

Lancasterian Primary School

Science Policy



Version No.	Date	Approved by	Review Frequency	Review Date
1	March 2019	Governors	+2 years	March 2021

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

Working Scientifically

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

- Exploring
- Researching
- Classifying

- Fair Testing
- Observing over time
- Pattern Seeking

Planning and Teaching

Science should be taught discretely for between 1 and 1.5 hours each week. The teaching methods used should be in line with the school's principles of teaching and learning in Science.

Teachers will cover the content and programme of study specified from the National Curriculum outlined in the school science curriculum booklet to ensure progression across the school. Included in this booklet is an overview showing the different topics to be covered in different year groups. Also included are the objectives to be covered and the suggested lesson ideas, which teachers can use to plan from. Please see Appendices 1 and 2 examples.

The school's Science curriculum booklet and overview document can be found in:
Teacherdropbox>>> Science >>> Science curriculum booklet.

Each teacher needs to ensure they are covering the objectives for their year group. The Science coordinator will check and refresh the objectives in the document each academic year using the master copies stored on the system.

The order in which topics are covered is at the teacher's discretion, to allow for cross-curricular links. The last half term of the year is to be used for diminishing the gaps informed through the assessment records.

Outdoor Learning




All classes are expected to plan for 1 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 Outdoor Community lead have worked together to produce a document to support teachers with planning for this whereby ideas for lessons, links to websites and the cross-curricular links can be found for each topic in each year group ensuring teachers are confident in delivering lessons outside the classroom. An example of this can be found in appendix 3.

Assessment

Years 1 to 6

Curriculum knowledge:

Children's subject knowledge is assessed throughout each topic, with emphasis on those who have not achieved the objective. Those who are showing 'No Evidence (.),

beginning (/) or working within (), secure () or mastery () against the learning objective for the lesson(s) should be marked. All others can be left blank meaning they are either secure or have mastered that objective.

Working scientifically:

Children's working scientifically skills are assessed again at the end of the topic, at the teacher's discretion. Each child is marked as having teachers indicate either evidence not yet seen (.), beginning (/), working within (\), secure (△) or mastery (△_M) against the learning objective for the lesson(s).

Children in Year 2 and Year 6 will be assessed at the end of the year using the relevant APP expectations to support judgements.

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

As far as possible, 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. Science based texts are sometimes used in English lessons.

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. Resources have been audited and new resources purchased. 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.

Lancasterian Primary School

Science Curriculum Overview 2016-2017



Year	Topic	Topic	Topic	Topic	Topic
Year 1	Plants	Animals Including Humans	Everyday Materials	Seasonal Changes	
Year 2	Living Things and their Habitats	Plants	Animals Including Humans	Uses of everyday materials	
Year 3	Plants	Animals Including Humans	Rocks	Light	Forces and Magnets
Year 4	Living Things and their Habitats	Animals Including Humans	States of Matter	Sound	Electricity
Year 5	Living Things and their Habitats	Animals Including Humans	Properties and Changes of Materials	Earth and Space	Forces
Year 6	Living Things and their Habitats	Animals Including Humans	Evolution and Inheritance	Light	Electricity

Key:

- Biology
- Chemistry
- Physics

Appendix 2

YR-4	Animals Including Humans	Biology	
<u>Programme of Study:</u>			
<p>Pupils will be able to:</p> <ul style="list-style-type: none"> 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 			
<u>Vocabulary:</u>			
Digestive system	Large intestine	Small intestine	Liver
Colon	Pancreas	Kidney	Stomach
Oesophagus	Bladder	Canine	Tarsus
Predator	Prey	Producer	
<u>Possible activities to carry out:</u>			
<p><u>Classify:</u> Children to learn names and types of human teeth and use this knowledge to infer the diet of an animal based on their teeth</p> <p>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</p> <p><u>Observation:</u> Place eggs in diet coke/cola/juice/milk/leather 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?</p> <p><u>Research:</u> 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</p>			

<u>Fac-Test (Teestights):</u>		
Which drink causes the most damage to teeth? (Leaving dirty coins in different drinks to compare the effects)		
<u>Cross curricular links:</u>		
<u>Literacy:</u>	<u>Maths:</u>	<u>ICT:</u>
Writing questions for our visitors to find our mine. Writing healthy Men's Writing Instructions Writing lab reports for investigations	Drawing graphs to compare nutritional information on food types.	Using Visualisation software to get a closer look in the body.
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.		

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

Assessment guidance.	Key learning	Possible evidence
Shows understanding of a concept using scientific vocabulary correctly.	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. Humans have three types of teeth - incisors for cutting, canines for tearing, and molars for grinding (chewing)	Can sequence the main parts of the digestive system Can draw the main parts of the digestion system on to a human outline Can describe what happens in each part of the digestive system Can point to the three different types of teeth in their mouth and talk about their shape and what they are used for Can name producers, predators and prey within a habitat Can construct food chains
Applying knowledge in familiar related contexts, including a range of enquires.	Research the functions of the parts of the digestive system Create a model of the digestive system using household objects Explore eating different types of food, to identify which teeth are being used for cutting, tearing and grinding (chewing) Classify animals according to the type of teeth they have in their skulls Use food chains to identify producers, predators and prey within a habitat Use secondary sources to identify animals in a habitat and find out what they eat	Can use diagrams or a model to describe the journey of food through the body explaining what happens in each part. Can record the teeth in their mouth (make a dental record) Can explain the role of the different types of teeth Can explain how the teeth in animal skulls show they are carnivores, herbivores or omnivores. Create food chains based on research

YR-4	Electricity	Physics															
<p>Progression of Study</p> <p> pupils will be able to</p> <ul style="list-style-type: none"> Identify common appliances that use electricity Construct a simple series electrical circuit, measuring and comparing its total parts, including cells, wire, bulbs, switches and fuses Identify whether a cell stores and gives it energy inside circuit, based on whether or not it can be used as a portable power cell Recognise that a switch opens and closes a circuit and describe this with whether or not it is open or a closed series circuit Recognise some common conductors and insulators, and describe materials with being good conductors 																	
<p>Classify</p> <table border="1"> <tr> <td>Cell</td> <td>Battery</td> <td>Bulb</td> <td>Wire</td> <td>Switch</td> </tr> <tr> <td>Appliance</td> <td>Circuit</td> <td>Electricity</td> <td>Wires</td> <td>Lamp</td> </tr> <tr> <td>Appliance</td> <td>Switch</td> <td>Conductor</td> <td>Insulator</td> <td></td> </tr> </table>			Cell	Battery	Bulb	Wire	Switch	Appliance	Circuit	Electricity	Wires	Lamp	Appliance	Switch	Conductor	Insulator	
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<p>Possible activities to carry out</p> <p>Research</p> <p>Electricity 'detect' children to photograph for electrical appliances they use that cannot be used - could set a homework challenge to do a similar activity at home and compare if they don't notice, point out any good working in the bathroom as well.</p> <p>Class</p> <p>Children to give apparatus needed to make a simple circuit and work out how to make the circuit</p> <p>Use children to simple circuit that contains an error and ask them to repair the circuit</p> <p>Children to make a switch that can be used to make an electrical circuit with a switch (great interactive display)</p>																	

<p>Plan Test</p> <p>Children to investigate whether the thickness of card placed between the two contacts affects the amount of pressure needed to turn on the switch</p> <p>Conductors</p> <p>Sort materials into conductors and non-conductors of electricity</p> <p>Sort appliances into battery powered and mains powered (or both)</p> <p>Sort batteries according to voltage</p>											
<p>Classify suitable links</p> <table border="1"> <tr> <td>Chemistry</td> <td>Maths</td> <td>ICT</td> </tr> <tr> <td>To write laboratory reports of investigations, including an introduction, to be kept as a reference to be kept safe in the files.</td> <td>To show bar charts to compare where the electricity comes from, to compare which countries use the most electricity.</td> <td>To use the internet to find out about how power stations work and the different fuel sources electricity comes from.</td> </tr> <tr> <td>To write a report about lightning.</td> <td>To write a report about how power stations work.</td> <td>To give a presentation to the class about how electricity is made.</td> </tr> </table>			Chemistry	Maths	ICT	To write laboratory reports of investigations, including an introduction, to be kept as a reference to be kept safe in the files.	To show bar charts to compare where the electricity comes from, to compare which countries use the most electricity.	To use the internet to find out about how power stations work and the different fuel sources electricity comes from.	To write a report about lightning.	To write a report about how power stations work.	To give a presentation to the class about how electricity is made.
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Assessment guidance.

Shows understanding of a concept using scientific vocabulary correctly.

Applying knowledge in familiar related contexts, including a range of enquires.

Key learning

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).

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.

Possible evidence

Can name the components in a circuit
Can make electric circuits
Can control a circuit using a switch
Can name some materials that are conductors
Can name materials that are insulators

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

Appendix 3

Below is an example of the support document for outdoor learning lesson ideas which teachers can reference when completing Medium Term 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 cuboard 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		