



Title	Examples of Lower Key Stage 2 Science Specific Learning Challenges
Originator	CD
Last update	Updated January 2014
Copyright	© Focus Education UK Ltd. 2014
Circulation	This document is for use in the purchasing organisation only. Should it be suspected or known that the document has been circulated more widely, Focus Education reserve the right to withdraw access to the Learning Challenge website.
Contact	www.learningchallengecurriculum.com Telephone: Customer services 01457 872427 Email: publishing@focus-education.co.uk

Introduction

- This scheme of work has been developed to ensure that you will have full coverage of the new National Curriculum. It follows the programmes of study for each year very carefully and provides the right balance between working scientifically and learning scientific facts.
- Each set of Learning Challenges then links directly to the science knowledge, skills and understanding to ensure that learning is progressive and continuous.
- There has been an attempt to link either creative or expressive arts into each scientific learning challenge so that there is breadth and balance in the coverage as a whole.
- The art, DT, music and dance knowledge, skills and understanding have been taken from the 'Weaving KSU into the new National Curriculum' book which ensures that you will have progression and continuity in these subject areas also.
- The initial or main questions outlined in the examples that follow are obviously the starting points for you to consider. The ethos that underpins the Learning Challenge approach requires teachers to check on what children already know and then invite them to think of their own questions. This approach is still highly desirable but teachers need to ensure that they are meeting the National Curriculum requirements. **Very importantly ensure that all content absolutely meets your context.**
- Each Learning Challenge has a suggested 'wow' and its own suggested reflection. By using these you will get a more complete level of challenge for the pupils.
- You will also note that every opportunity has been taken to help children apply literacy and numeracy skills where it is possible to do so.
- Finally, every attempt has been made to bring science to life by taking starting points from the children's context. In this way it is hoped that science will be viewed as exciting and interesting as well as fun.

Learning Challenges – The Principles

What are the main principles?

- The Learning Challenge concept is built around the principle of greater learner involvement in their work. It requires deep thinking and encourages learners to work using a question as the starting point.
- In designing the curriculum teachers and learners are using a prime learning challenge, expressed as a question, as the starting point. Using the information gained from pre- learning tasks and the school's context a series of subsidiary challenges are then planned. Each subsidiary learning challenge is also expressed as a question. See how this works in the scheme of work provided.
- The subsidiary learning challenge is normally expected to last for one week but this does not need to be the case. However, initially it may be useful for the learners and indeed the staff to get used to the weekly learning challenge. The important point is that the learning challenges need to make sense to the learners and be something that is within their immediate understanding.

Learning Challenges – The Principles

How do the Pre- Learning Tasks Work?

- Pre-Learning Tasks ensure that learners are directly involved in the planning process. Well planned pre-learning tasks should help to bring out what learners already know; what misconceptions they may have and what really interests them.
- Teachers should take account of the outcomes from pre-learning tasks to plan the subsidiary learning challenges for each major area of study. It should help teachers recognise what transferable skills learners have already developed that could be used to initiate new learning with a level of confidence.
- Pre-Learning tasks could take many different forms and can last for as long or as short as required. Some may be written tasks others oral. Mind mapping is one method that has been used successfully by many schools. Using pre-learning tasks as part of a school's programme of home learning will help to get parents and carers directly involved in their children's learning.

Learning Challenges – The Principles

How do we ensure that pupils are improving their knowledge and understanding and developing appropriate skills?

- Continuity and Progression in the curriculum will be built around a set of matrices known as essential ‘knowledge, skills and understanding’ within subject disciplines. These are broken into Year group expectations and have additional challenges for able learners. The Knowledge, Skills and Understanding’ matrices within the Learning Challenge Curriculum (Weaving Knowledge, Skills and Understanding into the new National Curriculum) will allow school to guarantee that the learners’ essential skills are being developed, alongside National Curriculum requirements (where appropriate), whilst allowing individual schools to have a great deal of autonomy with their methodology.
- In addition, there is an expectation that teachers apply English, mathematics and ICT skills where it is appropriate to do so.

Learning Challenges – The Principles

How are learners presented with opportunities to reflect on their learning?

- Time for learners to reflect or review their learning is central to the whole process. This is in keeping with the 'Learning to Learn' principles where reflection is seen as a very important part of individuals' learning programme.
- Within the Learning Challenge Curriculum it is suggested that the final subsidiary learning challenge is handed over for learners to reflect on their learning. The idea is that learners present their learning back to the rest of the class or another appropriate audience - making the most of their oracy and ICT skills to do so. Initially, learners may require a great deal of direction so the reflection time may need to be presented in the form of a question which helps them to review their work.
- Although reflection is seen as a concluding part of the prime learning challenge it is hoped that there will be continual opportunities for learners to reflect frequently, especially as each subsidiary learning challenge comes to an end. Ideally, there should be a good deal of learner autonomy evident during reflection time.

Science

Lower Key Stage 2

Lower Key Stage 2

Science Programme of Study: Lower Key Stage 2

- The principal focus of science teaching in **lower key stage 2** is to enable pupils to broaden their scientific view of the world around them. They should do this through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They should draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out.
- 'Working scientifically' is described separately at the beginning of the programme of study, but must **always** be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.
- Pupils should read and spell scientific vocabulary correctly and with confidence, using their growing word reading and spelling knowledge.

Science Learning Challenges

Year 3

Year 3 Statutory Requirements

Working Scientifically (Y3 & Y4)	Plants	Animals, including humans
<ul style="list-style-type: none"> • asking relevant questions and using different types of scientific enquiries to answer them • setting up simple practical enquiries, comparative and fair tests • making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • gathering, recording, classifying and presenting data in a variety of ways to help in answering questions • recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • identifying differences, similarities or changes related to simple scientific ideas and processes • using straightforward scientific evidence to answer questions or to support their findings. 	<ul style="list-style-type: none"> • identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers • explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant • investigate the way in which water is transported within plants • explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. 	<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.

Year 3 Statutory Requirements (continued)

Rocks	Light	Forces and Magnets
<ul style="list-style-type: none"> compare and group together different kinds of rocks on the basis of their appearance and simple physical properties describe in simple terms how fossils are formed when things that have lived are trapped within rock recognise that soils are made from rocks and organic matter. 	<ul style="list-style-type: none"> recognise that they need light in order to see things and that dark is the absence of light notice that light is reflected from surfaces recognise that light from the sun can be dangerous and that there are ways to protect their eyes recognise that shadows are formed when the light from a light source is blocked by a solid object find patterns in the way that the size of shadows change. 	<ul style="list-style-type: none"> compare how things move on different surfaces notice that some forces need contact between two objects, but magnetic forces can act at a distance observe how magnets attract or repel each other and attract some materials and not others compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials describe magnets as having two poles predict whether two magnets will attract or repel each other, depending on which poles are facing.

Science: Year 3 Overview

	ANIMALS (including Humans)	PLANTS	LIGHT	FORCES and MAGNETS	ROCKS
YEAR 3	<ul style="list-style-type: none"> • Nutrition, linked to what we eat • Skeletons and muscles 	<ul style="list-style-type: none"> • Function of different parts of plants • What different plants need to flourish • Journey of water through a plant • Life cycle of a plant 	<ul style="list-style-type: none"> • Sources, including the Sun • Protecting eyes from the Sun • Shadows • Reflection /mirrors 	<ul style="list-style-type: none"> • How magnets attract/repel some materials • Magnetic poles • Friction 	<ul style="list-style-type: none"> • How rocks are formed • Different kinds of rocks • Fossils • Soil
Possible Learning Challenges	<ul style="list-style-type: none"> • How can Usain Bolt move so quickly? 	<ul style="list-style-type: none"> • How did that blossom become an apple? 	<ul style="list-style-type: none"> • How far can you throw your shadow? 	<ul style="list-style-type: none"> • Are you attractive enough? 	<ul style="list-style-type: none"> • What do rocks tell us about the way the Earth was formed?

Scientific Knowledge, Skills and Understanding within the National Curriculum

Year 3 Science

Knowledge, Skills and Understanding breakdown for Working Scientifically

Year 3

Planning	Obtaining and presenting evidence	Considering evidence and evaluating
<ul style="list-style-type: none"> • Can they use different ideas and suggest how to find something out? • Can they make and record a prediction before testing? • Can they plan a fair test and explain why it was fair? • Can they set up a simple fair test to make comparisons? • Can they explain why they need to collect information to answer a question? 	<ul style="list-style-type: none"> • Can they measure using different equipment and units of measure? • Can they record their observations in different ways? <labelled diagrams, charts etc> • Can they describe what they have found using scientific language? • Can they make accurate measurements using standard units? 	<ul style="list-style-type: none"> • Can they explain what they have found out and use their measurements to say whether it helps to answer their question? • Can they use a range of equipment (including a data-logger) in a simple test?

Year 3 (Challenging)

<ul style="list-style-type: none"> • Can they record and present what they have found using scientific language, drawings, labelled diagrams, bar charts and tables? 	<ul style="list-style-type: none"> • Can they explain their findings in different ways (display, presentation, writing)? • Can they use their findings to draw a simple conclusion? • Can they suggest improvements and predictions for further tests? 	<ul style="list-style-type: none"> • Can they suggest how to improve their work if they did it again?
---	---	--

Knowledge, Skills and Understanding breakdown for Plants and Animals, including Humans

Year 3

Animals, including humans

- Can they explain the importance of a nutritionally balanced diet?
- Can they describe how nutrients, water and oxygen are transported within animals and humans?
- Can they identify that animals, including humans, cannot make their own food: they get nutrition from what they eat?
- Can they describe and explain the skeletal system of a human?
- Can they describe and explain the muscular system of a human?

Plants

- Can they identify and describe the functions of different parts of flowering plants? (roots, stem/trunk, leaves and flowers)?
- Can they explore the requirement of plants for life and growth (air, light, water, nutrients from soil, and room to grow)?
- Can they explain how they vary from plant to plant?
- Can they investigate the way in which water is transported within plants?
- Can they explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal?

Year 3 (Challenging)

- Can they explain how the muscular and skeletal systems work together to create movement?
- Can they classify living things and non-living things by a number of characteristics that they have thought of?
- Can they explain how people, weather and the environment can affect living things?
- Can they explain how certain living things depend on one another to survive?

- Can they classify a range of common plants according to many criteria (environment found, size, climate required, etc.)?

Knowledge, Skills and Understanding breakdown for Rocks

Year 3

Rocks

- Can they compare and group together different rocks on the basis of their appearance and simple physical properties?
- Can they describe and explain how different rocks can be useful to us?
- Can they describe and explain the differences between sedimentary and igneous rocks, considering the way they are formed?
- Can they describe in simple terms how fossils are formed when things that have lived are trapped within rock?
- Can they recognise that soils are made from rocks and organic matter?

Year 3 (Challenging)

- Can they classify igneous and sedimentary rocks?
- Can they begin to relate the properties of rocks with their uses?

Knowledge, Skills and Understanding breakdown for Light, Forces and Magnets

Year 3

Forces and magnets

- Can they compare how things move on different surfaces?
- Can they observe that magnetic forces can be transmitted without direct contact?
- Can they observe how some magnets attract or repel each other?
- Can they classify which materials are attracted to magnets and which are not?
- Can they notice that some forces need contact between two objects, but magnetic forces can act at a distance?
- Can they compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet?
- Can they identify some magnetic materials?
- Can they describe magnets have having two poles (N & S)?
- Can they predict whether two magnets will attract or repel each other depending on which poles are facing?

Light

- Can they recognise that they need light in order to see things?
- Can they recognise that dark is the absence of light?
- Can they notice that light is reflected from surfaces?
- Can they recognise that light from the sun can be dangerous and that there are ways to protect their eyes?
- Can they recognise that shadows are formed when the light from a light source is blocked by a solid object?
- Can they find patterns in the way that the size of shadows change?

Year 3 (Challenging)

- Can they investigate the strengths of different magnets and find fair ways to compare them?
- Can they explain why lights need to be bright or dimmer according to need?
- Can they explain the difference between transparent, translucent and opaque?
- Can they explain why lights need to be bright or dimmer according to need?
- Can they make a bulb go on and off?
- Can they say what happens to the electricity when more batteries are added?
- Can they explain why their shadow changes when the light source is moved closer or further from the object?

Year 3: How can Usain Bolt move so quickly?

KS2 Science (Y3 Animals, including humans)

- 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.

WOW: Check to see how far each child can run in the 9.68 secs which is the world record for 100m. Compare with Usain Bolt.

LC1	How long will it take you to run 100m?
LC2	How does the arm joint work and can you make a similar joint?
LC3	What role does the muscle have in helping the arm to move?
LC4	How does the food we eat get transported around our body?
LC5	Can you sketch the position that Usain Bolt is in from 'on your marks to go'?
LC6	How can you create a movement that links six different balances, using your body?
LC7	Reflection: From photographs of your balances explain how the skeleton and muscles link to support you.

Working Scientifically: Identifying and grouping animals with and without skeletons and observing and comparing their movement; exploring ideas about what would happen if humans did not have skeletons.

Numeracy Link: Children to time themselves running and then create graphs to make comparisons with Usain Bolt's time.

Literacy Link: Children to work on explanation texts and explain how the food is transported by the blood to the various muscles in the body.

Creative Arts Link: Create different sketches of the position of a body as it moves from crouch to upright when running. Think of proportions. Think of Giacometti; Thomas Heatherwick (b of the bang)

Expressive Arts Link: Create dance movements, from ballet to street dance, which reflect the body's ability to balance and move between different positions.



Year 3: How can Usain Bolt move so quickly?

Year 3: Science and Art Knowledge, Skills and Understanding

Science

Animals, including Humans

- Can they make and record a prediction before testing?
- Can they measure using different equipment and units of measure?
- Can they record their observations in different ways? (labelled diagrams, charts etc.)
- Can they describe what they have found using scientific words?
- Can they make accurate measurements using standard units?
- Can they explain what they have found out and use their measurements to say whether it helps to answer their question?

- Can they explain the importance of a nutritious balanced diet?
- Can they describe how nutrients, water and oxygen are transported within animals and humans?
- Can they describe and explain the skeletal system of a human?
- Can they describe and explain the muscular system of a human?

Art & Design

- Can they use their sketches to produce a final piece of work?
- Can they write an explanation of their sketch in notes?
- Can they use different grades of pencil shade, show different tones, show tone and texture?
- Can they make notes in their sketch book about techniques used by artists?
- Can they suggest improvements to their work by keeping notes in their sketch books?
- Can they show proportion when drawing the face or the whole body?

Year 3 (Challenging)

- Can they record and present what they have found using scientific language, drawings, labeled diagrams, bar charts, keys and tables?
- Can they explain their findings in different ways (display, presentation, writing)?
- Can they use their findings to draw a simple conclusion?

- Can they explain how the muscular and skeletal systems work together to create movement?

Year 3: How did that blossom become an apple?

KS2 Science (Y3 Plants) – (May or June)

- identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
- explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant
- investigate the way in which water is transported within plants
- explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.

WOW: Start by making a fruit salad and discuss the fruit used

LC1 What is blossom and why is it so important for the fruit we grow?

LC2 How can you make a presentation to show the life cycle of an apple?

LC3 Could we grow any fruit in this country? If not why not?

LC4 How can you capture the beauty of the blossom?

LC5 What happens to the water that you put into the soil to help a plant grow?

LC6 What do we mean by seed dispersal and why is it so important for our plants?

LC7 Why is it so important for us to look after the bees in our country?

LC8 Reflection: Choose one of these areas and perform a presentation to the rest of the class: Why are bees important to us?; Where did that apple come from?; What is seed dispersal?

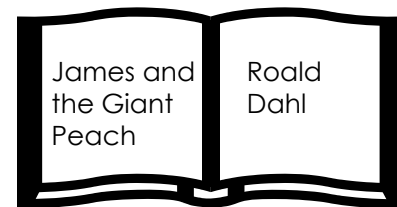
Working Scientifically: Children will be provided with many opportunities to carry out their own research based on different aspects of plants they will have looked at.

Comparing the effect of different factors on plant growth, for example, the amount of light, the amount of fertiliser; discovering how seeds are formed by observing the different stages of plant life cycles over a period of time; looking for patterns in the structure of fruits that relate to how the seeds are dispersed.

Creative Art Link: Children to create their own fruit salads taking account of food hygiene and design procedures

Literacy Link: Children to write information texts on a range of aspects such as, pollination, seed dispersal, the life cycle of an apple, etc.

Creative Art Link: Children to use water colours to create paintings of different blossom working from first hand experience.



Year 3: How did that blossom become an apple?

Year 3: Science, Art and DT Knowledge, Skills and Understanding

Science - Plants

- Can they record their observations in different ways? (labelled diagrams, charts etc.)
- Can they describe what they have found using scientific words?
- Can they identify and describe the functions of different parts of plants? (roots, stem, leaves and flowers)
- Can they identify what a plants needs for life and growth?
- Can they describe the ways in which nutrients, water and oxygen are transported within plants?
- Can they explain how the needs and functions of plant parts vary from plant to plant e.g. insect and wind pollinated plants?
- Can they investigate the way in which water is transported within plants?

Art & Design

- Can they predict with accuracy the colours that they mix?
- Do they know where each of the primary and secondary colours sits on the colour wheel?
- Can they create a background using a wash?
- Can they use a range of brushes to create different effects?
- Can they use their sketch books to express feelings about a subject and to describe likes and dislikes?
- Can they make notes in their sketch book about techniques used by artists?
- Can they suggest improvements to their work by keeping notes in their sketch books?
- Can they explore work from other periods of time?
- Are they beginning to understand the viewpoints of others by looking at images of people and understand how they are feeling and what the artist is trying to express in their work?

Year 3 (Challenging)

- Can they explain their findings in different ways (display, presentation, writing)?
- Can they use their findings to draw a simple conclusion?
- Can they record and present what they have found using scientific language, drawings, labeled diagrams, bar charts, keys and tables?
- Can they classify a range of common plants according to many criteria (environment found, size, climate required, etc.)?
- Can they explore the role of flowers in the life cycle of flowering plants. Including pollination, seed formation and seed dispersal?

Design Technology

- Can they show that their design meets a range of requirements?
- Can they put together a step-by-step plan which shows the order and also what equipment and tools they need?
- Can they describe their design using an accurately labelled sketch and words?
- How realistic is their plan?
- Can they use equipment and tools accurately?
- What did they change which made their design even better?

Year 3: How far can you throw your shadow?

KS2 Science (Y3 Light)

- recognise that they need light in order to see things and that dark is the absence of light
- notice that light is reflected from surfaces
- recognise that light from the Sun can be dangerous and that there are ways to protect their eyes
- recognise that shadows are formed when the light from a light source is blocked by a solid object
- find patterns in the way that the size of shadows change.

WOW: Use torches to create different shapes and attempt to photograph them.

LC1	How can you show that your shadow changes according to the position of the Sun?
LC2	Why do footballers in a night match often have four shadows?
LC3	How can you explain the relationship between the Sun and the Moon (in terms of lighting up the moon)?
LC4	How can you design and make a periscope to show how light reflects?
LC5	How can you set up an experiment to show how shiny things respond in the dark?
LC6	Can you create a painting which shows reflection of light on water?
LC7	Can you create a stained glass window which is translucent?
LC8	Reflection: Put together a photo story of the completed challenge.

Working Scientifically: Set up a fair test to see what happens when there is more than one source of light and record findings.

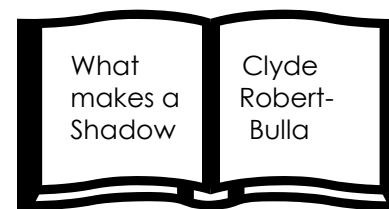
Looking for patterns in what happens to shadows when the light source moves or the distance between the light source and the object changes.

Numeracy Link: Children to measure the lengths of their shadows and to present their findings in graphical format

Creative Art Link: Children to design and make periscopes, taking account of the light source

Creative Arts Link: Children to look at the work of Turner and use water colour or acrylic paint to create the reflection on water.

Creative Arts Link: Children to design and create their own stained glass windows having thought about their design.



Year 3: How far can you throw your shadow?

Year 3: Science, Art and DT Knowledge, Skills and Understanding

Science - Light

- Can they make and record a prediction before testing?
- Can they measure using different equipment and units of measure?
- Can they record their observations in different ways? (labelled diagrams, charts etc.)
- Can they describe what they have found using scientific words?
- Can they make accurate measurements using standard units?
- Can they explain what they have found out and use their measurements to say whether it helps to answer their question?
- Can they explain what dark is using words like shadow?

Art & Design

- Can they predict with accuracy the colours that they mix?
- Do they know where each of the primary and secondary colours sits on the colour wheel?
- Can they create a background using a wash?
- Can they use a range of brushes to create different effects?
- Can they use their sketch books to express feelings about a subject and to describe likes and dislikes?
- Can they make notes in their sketch book about techniques used by artists?
- Can they suggest improvements to their work by keeping notes in their sketch books?
- Can they explore work from other periods of time?
- Are they beginning to understand the viewpoints of others by looking at images, people and understand how they are feeling and what the artist is trying to express in their work?

Year 3 (Challenging)

- Can they record and present what they have found using scientific language, drawings, labeled diagrams, bar charts, keys and tables?
- Can they explain their findings in different ways (display, presentation, writing)?
- Can they use their findings to draw a simple conclusion?

- Can they explain why lights need to be bright or dimmer according to need?
- Can they explain why their shadow changes when the light source is moved closer or further from the object?

Design Technology

- Can they show that their design meets a range of requirements?
- Can they put together a step-by-step plan which shows the order and also what equipment and tools they need?
- Can they describe their design using an accurately labelled sketch and words?
- How realistic is their plan?
- Can they use equipment and tools accurately?
- What did they change which made their design even better?

Year 3: Are you attractive enough?

KS2 Science (Y3 Forces and Magnets)

- compare how things move on different surfaces
- notice that some forces need contact between two objects, but magnetic forces can act at a distance
- observe how magnets attract or repel each other and attract some materials and not others
- compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials
- describe magnets as having two poles
- predict whether two magnets will attract or repel each other, depending on which poles are facing.

WOW: Explore with a number of magnets and work out which side attracts and which side repels

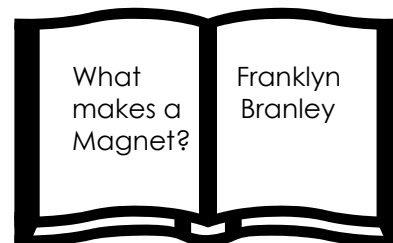
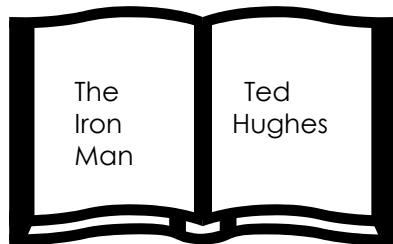
LC1	What is a magnet and what is its relationship to the North Pole?
LC2	What do we mean by attract and repel?
LC3	What other force do we know about and how can we classify forces?
LC4	How can we use magnets to make an exciting game?
LC5	Reflection: Create a television advert for your magnetic game

Working Scientifically: Children will set up a fair test to consider what is attracted by magnets and what is repelled by magnets. Exploring the strengths of different magnets and finding a fair way to compare them; sorting materials into those that are magnetic and those that are not; looking for patterns in the way that magnets behave in relation to each other and what might affect this, such as the strength of the magnet or which pole faces another; identifying how these properties make magnets useful in everyday items and suggesting creative uses for different magnets.

Literacy Link: Children to create tables of classifications in list format

Literacy Link: Children to focus on persuasive skills to make their game attractive to others.

Creative Art Link: Children to plan, design and make a simple game based on magnets.



Year 3: Are you attractive enough?

Year 3: Science and DT Knowledge, Skills and Understanding

Science – Forces and Magnets

- Can they use different ideas and suggest how to find something out?
- Can they make and record a prediction before testing?
- Can they plan a fair test and explain why it was fair?
- Can you set up a simple fair test to make comparisons?
- Can they explain why they need to collect information to answer a question?

- Can they observe that magnetic forces can be transmitted without direct contact?
- Can they talk about how some magnets attract or repel each other?
- Can they classify which materials are attracted to magnets?
- Can they describe the speed and direction of moving objects?

Design Technology

- Do they select the most appropriate tools and techniques to use for a given task?
- Can they show that their design meets a range of requirements?
- Can they put together a step-by-step plan which shows the order and also what equipment and tools they need?
- Can they describe their design using an accurately labelled sketch and words?
- How realistic is their plan?
- Can they use equipment and tools accurately?
- What did they change which made their design even better?

Year 3 (Challenging)

- Can they record and present what they have found using scientific language, drawings, labeled diagrams, bar charts, keys and tables?

- Can they investigate the strengths of different magnets and find fair ways to compare them?
- Can they explain why an object will move faster if it is rolling down a hill or a slope?

Year 3: What do rocks tell us about the way the Earth was formed?

(Linked to 'What makes the Earth Angry?')

KS2 Science (Y3 Rocks)

- compare and group together different kinds of rocks on the basis of their appearance and simple physical properties
- describe in simple terms how fossils are formed when things that have lived are trapped within rock
- recognise that soils are made from rocks and organic matter.

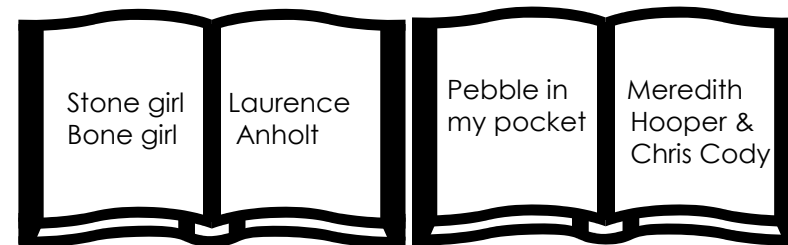
WOW: Bring in a collection of rocks and let the children touch and talk about them.

LC1	What are fossils and why are they so fascinating?
LC2	What can you find out about sedimentary and igneous rocks?
LC3	Why is a diamond a 'girl's best friend'?
LC4	Can you collect some rocks to create a rock sculpture?
LC5	Reflection: Can you work as a team to create a power-point presentation about rocks?

Working Scientifically: Observing rocks, including those used in buildings and gravestones, and exploring how and why they might have changed over time; using a hand lens or microscope to help them to identify and classify rocks according to whether they have grains or crystals, and whether they have fossils in them.

Literacy Link: Opportunities here for children to carry out individual research based on rock types, including fossils.

Creative Art Link: Children to plan, design and make a rock sculpture using large, medium and small rocks. These should be photographed and used as part of their reflection presentations.



Short Unit

Year 3: What do rocks tell us about the way the Earth was formed?

Year 3: Science and Art Knowledge, Skills and Understanding

Science – Rocks

- Can they compare and group together different rocks based on their simple physical properties?
- Can they describe and explain how different rocks can be useful to us?
- Can they describe how fossils are formed?
- Can they recognise that soils are formed from rocks and organic matter?

Art & Design

- Can they add onto their work to create texture and shape?
- Can they work with life size materials?
- Can they use their sketch books to express feelings about a subject and to describe likes and dislikes?
- Can they make notes in their sketch books about techniques used by artists?
- Can they suggest improvements to their work by keeping notes in their sketch books?

Year 3 (Challenging)

- Can they classify igneous and sedimentary rocks?
- Can they begin to relate the properties of rocks with their uses?

Science Learning Challenges

Year 4 Science

Year 4 Statutory Requirements

Working Scientifically (Y3 & Y4)	Living Things and their Habitats	Animals, including humans
<ul style="list-style-type: none"> • asking relevant questions and using different types of scientific enquiries to answer them • setting up simple practical enquiries, comparative and fair tests • making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • gathering, recording, classifying and presenting data in a variety of ways to help in answering questions • recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • identifying differences, similarities or changes related to simple scientific ideas and processes • using straightforward scientific evidence to answer questions or to support their findings. 	<ul style="list-style-type: none"> • recognise that living things can be grouped in a variety of ways • explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment • recognise that environments can change and that this can sometimes pose dangers to living things. 	<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.

Year 4 Statutory Requirements (continued)

States of Matter	Sound	Electricity
<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. 	<ul style="list-style-type: none"> identify how sounds are made, associating some of them with something vibrating recognise that vibrations from sounds travel through a medium to the ear find patterns between the pitch of a sound and features of the object that produced it find patterns between the volume of a sound and the strength of the vibrations that produced it recognise that sounds get fainter as the distance from the sound source increases. 	<ul style="list-style-type: none"> identify common appliances that run on electricity construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, 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.

Science: Year 4 Overview

	ANIMALS, including Humans	LIVING THINGS and their Habitats	STATES OF MATTER	ELECTRICITY	SOUND
YEAR 4	<ul style="list-style-type: none"> • Digestive System • Teeth • Food chains • Predators and prey 	<ul style="list-style-type: none"> • Identify and name a variety of living things (plants and animals) in the local and wider environment and group them • Recognise that environments can change and can pose dangers 	<ul style="list-style-type: none"> • Solids, Liquids and Gases • Heating and cooling (no baking, etc.) • Evaporation and condensation 	<ul style="list-style-type: none"> • Identify common appliances • Construct simple circuits including switches • Common conductors and insulators • Alternative sources of energy 	<ul style="list-style-type: none"> • Sources • Vibration • Loud and faint • Pitch • Volume • Sound travelling
Possible Learning Challenges	<ul style="list-style-type: none"> • What happens to the food we eat? 	<ul style="list-style-type: none"> • Which wild animals and plants thrive in your locality? 	<ul style="list-style-type: none"> • How would we survive without water? 	<ul style="list-style-type: none"> • How could we cope without electricity for one day? 	<ul style="list-style-type: none"> • Why is the sound that 'One Direction' makes enjoyed by so many?

Scientific Knowledge, Skills and Understanding within the National Curriculum

Year 4 Science

Knowledge, Skills and Understanding breakdown for Working Scientifically

Year 4

Planning	Obtaining and presenting evidence	Considering evidence and evaluating
<ul style="list-style-type: none"> • Can they set up a simple fair test to make comparisons? • Can they plan a fair test and isolate variables, explaining why it was fair and which variables have been isolated? • Can they suggest improvements and predictions? • Can they decide which information needs to be collected and decide which is the best way for collecting it? • Can they use their findings to draw a simple conclusion? 	<ul style="list-style-type: none"> • Can they take measurements using different equipment and units of measure and record what they have found in a range of ways? • Can they make accurate measurements using standard units? • Can they explain their findings in different ways (display, presentation, writing)? 	<ul style="list-style-type: none"> • Can they find any patterns in their evidence or measurements? • Can they make a prediction based on something they have found out? • Can they evaluate what they have found using scientific language, drawings, labelled diagrams, bar charts and tables? • Can they use straightforward scientific evidence to answer questions or to support their findings? • Can they identify differences, similarities or changes related to simple scientific ideas or processes?

Year 4 (Challenging)

<ul style="list-style-type: none"> • Can they plan and carry out an investigation by controlling variables fairly and accurately? • Can they use test results to make further predictions and set up further comparative tests? 	<ul style="list-style-type: none"> • Can they record more complex data and results using scientific diagrams, classification keys, tables, bar charts, line graphs and models? 	<ul style="list-style-type: none"> • Can they report findings from investigations through written explanations and conclusions? • Can they use a graph or diagram to answer scientific questions?
---	---	---

Knowledge, Skills and Understanding breakdown for Living Things, their Habitats and Animals, including humans

Year 4

Animals, including humans

- Can they identify and name the basic parts of the digestive system in humans?
- Can they describe the simple functions of the basic parts of the digestive system in humans?
- Can they identify the simple function of different types of teeth in humans?
- Can they compare the teeth of herbivores and carnivores?
- Can they explain what a simple food chain shows?
- Can they construct and interpret a variety of food chains, identifying producers, predators and prey?

Living Things and their Habitats

- Can they recognise that living things can be grouped in a variety of ways?
- Can they explore and use a classification key to group, identify and name a variety of living things? (plants, vertebrates, invertebrates)
- Can they compare the classification of common plants and animals to living things found in other places? (under the sea, prehistoric)
- Do they recognise that environments can change and this can sometimes pose a danger to living things?

Year 4 (Challenging)

- Can they classify living things and non-living things by a number of characteristics that they have thought of?
- Can they explain how people, weather and the environment can affect living things?
- Can they explain how certain living things depend on one another to survive?

- Can they give reasons for how they have classified animals and plants, using their characteristics and how they are suited to their environment?
- Can they explore the work of pioneers in classification? (e.g. Carl Linnaeus)
- Can they name and group a variety of living things based on feeding patterns? (producer, consumer, predator, prey, herbivore, carnivore, omnivore)

Knowledge, Skills and Understanding breakdown for States of Matter

Year 4

States of Matter

- Can they compare and group materials together, according to whether they are solids, liquids or gases?
- Can they explain what happens to materials when they are heated or cooled?
- Can they measure or research the temperature at which different materials change state in degrees Celsius?
- Can they use measurements to explain changes to the state of water?
- Can they identify the part that evaporation and condensation has in the water cycle?
- Can they associate the rate of evaporation with temperature?

Year 4 (Challenging)

- Can they group and classify a variety of materials according to the impact of temperature on them?
- Can they explain what happens over time to materials such as puddles on the playground or washing hanging on a line?
- Can they relate temperature to change of state of materials?

Knowledge, Skills and Understanding breakdown for Sound and Electricity

Year 4

Sound

- Can they describe a range of sounds and explain how they are made?
- Can they associate some sounds with something vibrating?
- Can they compare sources of sound and explain how the sounds differ?
- Can they explain how to change a sound (louder/softer)?
- Can they recognise how vibrations from sound travel through a medium to a ear?
- Can they find patterns between the pitch of a sound and features of the object that produce it?
- Can they find patterns between the volume of the sound and the strength of the vibrations that produced it?
- Can they recognise that sounds get fainter as the distance from the sound source increases?
- Can they explain how you could change the pitch of a sound?
- Can they investigate how different materials can affect the pitch and volume of sounds?

Electricity

- Can they identify common appliances that run on electricity?
- Can they construct a simple series electric circuit?
- Can they identify and name the basic part in a series circuit, including cells, wires, bulbs, switches and buzzers?
- Can they 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?
- Can they recognise that a switch opens and closes a circuit?
- Can they associate a switch opening with whether or not a lamp lights in a simple series circuit?
- Can they recognise some common conductors and insulators?
- Can they associate metals with being good conductors?

Year 4 (Challenging)

- | | |
|---|--|
| <ul style="list-style-type: none">• Can they explain why sound gets fainter or louder according to the distance?• Can they explain how pitch and volume can be changed in a variety of ways?• Can they work out which materials give the best insulation for sound? | <ul style="list-style-type: none">• Can they explain how a bulb might get lighter?• Can they recognise if all metals are conductors of electricity?• Can they work out which metals can be used to connect across a gap in a circuit?• Can they explain why cautions are necessary for working safely with electricity? |
|---|--|

Year 4: What happens to the food we eat?

• Science Y4: Animals, including Humans

- 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.

WOW: Children to eat a piece of chocolate at the beginning of the day with a view to tracking its journey through the body. Life Caravan visits school.

LC1 What happens to that piece of chocolate once you swallow it?

LC2 Why would it not be sensible to eat a burger everyday?

LC3 What is the digestive system and why is it so important?

LC4 How can you make a simple model, using junk material, to show how the digestive system works?

LC5 Why is it important to brush your teeth each day?

LC6 Why are shark's teeth different to our teeth?

LC7 How can we create a dance that shows the movement of food through our body?

LC8 Reflection: How can you make a presentation that would help a group of younger children understand what happens in your body?

Working Scientifically: Comparing the teeth of carnivores and herbivores, and suggesting reasons for differences; finding out what damages teeth and how to look after them. They might draw and discuss their ideas about the digestive system and compare them with models or images.

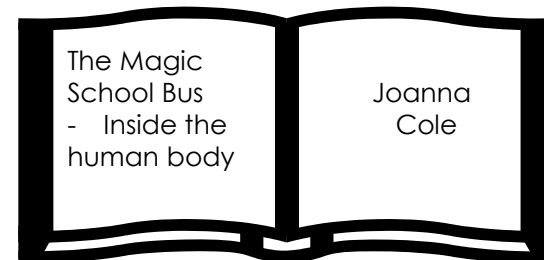
Literacy Link: Adventure story: Imagine being shrunk and being swallowed by mistake

Numeracy Link: Time intervals – looking at the journey of the chocolate through the body

- Graph work on food types

Creative Art Link: Children to design and make a model to represent the digestive system and its working.

Expressive Art Link: Children will perform a dance working in groups, which will show the movement of food through the body.



Year 4: What happens to the food we eat?

Year 4: Science, Art and DT Knowledge, Skills and Understanding

Year 4 Science: Animals, including humans

- Can they take measurements using different equipment and units of measure and record what they have found in a range of ways?
- Can they make accurate measurements using standard units?
- Can they explain their findings in different ways (display, presentation, writing)?
- Can they make a prediction based on something they have found out?
- Can they record and present what they have found using scientific language, drawings, labeled diagrams, bar charts and tables?
- Can they identify and name the basic parts of the human digestive system?
- Can they describe the function of the organs of the human digestive system?
- Can they identify the simple function of different types of human teeth?
- Can they compare the teeth of herbivores and carnivores?
- Can they explain what a simple food chain shows?

Year 4 Science: (Challenging)

- Can they record more complex data and results using scientific diagrams, classification keys, tables, bar charts, line graphs and models?
- Can they report findings from investigations through written explanations and conclusions?
- Can they use a graph or diagram to answer scientific questions?

Art & Design : Drawing

- Can they begin to show facial expressions and body language in their sketches?
- Can they identify and draw simple objects, and use marks and lines to produce texture?
- Can they organise line, tone, shape and colour to represent figures and forms in movement?
- Can they show reflections?
- Can they explain why they have chosen specific materials to draw with?

Design Technology

- Can they come up with at least one idea about how to create their product?
- Do they take account of the ideas of others when designing?
- Can they produce a plan and explain it to others?
- Can they suggest some improvements and say what was good and not so good about their original design?
- Can they tell if their finished product is going to be good quality?
- Are they conscious the need to produce something that will be liked by others?
- Can they show a good level of expertise when using a range of tools and equipment?
- Have they thought of how they will check if their design is successful?
- Can they begin to explain how they can improve their original design?
- Can they evaluate their product, thinking of both its appearance and the way it works?

Year 4: Which wild animals and plants thrive in your locality?

Science Y4: Living Things and their Habitats

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

WOW: Visit to a Garden Centre

LC1	Which wild flowers will we find within a Km of our school?
LC2	How would Georgia O'Keefe have painted these flowers?
LC3	Would dinosaurs have roamed around your locality in the past?
LC4	Why did dinosaurs die out?
LC5	Why are there large wild animals like the tiger in danger of extinction today?
LC6	Which birds can we see out of our classroom window?
LC7	How can we encourage more birds to visit our school?
LC8	Reflection: Can you create a documentary about saving a species of your choice.

Working Scientifically: explore local small invertebrates and using guides or keys to identify them; making a guide to local living things; raising and answering questions based on their observations of animals and what they have found out about other animals that they have researched.

Literacy Link: Develop fact files about wild flowers and endangered animals

Numeracy Link: Classification of plants and birds, leading to graphs and tables

Creative Art Link: Taking photographs of flowers in the manner that Georgia O'Keefe would have done.

- Develop pencil sketches from the photographs
- Paint – water colour or acrylic

Creative Art Link: Designing and making a bird box which will be used to help attract birds to the immediate area around the school



Year 4: Which wild animals and plants will we find in your locality?

Year 4: Science, Art and DT Knowledge, Skills and Understanding

Year 4 Science: All Living Things

- Can they take measurements using different equipment and units of measure and record what they have found in a range of ways?
- Can they make accurate measurements using standard units?
- Can they explain their findings in different ways (display, presentation, writing)?
- Can they find any patterns in their evidence or measurements?
- Can they make a prediction based on something they have found out?
- Can they record and present what they have found using scientific language, drawings, labeled diagrams, bar charts and tables?

- Can they use a classification key to group a variety of living things? (plants, vertebrates, invertebrates)
- Can they compare the classification of common plants and animals to living things found in other places? (under the sea, prehistoric)
- Can they name and group a variety of living things based on feeding patterns? (producer, consumer, predator, prey, herbivore, carnivore, omnivore)

Year 4 Challenging

- Can they record more complex data and results using scientific diagrams, classification keys, tables, bar charts, line graphs and models?
- Can they report findings from investigations through written explanations and conclusions?
- Can they use a graph or diagram to answer scientific questions?

Art & Design

- Can they create all the colours they need?
- Can they create mood in their paintings?
- Do they successfully use shading to create mood and feeling?
- Can they use their sketch books to express their feelings about various subjects and outline likes and dislikes?
- Can they produce a montage all about themselves?
- Do they use their sketch books to adapt and improve their original ideas?
- Do they keep notes about the purpose of their work in their sketch books?

Design Technology

- Can they come up with at least one idea about how to create their product?
- Do they take account of the ideas of others when designing?
- Can they produce a plan and explain it others?
- Can they suggest some improvements and say what was good and not so good about their original design?
- Can they tell if their finished product is going to be good quality?
- Are they conscious of the need to produce something that will be liked by others?
- Can they show a good level of expertise when using a range of tools and equipment?
- Have they thought of how they will check if their design is successful?
- Can they begin to explain how they can improve their original design?
- Can they evaluate their product, thinking of both appearance and the way it works?

Year 4: How would we survive without water?

Science Y4: States of Matter

- 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.

WOW: Create different shapes with clay or plasticine and put water into the mould and freeze it.

LC1 How can you classify solids, liquids and gases?

LC2 How do we measure temperature and how does temperature vary during the day and across the world?

LC3 How can water be a solid, liquid and gas?

LC4 Which other materials change when they are heated or cooled?

LC5 Where do puddles on the playground disappear to?

LC6 Why do windows sometimes steam up?

LC7 How can you create a dance that shows the three states of water?

LC8 Reflection: Can you put together a presentation to show how water is our life line?

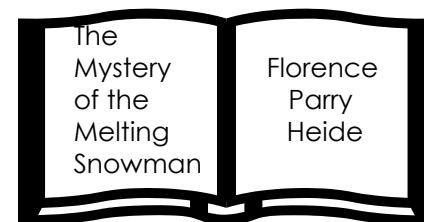
Working Scientifically: Huge opportunities here for children to work scientifically by setting up experiments and investigations associated with changing state.

Exploring the effect of temperature on substances such as chocolate, butter, cream (for example, to make food such as chocolate crispy cakes and ice-cream for a party.

Literacy Link: There are several opportunities for children to apply their skills in writing and reading in different contexts. These occur in LC1, 2, 3, 4, 5 and 6.

Numeracy Link: There is a natural link with children's maths work on temperature.

Expressive Art Link: Children will be provided with an opportunity to work in a small group and create a dance based on the change of state of water.



Year 4: How would we survive without water?

Year 4: Science and Dance Knowledge, Skills and Understanding

Year 4 Science: States of Matter

- Can they set up a simple fair test to make comparisons?
- Can they plan a fair test and isolate variables and explain why it was fair and explain which variables have been isolated?
- Can they suggest improvements and predictions?
- Can they decide which information needs to be collected and decide which is the best way for collecting it?
- Can they use their findings to draw a simple conclusion?

- Can they compare and group materials based on their states of matter, ie, liquid, solid or gas?
- Can they explain what happens to materials when they are heated or cooled?
- Can they measure the temperature at which different materials change state?
- Can they use measurements to explain changes to the state of water?
- Can they link changes of state to the water cycle?

Year 4 Challenging

- Can they plan and carry out an investigation by controlling variables fairly and accurately?
- Can they use test results to make further predictions and set up further comparative tests?

- Can they group and classify a variety of materials according to the impact of temperature on them?
- Can they explain what happens over time to materials such as puddles on the playground or washing hanging on a line?
- Can they relate temperature to change of state of materials?

Dance

- Can they respond imaginatively to a range of stimuli related to character and narrative?
- Do they use simple motifs and movement patterns to structure dance phrases on their own, with a partner and in a group?
- Can they refine, repeat and remember dance phrases and dances?
- Can they perform dances clearly and fluently?
- Can they show sensitivity to the dance idea and the accompaniment?
- Do they show a clear understanding of how to warm-up and cool-down safely?
- Do they describe, interpret and evaluate dance, using appropriate language?

Challenging

- Can they structure and vary longer dances?
- Do they develop movement ideas for others?
- Do they show a good sense of rhythm and style when performing?
- Can they remember and perform a range of warm-up and cool-down activities?
- Can they give reasons why physical activity is good for health?
- Do they use a range of dance vocabulary to describe, interpret and evaluate dance?

Year 4: How could we cope without electricity for one day?

• Science Y4: Electricity

- identify common appliances that run on electricity
- construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, 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.

WOW: Children to spend a full day without access to electricity. This to be organised and liaised with home.

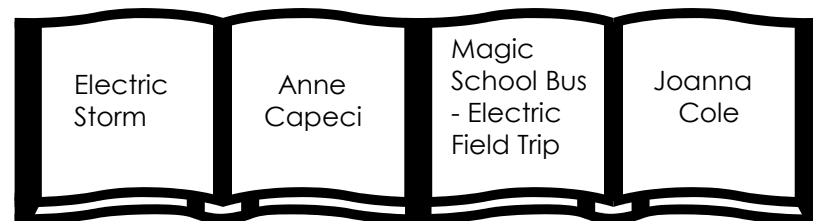
LC1	Why have we become so dependent on electricity?
LC2	How can you create an electrical circuit that has a switch or a buzzer?
LC3	What are conductors and insulators and how are they associated with electricity?
LC4	What! no TV or play-station!: what shall we do?
LC5	Could you create a meal that has not required electricity to prepare it?
LC6	How is electricity generated and what do we mean by alternative sources?
LC7	Reflection: Working as a team, can you put together a presentation which tells us about electricity?

Working Scientifically: observing patterns, for example, that bulbs get brighter if more cells are added, that metals tend to be conductors of electricity, and that some materials can and some cannot be used to connect across a gap in a circuit.

Literacy Link: Children write a letter to their parents explaining about spending a day without electricity and asking for their support for this to happen at home also. In addition, there are many opportunities for children to use explanation texts to support their work.

Creative Art Link: Children to design and make a game which they could play as an alternative to an electrically powered game.

Creative Art Link: Children to design, make and plan a meal which they will eat. The issue is that electricity must not have been required when preparing the meal.



Year 4: How could we cope without electricity for one day?

Year 4: Science and DT Knowledge, Skills and Understanding

Year 4 Science: Electricity

- Can they set up a simple fair test to make comparisons?
- Can they plan a fair test and isolate variables and explain why it was fair and explain which variables have been isolated?
- Can they suggest improvements and predictions?
- Can they decide which information needs to be collected and decide which is the best way for collecting it?
- Can they use their findings to draw a simple conclusion?

- Can they explain how electricity is useful to us?
- Can they construct a simple circuit?
- Can they explain what a conductor is and test materials for conductivity?
- Can they explain closed and open circuits?
- Can they construct a circuit with a switch?
- Can they recognise some common conductors and insulators?

Design Technology

- Can they come up with at least one idea about how to create their product?
- Do they take account of the ideas of others when designing?
- Can they produce a plan and explain it to others?
- Can they suggest some improvements and say what was good and not so good about their original design?
- Can they tell if their finished product is going to be good quality?
- Are they conscious of the need to produce something that will be liked by others?
- Can they show a good level of expertise when using a range of tools and equipment?
- Have they thought of how they will check if their design is successful?
- Can they begin to explain how they can improve their original design?
- Can they evaluate their product, thinking of both its appearance and the way it works?
- **Food Technology:** Do they know what to do to be hygienic and safe?
- Have they thought what they can do to present their product in an interesting way?
- **Using materials:** Can they measure carefully so as to make sure they have not made mistakes?
- How have they attempted to make their product strong?

Year 4 Challenging

- Can they plan and carry out an investigation by controlling variables fairly and accurately?
- Can they use test results to make further predictions and set up further comparative tests?

- Can they explain how a bulb might get lighter?
- Can they recognise if all metals are conductors of electricity?
- Can they work out which metals can be used to connect across a gap in a circuit?

Year 4: Why is the sound that 'One Direction' makes enjoyed by so many?

Science Y4: Sound

- identify how sounds are made, associating some of them with something vibrating
- recognise that vibrations from sounds travel through a medium to the ear
- find patterns between the pitch of a sound and features of the object that produced it
- find patterns between the volume of a sound and the strength of the vibrations that produced it
- recognise that sounds get fainter as the distance from the sound source increases.

WOW: Listen to a range of different music: rock, classical and opera and discuss likes and dislikes

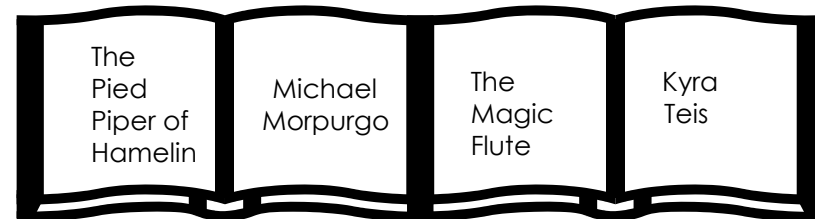
LC1	What caused that 'racket'?
LC2	How do your ears work?
LC3	What do we mean by the pitch and volume of the sound?
LC4	Does sound have the same intensity the further away you go from the source?
LC5	Could you be the next X Factor star?
LC6	What do we know about the way telephones work and how have they changed over time?
LC7	Reflection: A performance in the style of an X Factor talent show but with a strong emphasis on why some may prefer one source of music as opposed to another.

Working Scientifically: Finding patterns in the data (for example, blowing across the top of bottles, changing the length and thickness of elastic bands). They might make earmuffs from a variety of different materials to investigate which provides the best insulation against sound. They could make and play their own instruments by using what they have found out about pitch and volume.

Expressive Arts Link: This is a music appreciation opportunity with children being encouraged to be precise about their likes and dislikes in relation to a range of music provided for them.

Numeracy Link: Many opportunities through this challenge to create tables, graphs as well as measure.

Expressive Art Link: Children will perform as a group with some performing and others directing as their talents allow. This will end up as a performance for the whole school or for a selection of pupils and staff.



Year 4: Why is the sound that 'One Direction' makes enjoyed by so many?

Year 4: Science and Music Knowledge, Skills and Understanding

Year 4 Science: Sound

- Can they take measurements using different equipment and units of measure and record what they have found in a range of ways?
- Can they make accurate measurements using standard units?
- Can they explain their findings in different ways (display, presentation, writing)?
- Can they find any patterns in their evidence or measurements?
- Can they make a prediction based on something they have found out?
- Can they record and present what they have found using scientific language, drawings, labeled diagrams, bar charts, keys and tables?

- Can they describe a range of sounds and explain how they are made?
- Can they compare sources of sound and explain how the sounds differ?
- Can they explain how to change a sound (louder/softer)?
- Can they describe and explain how a sound travels from a source to our ears?
- Can they explain what happens to sound as it travels away from its source?
- Can they explain how you could change the pitch of a sound?
- Can they investigate how different materials can affect the pitch and volume of sounds?

Music

- Can they explain the place of silence and say what effect it has?
- Can they start to identify the character of a piece of music?
- Can they describe and identify the different purposes of music?
- Can they begin to identify with the style of work of Beethoven, Mozart and Elgar?
- Can they perform a simple part rhythmically?
- Can they sing songs from memory with accurate pitch?
- Can they improvise using repeated patterns?

Year 4 Challenging

- Can they explain why sound gets fainter or louder according to the distance?
- Can they explain how pitch and volume can be changed in a variety of ways?
- Can they work out which materials give the best insulation for sound?