

Year 6

Science

Block	Key NC Science Objectives	Key Science Activities and Extended Writing Opportunities
<p style="text-align: center;">Autumn 1 – Light</p> <p>Crime lab investigations</p> <p><i>A crime has been committed and the UK Crime Lab needs a team to analyse its evidence against six suspects. They need a team with mathematical prowess and a scientific line of attack. Could you be the team to tackle the mystery of the West Hollow High School laptop thief?</i></p>	<p>Light</p> <ol style="list-style-type: none"> i. Recognise that light appears to travel in straight lines ii. Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye iii. Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes iv. Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them <p>Working Scientifically (UKS2)</p> <ol style="list-style-type: none"> i. Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary ii. Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate iii. Recording results using scientific diagrams and labels iv. Using test results to make predictions to set up further comparative and fair tests v. Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations vi. Identifying scientific evidence that has been used to support or refute ideas or arguments 	<ul style="list-style-type: none"> • Investigate a range of simple light challenges (planning/fair testing/exploring) • Investigate and demonstrate that light travels in straight lines (exploring) • Investigate shadows and how they change as a result of light sources (Fair testing/exploring/pattern seeking) • Investigate how light reflects (make a periscope) (exploring/problem solving) • Explore split light (finding ‘rainbows’) (exploring) • Investigate coloured light mixing (exploring/problem solving) <p>Extended writing opportunity</p> <p>Explanations: report and present findings from your light enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in written report.</p> <p>Journalistic writing: write up the crime enquiry and final court proceedings, as if for a local newsletter.</p>

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<p>Autumn 2 - Electricity</p> <p>Electric celebrations</p> <p><i>Dare you enter the Dragons' Den and market your very own inventive festive lights decoration? Use motors, switches, bulbs and buzzers to make your product the stand-out choice of the dragons.</i></p>	<p>Electricity</p> <ol style="list-style-type: none"> i. Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit ii. Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches iii. Use recognised symbols when representing a simple circuit in a diagram <p>Working Scientifically (UKS2)</p> <ol style="list-style-type: none"> i. Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary ii. Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate iii. Recording results using scientific diagrams and labels iv. Using test results to make predictions to set up further comparative and fair tests v. Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations vi. Identifying scientific evidence that has been used to support or refute ideas or arguments 	<ul style="list-style-type: none"> • Investigate a range of simple electric circuit challenges (planning/fair testing/exploring) • Investigate the effects of voltage and number of components on a working circuit (exploring/fair testing/pattern seeking) • Explore resistance through the use of various components (exploring) • Draw circuit diagrams (analysing secondary sources) • Design and make a dimmer switch (problem solving/exploring) • Design and create a light decoration circuit (exploring/problem solving) <p>Extended writing opportunity</p> <p>Explanation: Carry out a series of enquiries that explore the effects of voltage on electrical circuit components and write up your findings, causal relationships and explanations in a written report.</p> <p>Persuasive writing: Write up the research and development of your festive lights decoration in order to persuade the Dragons that yours is the best.</p>

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<p>Spring 1 - Living Things and their Habitats</p> <p>Classification Connoisseurs</p> <p><i>Take part in classification training, gaining credits along the way to gain your Classification Connoisseur qualification. Discover Linnaeus' classic classification system and identify a range of living things right on your back door as well as exploring creatures further afield. Your training culminates in the design of your own new creatures that fit within Linnaeus' system. Develop your drawing skills along the way to create detailed scientific illustrations and gain extra credits towards a distinction grading.</i></p>	<p>Living Things and their Habitats</p> <ol style="list-style-type: none"> Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals Give reasons for classifying plants and animals based on specific characteristics <p>Working scientifically</p> <ol style="list-style-type: none"> Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs Using test results to make predictions to set up further comparative and fair tests Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations Identifying scientific evidence that has been used to support or refute ideas or arguments 	<ul style="list-style-type: none"> Make a classification system for sweets (sorting and classifying) Group animals, microorganisms and plants and identify 'odd ones out' (sorting and classifying) Observe, record and classify local area living things (exploring/sorting and classifying) Classify unusual creatures and plants (sorting and classifying) Design a 'new' creature that fits within a specific classification (sorting and classifying) Debate reasons for classifying living things as we do (sorting and classifying) <p>Extended writing opportunities</p> <p>Chronological report or persuasive writing: Write a chronological report about the life and work of Carl Linnaeus or a persuasive piece of writing arguing why he is one of the greatest scientists.</p> <p>Non-chronological report: Research some unusual living things and write up all findings in the form of a 'fact file'.</p>

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<p>Spring 2 – Evolution and Inheritance</p> <p>Game of Survival</p> <p><i>Can you succeed in the Game of Survival? Take part in a series of challenges and see if you can accrue enough points to make it onto the Game of Survival leaders' board. You will need to have your evolutionary wits about you and a keen eye for the survival of the fittest.</i></p>	<p>Evolution and Inheritance</p> <ol style="list-style-type: none"> i. Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago ii. Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents iii. Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution <p>Working scientifically</p> <ol style="list-style-type: none"> i Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary ii Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate iii Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs iv Using test results to make predictions to set up further comparative and fair tests v Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations vi Identifying scientific evidence that has been used to support or refute ideas or arguments 	<ul style="list-style-type: none"> • Identify things that are inherited and things that are learned (exploring/analysing secondary sources) • Explore variation through dog breeds (exploring) • Identify features that support survival in a given environment (pattern seeking/exploring) • Meet Darwin, Anning and Wallace and explore the role of fossils in scientific understanding of evolution (analysing secondary sources) • Use the principles of biscuit evolution to animal and plant evolution (exploring/analysing secondary sources/pattern seeking) <p>Extended writing opportunity</p> <p>Argument and debate: write up your new animal or plant explaining all adaptations to an extreme climate and why it would be the most valuable addition to the world.</p> <p>Fiction: Explain through story writing how certain features of animals have evolved.</p>

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<p>Summer 1 – Animals including humans</p> <p>The Art of being Human</p> <p><i>The link between the arts and science has always been a complex one, but you are going to create an exhibition of artwork that not only reflects the beautiful complexity of the human body but also acts as an accurate and informative presentation of the complex systems that help make us human. You will need to exhibit your art for others to see and learn from.</i></p>	<p>Animals (including humans)</p> <ol style="list-style-type: none"> i) Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood ii) Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function iii) Describe the ways in which nutrients and water are transported within animals, including humans <p>Working scientifically</p> <ol style="list-style-type: none"> i) Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary ii) Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate iii) Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs iv) Using test results to make predictions to set up further comparative and fair tests v) Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations vi) Identifying scientific evidence that has been used to support or refute ideas or arguments 	<ul style="list-style-type: none"> • Heart rates and physical exertion - a dramatic representation (observing over time/fair testing/exploring/pattern seeking) • Circulatory system sculptures (analysing secondary sources/pattern seeking) • Heartbeat sound installation (fair testing/exploring/pattern seeking) • Understanding the human body through history (analysing secondary sources) • Documentary on diet, exercise, drugs and lifestyle (fair testing, analysing secondary sources) • Plotting the journey of water and food (exploring/analysing secondary sources) <p>Extended writing opportunity</p> <p>Information/ explanation text: create an information leaflet, for a doctor's surgery, explaining the composition of blood and the role it has to play in the human body.</p> <p>Information text: create a booklet that describes the impact of drugs and alcohol on the human body.</p> <p>Descriptive writing: collect words to describe the impact on their bodies of physical exertion and use these to write a short passage describing how you might feel if being chased / trying to win an important race / preparing to go on stage.</p>

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Summer 2 Second-look Science – The Science of Sport [6 sessions]	<p>Living Things and their Habitats i. describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals</p> <p>Properties of Materials i. compare and group together everyday materials on the basis of their properties ii. give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic</p> <p>Forces i. explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object ii. Identify the effects of air resistance, water resistance and friction, that act between moving surfaces iii. recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect</p> <p>Animals including Humans i. recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function ii. recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents</p> <p>Electricity i. associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit ii. compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches iii. use recognised symbols when representing a simple circuit in a diagram</p> <p>Working scientifically i. planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary ii. taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate iii. recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs iv. using test results to make predictions to set up further comparative and fair tests v. reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations vi. identifying scientific evidence that has been used to support or refute ideas or arguments</p>	<ul style="list-style-type: none"> Identify characteristics of grass and create their own classification key for given grasses (classification) Identify and compare the properties of sports top materials (fair testing/exploring/pattern seeking) Identify the forces that can impact on a sports game and suggest how friction, air resistance and gravity can be exploited in sports (fair testing/exploring/pattern seeking) Investigate the impact of exercise on the human body and the impact of nutrition on sports performance (fair testing/exploring/pattern seeking) Identify the influence of inheritance and environmental factors on sports performance (analysing secondary sources) Design and create circuits to ensure floodlights in a stadium are bright enough (fair testing/exploring/pattern seeking) <p>Extended writing opportunity Persuasive writing: Complete research or investigations into the materials used for various sports balls or bats/rackets and clubs and write a sports company advertising leaflet extolling the virtues of the new equipment. Information text: Create a sports information leaflet about the factors that impact on sports talent.</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?