

Year 4

Science

Block	Key NC Science Objectives	Key Science Activities and Extended Writing Opportunities
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<p>Autumn 1 – Electricity 4E It's Electric!</p> <p><i>Learn all about electrical circuits and test materials ability to conduct electricity. Put your knowledge of circuits on display by building your own circuit to create a buzz-wire game. Then use your game to try to defeat a challenger. Who can remain 'disconnected' on the game? You will need to impress with your electrical knowhow.</i></p>	<p>Electricity (4E)</p> <ul style="list-style-type: none">i) identify common appliances that run on electricityii) construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzersiii) 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 batteryiv) recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuitv) recognise some common conductors and insulators, and associate metals with being good conductors <p>Working Scientifically (LKS2)</p> <ul style="list-style-type: none">i) asking relevant questions and using different types of scientific enquiries to answer themii) setting up simple practical enquiries, comparative and fair testsiii) making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggersiv) gathering, recording, classifying and presenting data in a variety of ways to help in answering questionsv) recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tablesvi) reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusionsvii) using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questionsviii) identifying differences, similarities or changes related to simple scientific ideas and processesix) using straightforward scientific evidence to answer questions or to support their findings	<ul style="list-style-type: none">● Explore electricity and understand what you already know (exploring).● Understand electricity and the dangers it poses (exploring).● Identify electrical components and explore electrical circuits (problem solving and exploring).● Sort materials into conductors and insulators by testing them within a circuit (sorting and classifying).● Using knowledge of electrical circuits, build a buzz-wire game (problem solving).● Demonstrate an understanding of electrical circuits with a class quiz. <p>Extended writing opportunity Information texts: Create detailed safety posters to highlight the dangers of electricity. Recount: Write a detailed recount, for Young Scientist of the Year competition, of your first-hand experience of testing a range of materials; include what you did, the results and your conclusions.</p>
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<p style="text-align: center;">Autumn 2 – States of Matter 4SM</p> <p style="text-align: center;">States of Matter Scientists</p> <p><i>Become experts in States of Matter! Develop and showcase an understanding of all areas of states of matter, including how materials can change from one state to another, through a large range of simple practical enquiries. Take on the challenge to demonstrate your knowledge to visitors of a Science Fair.</i></p>	<p>States of Matter (4SM)</p> <ul style="list-style-type: none"> i) compare and group materials together, according to whether they are solids, liquids or gases ii) 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) iii) identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature <p>Working Scientifically (LKS2)</p> <ul style="list-style-type: none"> i) asking relevant questions and using different types of scientific enquiries to answer them ii) setting up simple practical enquiries, comparative and fair tests iii) making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers iv) recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables v) reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions vi) using straightforward scientific evidence to answer questions or to support their findings 	<ul style="list-style-type: none"> ● Identify misconceptions and classify materials into solids, liquids and gases (sorting and classifying). ● Investigate the presence of gases (exploring). ● Understand the behaviour of particles in the different states and use a thermometer to observe temperature changes of water (observing over time/exploring). ● Investigate evaporation and condensation (fair testing/exploring). ● Understand and explain the water cycle using scientific language (exploring). ● Demonstrate an understanding of states of matter by recreating a range of simple practical enquiries (exploring). <p>Extended writing opportunity</p> <p>Information text: Write an information booklet about solids, liquids and gases, summarising the properties of these states of matter and the evidence for your understanding.</p> <p>Chronological report: Create a leaflet explaining the water cycle to others, using scientific language, for the local water authority’s education pack.</p>

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Spring 1 – Sound 4S

Listen Up!

The rock stars of the world need your help! They want their children to come to their concerts and rock-out, but they want to protect their precious ears! Find out all you can about sound; how it travels, pitch and volume. Then investigate materials to see which will provide the best insulation against sound. Be ready to present your ideas to a famous panel.

Sound (4S)

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

Working Scientifically (LKS2) (scientific enquiries to answer them

- vii)** setting up simple practical enquiries, comparative and fair tests
- viii)** making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- ix)** gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
- x)** recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- xi)** reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- xii)** using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- xiii)** identifying differences, similarities or changes related to simple scientific ideas and processes
- xiv)** using straightforward scientific evidence to answer questions or to support their findings

- Go on a ‘sound walk’ through the school and begin to think about how sound is made (**exploring**).
- Explore sound further and investigate vibrations and how sound travels (**exploring, problem solving**).
- Investigate pitch and volume by exploring instruments and the different sounds they make (**exploring, pattern seeking**).
- Understand how we hear sounds and begin to consider ways to reduce what we can hear (**exploring, pattern seeking, problem solving**).
- Plan and conduct an investigation into which material best reduces the sounds we hear (**pattern seeking, fair testing, exploring over time, problem solving**).
- Present your ear defenders design, and explain your findings (**problem solving**).

Extended writing opportunity

Explanation text: Make a picture book summarising what you have found out about sound, how to vary the pitch of a sound and the pattern between the pitch and volume of a sound.

Persuasive writing: Write an advertising leaflet with diagrams describing why your ear defender design is the best.

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Spring 2 – Living Things and their Habitats 4LvH Name that living thing!

You are needed to become experts in the use of classification keys to help group, identify and name a variety of living things! Learn about the 7 characteristics of a living thing; sort living things in a number of ways; make a dichotomous classification key to identify local invertebrates; make observational drawings and a group large-scale drawing of an insect; finally demonstrate your knowledge of classification keys to a young invited audience.

Living things and their habitats (4LvH)

- i) recognise that living things can be grouped in a variety of ways
- ii) explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment

Working Scientifically (LKS2)

- i) asking relevant questions and using different types of scientific enquiries to answer them
- ii) setting up simple practical enquiries, comparative and fair tests
- iii) making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- iv) gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
- v) recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- vi) reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- vii) using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- viii) identifying differences, similarities or changes related to simple scientific ideas and processes
- ix) using straightforward scientific evidence to answer questions or to support their findings

- Ask relevant questions about living things and their habitats and begin to group them (**sorting, classifying and identifying**).
- Observe local habitats and record living things they see around them (**exploring, sorting, classifying and identifying**).
- Create a branching database to sort and identify local invertebrates (**sorting, classifying and identifying**).
- Make close observational drawings and large-scale drawings; understand that tiny details of features help with classification (**classifying and identifying**).
- Write a branching database for a variety of living things in the wider environment (**researching and analysing secondary sources, classifying and identifying**).

Extended writing opportunity

Non-chronological writing: Write a newspaper article, for the Nature column, about your observations during your trip within the local environment.

Biography: Research some key facts about Carl Linnaeus and write a short biography about him explaining his importance.

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<p>Summer 1 – Animals, including humans 4AH</p> <p>Excuse me, are these your teeth?</p> <p><i>Excuse me, are these your teeth? Who did this poo? Am I a predator? Find the answers to these and other peculiar questions about digestion and food chains.</i></p>	<p>Animals, including humans (4AH)</p> <ul style="list-style-type: none">i) describe the simple functions of the basic parts of the digestive system in humansii) identify the different types of teeth in humans and their simple functionsiii) construct and interpret a variety of food chains, identifying producers, predators and prey <p>Working Scientifically (LKS2)</p> <ul style="list-style-type: none">i) asking relevant questions and using different types of scientific enquiries to answer themii) setting up simple practical enquiries, comparative and fair testsiii) making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggersiv) gathering, recording, classifying and presenting data in a variety of ways to help in answering questionsv) recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tablesvi) reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusionsvii) using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questionsviii) identifying differences, similarities or changes related to simple scientific ideas and processesix) using straightforward scientific evidence to answer questions or to support their findings	<ul style="list-style-type: none">● Learn about the first stage of the digestive system, consider why our teeth are different shapes and have different functions (exploring, researching, analysing secondary sources)● Use everyday objects to demonstrate the human digestive system (exploring)● Use physical activity to demonstrate an understanding of the functions of each part of the digestive system (exploring).● Find out what we can learn from a poo (exploring, researching, analysing secondary sources)● Interpret food chains and discuss the impact of changes to a chain (exploring, researching, analysing secondary sources)● Plan and perform a ‘Healthy Teeth’ assembly for an invited audience (problem solving). <p>Extended writing opportunity</p> <p>Information text: Write informative zigzag books about the different parts of the digestive system for your local health centre.</p> <p>Persuasive writing: Create a poster and leaflets, for the visitors to your ‘Healthy Teeth’ assembly, about the importance of looking after your teeth.</p>
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<p>Summer 2 – Living things and their habitats 4LvH</p> <p style="text-align: center;">Help our Habitats!</p> <p><i>Your local council needs you! They want to turn an old industrial site in your town back to a wildlife haven. Which plants and animals would have lived here? What do they need to be able to live here again? Learn about wildlife and their habitats. How have their environments changed? What can we do to help them?</i></p>	<p>Living things and their habitats (4LvH)</p> <p>i) recognise that environments can change and that this can sometimes pose dangers to living things</p> <p>Working Scientifically (LKS2)</p> <p>i) asking relevant questions and using different types of scientific enquiries to answer them</p> <p>ii) setting up simple practical enquiries, comparative and fair tests</p> <p>iii) making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers</p> <p>iv) gathering, recording, classifying and presenting data in a variety of ways to help in answering questions</p> <p>v) recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</p> <p>vi) reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</p> <p>vii) using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</p> <p>viii) identifying differences, similarities or changes related to simple scientific ideas and processes</p> <p>ix) using straightforward scientific evidence to answer questions or to support their findings</p>	<ul style="list-style-type: none"> ● Take a walk around their school environment and consider how and why changes have happened (exploring). Consider natural and manmade changes to the environment (exploring). ● Look in more detail at climate change (exploring, analysing). ● Look at some information on the impacts to living things if an environment changes (analysing). ● Plan how to make a positive change to a small local area considering the impact on people and other living things (classifying, identifying) <p>Extended writing opportunity</p> <p>Persuasive writing: Following the class debate about a proposed change to an area in the school environment, write a persuasive letter to the school governors setting out your view about what should happen next.</p> <p>Information writing: Create an information poster about the impacts on living things if an environment changes. Explain on the poster what people can do to help.</p>

Hamilton Science; Types of Investigations

'Working Scientifically' is the continuous area of study in the National Curriculum for Science in England. This aims to ensure that children have greater exposure to a range of enquiry types and that they recognize when the various forms of enquiry are taking place. This is to enable them to decide for themselves which type to use in order to tackle the question they are investigating. The following types of enquiry are included in Hamilton Science planning.

Exploring:

Discovering what happens through play and exploration, e.g. what happens when you add water to fabric?

Observing over time:

Often linked to exploring but with a time variable included, e.g. using a thermometer to observe temperature changes of water.

Sorting, classifying and identifying:

Putting things into groups based on their characteristics, e.g. in how many ways can you sort these materials?

Fair test:

Used when we can control all the variables except the one we are changing, e.g. which 'towel' material will absorb the most water?

Pattern seeking:

Used when there are too many variables to control and so a true fair test is not possible, e.g. do some people have stronger muscles because they use them more?

Problem solving:

Using the science we know to solve a problem, e.g. Using what you have learned about how sounds are made and the loudness of sounds made by different materials, design an effective bird scarer that uses wind chimes or similar.

Researching and analysing secondary sources

Using secondary sources to help answer scientific questions that cannot be answered through practical investigations, e.g. which materials are biodegradable?

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