Scotholme Science

Year 6

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Subject- Science

Contents

Threshold Concepts and Milestones

Threshold Concept	Year 6	Content
Work scientifically This concept involves learning the methodologies of the discipline of science.	• Plan enquiries, including recognising and controlling variables where necessary. • Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work. • Take measurements, using a range of scientific equipment, with increasing accuracy and precision. • Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs, and models. • Report findings from enquiries, including oral and written explanations of results, explanations involving causal	Use these skills in all discussion and experiment sessions. Understand and develop the skills that help you to think like a scientist. Be curious and want to find out more. Understand the concept of fair and comparative tests. Plan and carry out a range of fair tests, hypothesising, selecting equipment, measuring with accuracy, recording data and using it to draw evidence based conclusions. Understand the concept of variables and know how to manage them within an investigation. Select and use equipment to make a range of more complex measurements accurately, record the measurements in a variety of chosen ways including line graphs and use this to draw conclusions. Present the data collected to others using an appropriate method including the use of a range of graphs. Use the data collected to make further hypotheses and carry out further tests. Use appropriate vocabulary and scientific language when explaining. Draw conclusions, using the principles of cause and effect. Use labelled diagrams and photographs. Create video explanations (use Explain Everything or PowerPoint)

	relationships, and conclusions. • Use simple models to describe scientific ideas, identifying scientific evidence that has been used to support or refute ideas or arguments.	

BIOLOGY 1 **Understand plants** This concept involves becoming familiar with different types of plants, their structure and reproduction.	• Relate knowledge of plants to studies of evolution and inheritance.	**Tree identification resource** **Grouping and classifying resource** **Darwin's Great Plant Hunt resource:** **Video link resource 1:** https://www.stem.org.uk/resources/elibrary/resource/34344/darwins-plant-detectives-assemblies-and-quick-start-resources

BIOLOGY 2 **Understand animals and humans** This concept involves becoming familiar with different types of animals, humans and the life processes they share.		Recall, showing understanding and the ability to explain the digestive and circulatory systems in humans and apply this to animals. **Circulation Game resource** **Human body systems resources** **Interactive human processes link:** https://www.stem.org.uk/resources/elibrary/resource/35233/human-body **Heart beaters resources** Heavy sugar video link: https://www.stem.org.uk/resources/elibrary/resource/33258/heavy-sugar **What affects your heart rate resources and video link:** https://www.stem.org.uk/resources/elibrary/resource/315584/what-affects-your-heart-rate Investigate the sugar content of a range of products. Understand how the body uses sugar.

BIOLOGY 3 **Investigate living things** This concept involves becoming familiar with a wider range of living things, including insects and understanding life processes.	• Describe the life process of reproduction in some plants and animals. • Describe and sort how living things are classified into broad groups according to common observable characteristics. • Give reasons for classifying plants and animals based on specific characteristics.	Use and develop classification skills What is classification? Review video link: https://www.bbc.co.uk/bitesize/topics/zn22pv4/articles/z3nbcwx Classification pack resources link: https://www.stem.org.uk/resources/collection/3940/linnean-learning **Living things and classification resource** Snapshot Serengeti – classification link: https://www.snapshotserengeti.org/beta/ Explore and classify minibeasts and insects **Bug count resource** **Minibeast discovery resource** Minibeast classification link: https://www.stem.org.uk/resources/elibrary/resource/264436/fera-resources-classification **Minibeast classification resource**

BIOLOGY 4 **Understand evolution and inheritance** This concept involves understanding that organisms come into existence, adapt, change and evolve and become extinct.	• Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. • Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. • Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.	Discover evolution and inheritance. Using a rage of sources, research how living things have changed over time, understanding reasons for that change. Understand why living things must adapt to their environments and how and why this changes over time. **Seeds and fruits adaptation resource** Evolution megalab resource link: https://www.stem.org.uk/resources/collection/4114/evolution-megalab Primary evolution resource link: https://www.stem.org.uk/resources/collection/4354/primary-evolution ARKive Darwin collection resource link: https://www.stem.org.uk/resources/collection/3439/arkive-darwin-collection Evolution of a whale and a horse video resource link: https://www.stem.org.uk/elibrary/collection/4220

CHEMISTRY **Investigate materials** This concept involves becoming familiar with a range of materials, their properties, uses and how they may be altered or changed.	• Compare and group together everyday materials based on evidence from comparative and fair tests, including their hardness, solubility, conductivity (electrical and thermal), and response to magnets. Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. • Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning, oxidisation and the action of acid on bicarbonate of soda.	Investigate a wide range of materials, designing and carrying out fair tests of properties including hardness (solids), solubility (powders), conductivity (solids), weight (gases) and density (liquids). Draw conclusions based on results and present findings to an audience. Explore solids, liquids and gases. Understand the molecular structure of each state and how this contributes to the properties of materials. Why are materials used in the way they are? Use evidence from practical experiments to present findings to others. **Gumdrops molecular structure resource** **Instant ice cream resource** Experiment with a range of irreversible and reversible changes, hypothesising and drawing conclusions. Reversible change video link: https://www.stem.org.uk/resources/elibrary/resource/34080/understanding-reversible-change **Irreversible change experiment:** **Is there anyone out there?** Experiment and video resource: https://www.stem.org.uk/elibrary/resource/30199 **Irreversible change experiment:** **Making plastic from milk resource**

PHYSICS 1 **Understand movement, forces and magnets** This concept involves understanding what causes motion.	• Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. • Identify the effect of drag forces, such as air resistance, water resistance and friction that act between moving surfaces. • Describe, in terms of drag forces, why moving objects that are not driven tend to slow down. • Understand that some mechanisms including levers, pulleys and gears, allow a smaller force to have a greater effect. • Understand that force and motion can be transferred through mechanical devices such as gears, pulleys, levers and springs.	Understanding different forces. **May the forces be with you resource** **Force and Gravity resource** Forces – mass, weight and gravity video link: https://www.stem.org.uk/resources/elibrary/resource/31854/forces-mass-weight-and-gravity **Air resistance and parachutes – Selena and the Victorian Adventure resource** **Forces and air resistance resource** **Aircraft forces resource** Exploring levers: **Vertically challenged resource** Investigating levers resource link: How do levers work video link: https://www.bbc.co.uk/bitesize/clips/zrp6n39 Explore levers and pulleys **Vertically challenged resource** Simple machines resource link: https://www.neok12.com/Simple-Machines.htm How do bike gears work? Video link: https://www.youtube.com/watch?v=oauDyIu_swM&safe=active

PHYSICS 2 **Understand light and seeing** This concept involves understanding how light and reflection affect sight.	• Understand that light appears to travel in straight lines. • Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eyes. • Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them, and to predict the size of shadows when the position of the light source changes. • 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.	Modelling light video link: https://www.stem.org.uk/resources/elibrary/resource/30672/modelling-light **Teacher's Guide resource** Experiment with light in a range of contexts. **Periscope resource** **Colour resource** **Crime Scene investigation resource** **Making shadows resource** **Shadow Investigation resource** Shadow Investigation video link: https://www.stem.org.uk/resources/elibrary/resource/315603/what-factors-affect-size-shadow-shadow-theatre Understand how the human eye works How does the eye work video links: https://www.bbc.co.uk/bitesize/clips/zf9c87h https://www.childrensuniversity.manchester.ac.uk/learning-activities/science/the-brain-and-senses/how-the-eye-works/ https://www.funkidslive.com/learn/homeschool/eyes/mission-1-how-the-eye-works/# https://www.lenstore.co.uk/eyecare/101-amazing-eye-facts https://www.youtube.com/watch?v=gvozcv8pS3c&safe=active

PHYSICS 3 **Understand electrical circuits** This concept involves understanding circuits and their role in electrical applications.	• Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. • 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. • Use recognised symbols when representing circuits in a diagram. • Construct series and parallel electrical circuits, understanding resistance.	Understanding electrical circuits resource link: https://www.stem.org.uk/resources/elibrary/resource/31006/electricity-circuits Adapt electrical circuits to understand the effects of components eg the thickness of wire etc Video link resource: https://www.bbc.co.uk/bitesize/topics/zq99q6f/articles/zt8vg82 Understand the function of electrical components resource link: https://www.outstandingscience.co.uk/index.php?action=view_page&page=view_unit&unit=6e Draw and construct a range of series and parallel circuits, explaining how they work.

PHYSICS 4 **Understand the Earth's movement in space** This concept involves understanding what causes seasonal changes, day and night.		Mission starlight video link: https://www.stem.org.uk/resources/elibrary/resource/98633/mission-starlight **Mission starlight resource**

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