats, plants and animals and changing states.

Assessment

Years 1 to 6

Books are marked using the school's feedback policy. Please see the Feedback Policy for further clarification.

Assessment

Science PAGs are used to assess half-termly. Please see the Assessment Policy for further clarification.

Recording of work

Within each science lesson, the children's learning is recorded in floor books. Children working in groups of 5-6 to encourage collaborative learning where discussion and enquiry is key. Learning is recorded in various ways including photos, group work, individual work, reflection and should be child-led. The books enable the children to see their journey through the topic and progression of their learning. The book records the learning journey of the 5-6 children in that group.

Foundation Stage

In the Early Years Foundation Stage, Science is taught through 'Understanding the World'. Pupils explore Science in a rich and stimulating learning environment. Pupils are encouraged to use their natural inquisitiveness, while taking part in exploratory play in specific scientific areas.

Early years practitioners encourage pupils to make predictions, using their senses and investigating materials and their properties. Children are encouraged to be creative and inquisitive as they participate in science activities.

Cross-Curricular Links

The science curriculum will provide opportunities to establish links with other curriculum areas:

English

In particular, at Key Stage 1, the pupils are encouraged to use their speaking and listening skills to describe what they see and explain what they are going to do next. At Key Stage 2 the pupils are encouraged to develop their skills of writing to record their planning, what they observe and what they found out. The children develop their written skills by writing reports in science. Each year has at least one science-based text as their class text, planned in for a time when this will build on learning in both English and science.

Maths

At both Key Stages the pupils are expected to use their knowledge and understanding of measurement and data handling at appropriate levels. In science, they should be applying their maths skills at levels similar to those, which they are using in their maths work. Mathematical skills such as weighing and measuring are important scientific skills. Where appropriate, children record their findings using charts, tables and graphs.

Information and communication technology

At both Key Stages the pupils will use ICT to:

- Locate and research information (CD ROM, internet)
- Record findings (using text, data and tables)
- Interactive whiteboards enabling the use of video clips and demonstration programmes to enrich lessons

Resource Management

The schools Science resources are stored in the science cupboard located on the stairs between KS2 hall and KS2 top floor. Materials are easy to locate, being found in labelled boxes on the shelves.

We as a staff are responsible for returning Science equipment when we have finished using it. Any damaged or incomplete equipment should be reported to the Science coordinator as soon as possible.

We all agree that the quality and availability of resources must be maintained and that children should value the school's equipment. As funding allows, the range of resources will be updated and extended as necessary.

Role of the Science Coordinator

The role of the Science Coordinator is:

- To monitor the quality of science teaching through planning checks, book scrutinies and lesson observations.
- To coordinate the teaching of science within the school.
- To ensure continuity and progression of the teaching and learning of Science across the key stages and the school.
- To order and maintain resources.
- To manage the Science budget.
- To make staff aware of changes/thinking in Science.
- To support staff who are less confident with Science.
- To feedback to the teaching staff from any CPD they undertake.
- To make staff aware of Science courses on offer and encourage them to attend.
- To provide where necessary, staff training and development.
- To show, by example, good Science practice.

Appendix 1

Below is an example of a curriculum overview showing the different topics covered in each year group. The topics do not have to be taught in the same order and can be moved around to make clearer links with other subjects.

Science Curriculum overview

Biology	Green
Chemistry	Red
Physics	Blue
Current affairs and Environment Linked to Working Sci	Yellow

Year 1	Plants	Animals including humans	Everyday materials	Seasonal changes	Poaching	
Year 2	Living things and their habitats	Plants	Animals including humans	Uses of everyday materials	Habitat Loss	
Year 3	Plants	Animals including humans	Rocks	Light	Forces and Magnets	Plastic Pollution
Year 4	Living things and their habitats	Animals including humans	States of matter	Sound	Electricity	Global warming Extinction Rebellion
Year 5	Living things and their habitats	Animals including humans	Properties and changes of materials	Earth and Space	Forces	Diet/farming linked to global warming
Year 6	Living things and their habitats	Animals including humans	Evolution and inheritance	Light	Electricity	Effects of global warming and climate change

Appendix 2

Below are two examples showing sections of the Year 4 curriculum booklet. Each topic from the overview shown on the previous page contains the objectives to be covered, and some suggested lesson ideas linking to the different working scientifically skills.

YR-4	<u>Animals Including Humans</u>	Biology
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Programme of Study:

Pupils will be able to:

- ❖ 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

Vocabulary:

Digestive system	Large intestine	Small intestine	Liver
Colon	Pancreas	Kidney	Stomach
Oesophagus	Molar	Canine	Incisor
Predator	Prey	Producer	

Possible activities to carry out:

Classify:

Children to learn names and types of human teeth and use this knowledge to infer the diet of an animal based on their teeth

Children to be given images of different components of a food chain for a specific habitat and asked to re-arrange them into a food chain (who eats who?). Introduce formal language of predator, prey and producers

Observation:

Place eggs in diet coke/coke/juice/milk/water and observe what happens - link to looking after teeth - if you put toothpaste on the egg shell, does it make any difference - Predict, observe conclude?

Research:

Children to learn the names and functions of parts of the digestive systems (mouth, tongue, teeth, oesophagus, stomach, small and large intestine) and use drama to act out the role of each part - perform to younger children

Fair Test (Investigate):

Which drink causes the most damage to teeth? (leaving dirty coins in different drinks to compare the effects)

Cross curricular links:

Literacy:

Writing questions for our visitors to find our more.

Writing healthy Menu's

Writing Instructions

Writing lab reports for investigations

Demonstration of the food's journey through the body accompanied by video footage. Children then use a key vocabulary list to write a story - A day in the life of Tommy the Tomato seed.

Maths:

Drawing graphs to compare nutritional information on food types.

ICT:

Using Visualisation software to get a closer look in the body.

Assessment guidance.	Key learning	Possible evidence
Shows understanding of a concept using scientific vocabulary correctly.	<p>Food enters the body through the mouth. Digestion starts when the teeth start to break the food down. Saliva is added and the tongue rolls the food into a ball. The food is swallowed and passes down the oesophagus to the stomach. Here the food is broken down further by being churned around and other chemicals are added. The food passes into the small intestine. Here nutrients are removed from the food and leave the digestive system to be used elsewhere in the body. The rest of the food then passes into the large intestine. Here the water is removed for use elsewhere in the body. What is left is then stored in the rectum until it leaves the body through the anus when you go to the toilet.</p> <p>Humans have three types of teeth - incisors for cutting, canines for tearing, and molars for grinding (chewing)</p>	<p>Can sequence the main parts of the digestive system</p> <p>Can draw the main parts of the digestion system on to a human outline</p> <p>Can describe what happens in each part of the digestive system</p> <p>Can point to the three different types of teeth in their mouth and talk about their shape and what they are used for</p> <p>Can name producers, predators and prey within a habitat</p> <p>Can construct food chains</p>
Applying knowledge in familiar related contexts, including a range of enquires.	<p>Research the functions of the parts of the digestive system</p> <p>Create a model of the digestive system using household objects</p> <p>Explore eating different types of food, to identify which teeth are being used for cutting, tearing and grinding (chewing)</p> <p>Classify animals according to the type of teeth they have in their skulls</p> <p>Use food chains to identify producers, predators and prey within a habitat</p> <p>Use secondary sources to identify animals in a habitat and find out what they eat</p>	<p>Can use diagrams or a model to describe the journey of food through the body explaining what happens in each part.</p> <p>Can record the teeth in their mouth (make a dental record)</p> <p>Can explain the role of the different types of teeth</p> <p>Can explain how the teeth in animal skulls show they are carnivores, herbivores or omnivores.</p> <p>Create food chains based on research</p>

Programme of Study:

Pupils will be able to:

- ❖ Identify common appliances that run on electricity
- ❖ Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wire, 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

Vocabulary:

Cell	Battery	Bulb	Wire	Switch
Buzzer	Circuit	Electricity	Mains	Lamp
Appliance	Volt	Conductor	Insulator	

Possible activities to carry out:Research:

'Electricity Safari' - children to photograph/list electrical appliances they can find around the school - could set a homework challenge to do a similar activity at home and compare. If they don't notice, point out any pull cords e.g. in the bathroom as well.

Explore:

Children to be given apparatus needed to make a simple circuit and work out how to make the circuit

Give children a simple circuit that contains an error and ask them to 'repair' the circuit

Children to make a torch/use switches/make an electricity picture with a switch (great interactive display)

Fair Test:

Children to investigate whether the thickness of card placed between the two contacts affects the amount of pressure needed to turn on the switch

Classifying:

Sort materials into conductors and non-conductors of electricity

Sort appliances into battery powered and mains powered (or both)

Sort batteries according to voltage

Cross curricular links:Literacy:

To write laboratory reports of investigations.

To create an information leaflet or poster about how to keep safe in the home.

To write a report about Lightning.

To write a report about how a power station works.

To give a presentation to the class about how electricity is made.

Maths:

To draw bar charts to compare where our electricity comes from.

To draw bar charts to compare which countries use the most electricity.

ICT:

To use the internet to find out about how power stations work and the National Grid moves electricity around.

To create a PowerPoint presentation about how electricity is made.

Assessment guidance.	Key learning	Possible evidence
Shows understanding of a concept using scientific vocabulary correctly.	<p>Many household devices and appliances run on electricity. Some plug into the mains and others run on batteries. An electrical circuit consists of a cell or battery connected to a component using wires. If there is a break in the circuit, a loose connection or a short circuit the component will not work. A switch can be added to the circuit to turn the component on and off. Metals are good conductors so they can be used as wires in a circuit. Non-metals are insulators except graphite (pencil lead).</p>	<p>Can name the components in a circuit Can make electric circuits Can control a circuit using a switch Can name some metals that are conductors Can name materials that are insulators</p>
Applying knowledge in familiar related contexts, including a range of enquires.	<p>Construct a range of circuits Explore how to make circuits with no wires using different materials Classify the materials that were suitable/not suitable for wires. Explore how to connect a range of different switches and investigate how they function in different ways. Choose switches to add to circuits to solve particular problems such as a pressure switch for a burglar alarm. Make circuits that can be controlled as part of a D&T project N.B children should be given one component at a time to add to circuits.</p>	<p>Can communicate structures of circuits using circuit diagrams with class symbols Use classification evidence to identify that metal are good conductors and non-metal are insulators Can incorporate a switch into a circuit to turn it on and off Can connect up a range of different switches identifying the parts that are insulators and conductors Can add a circuit with a switch to DT project and can demonstrate how it works</p>

Appendix 3

Below is an example of the support document for outdoor learning lesson ideas which teachers can reference when completing lesson Plans.

			Curriculum Links		
	Plants	outdoor planting/experimenting with where to place plants. Explore and fair testing.			
	Animals including humans	Senses: Sound walk around school - identifying what they can hear and ticking each time they hear it (phone ringing etc). Could introduce tally marks to record this. Gather and record data.	Maths - tally charts		
Y1	Everyday Materials	Explore both playgrounds with posters labelled the different materials (wood/metal/plastic). Can they find 1 object made from each materials. Take pics - back in classroom explain how they know. Classifying. Observing change over time.	Maths - Venn diagrams		
	Seasonal changes	Seasons nature walk - double sided sticky tape on paper, collect items linked to that season. Display in classroom. Research.			
	Living things and their habitats	Create an animal home/hotel in the garden. Research types of animals in the area (hedgehog, bugs, birds). Plan how materials and how to make item, write instructions and then make it outside. Children to bring in own resources like plastic bottles etc. Research https://www.rspb.org.uk/get-involved/activities/give-nature-a-home-in-your-garden/garden-activities/giveahogahome/	English: Instructional writing		
	Plants	Plant seeds and observe them over time (possible timelapse video on iPad to record each day). Comparative study to see how they grow inside a cupboard and how they grow in the sun outside. Observe over time, record data, simple tests.	Computing: Time lapse set up in classroom (iPad's)		
Y2	Animals including humans	Importance of exercise - short exercise session outside. Highlighting the effects of exercise on the body (pulse, breathing). Test what types of exercise get heart rate and breathing up and classify which types are valuable exercise and which are not improving our health as much. Simple tests, research.	PE - Link		
	Uses of everyday materials	Planning and making outdoor inventions for everyday materials. Plastic (Rain gatherer to collect rain water and reduce waste in school), cardboard (birds nest etc). Research, explore. Journey to school diary - what materials in what forms can they see on their way to school. Classify, explore.	DT		

Appendix 4 – Curriculum Map Example

LanCasterian Primary School

A safe and welcoming learning community where:

- we all aim high;
- everyone is included;
- creativity is valued.



KS1/2 Curriculum Map

SCIENCE

Physics

Chemistry

Biology

Climate Change

	Y1	Y2	Y3	Y4	Y5	Y6
Wk1&2	<p>Plants – Biology</p> <ul style="list-style-type: none"> • Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees • Identify and describe the basic structure of a variety of common flowering plants, including trees. 	<p>Uses of everyday materials – Chemistry</p> <ul style="list-style-type: none"> • 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. 	<p>Animals including humans – Biology</p> <ul style="list-style-type: none"> • 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 other animals have skeletons and muscles for support, protection and movement 	<p>States of matter – Chemistry</p> <ul style="list-style-type: none"> • 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. 	<p>Forces – Physics</p> <ul style="list-style-type: none"> • 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. 	<p>Light – Physics</p> <ul style="list-style-type: none"> • 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.

Appendix 5

Year 2 Habitat Loss				
LO	Learning suggestions	Linked learning	Useful links	Vocabulary
I can explore varying habitats	<p>What is a habitat? Explore varying- urban, desert, woodland, ocean, polar. How are they different? What makes it a habitat? Who might live there?</p> <p>Children could:</p> <ul style="list-style-type: none"> Sort animals and habitats to match. Build a web of what makes a habitat- (food, shelter, water, space, ability to reproduce) Compare different habitats of animals and plants. 	Year 2 Living things and their habitat	<p>https://www.hamilton-trust.org.uk/science/year-4-science/living-things-and-their-habitats-help-our-habitats/</p>	<p>man made</p> <p>natural</p> <p>habitat</p> <p>environmental</p> <p>desert</p> <p>woodland</p> <p>ocean</p> <p>polar</p> <p>deforestation</p> <p>micro-habitat</p> <p>organism</p>
I can understand change, both manmade and natural.	<p>What is manmade and what is natural?</p> <p>Review seasonal changes. How this affects animals. Show images of different change. Discuss if these were man made of natural- buildings, roads, deforestation, floods, droughts etc.</p> <p>Children could:</p> <ul style="list-style-type: none"> Sort manmade and natural changes into groups- explaining what made the change. 	Year 1 seasons	<p>https://www.bbc.co.uk/teach/class-clips-video/science-ks1-ks2-ivys-plant-workshop-the-impact-deforestation-has-on-plants/zd34hbk</p> <p>https://www.youtube.com/watch?v=nUstYj4o2VQ</p>	
I can research reasons for habitat loss	<p>What is a habitat? What different habitats do we know?</p> <p>Children to look at how local areas changed. Look at school and local to understand changes. (buildings, roads) Opportunity for discussion around what is more important and why? How can we support both?</p>	Year 2 habitats	<p>https://www.youtube.com/watch?v=7k8CcAU2Lt0</p>	