Scotholme Science

Year 4

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Subject- Science

CONTENTS

Threshold Concepts and Milestones

Threshold Concept	Year 4	Content
WORK SCIENTIFICALLY This concept involves learning the methodologies of the discipline of science.	• Make accurate measurements using standard units, using a range of equipment, e.g. thermometers and data loggers. • Gather, record, classify and present data in a variety of ways to help in answering questions. • Record findings using simple scientific language, drawings, labelled diagrams, bar charts and tables. • Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.	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 tests. Carry out a range of fair tests, measure and record results and use them to draw evidence based conclusions. Predict what you think will happen and give reasons for your answer, drawing on prior learning. Use equipment to make a range of measurements accurately, record measurements in a variety of ways and use them to draw conclusions. Present the data collected to others using an appropriate method. Use appropriate vocabulary and scientific language when explaining. Use labelled diagrams and photographs. Create video explanations.

	• Use results to draw simple conclusions and suggest improvements, new questions and predictions for setting up further tests. • Identify differences, similarities or changes related to simple, scientific ideas and processes.	

BIOLOGY 1 **Understand plants** This concept involves becoming familiar with different types of plants, their structure and reproduction.	• Identify and describe the functions of different parts of flowering plants: roots, stem, 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 role of flowers in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.	Recall and build on knowledge from KS1 and year 3. Name a wider range of plants and trees. Understand and explain the function of all the main parts of a flowering plant. Experiment by carrying out a fair test to see which conditions are essential for plants to survive. Use a variety of plants across the class and share findings. Dissect a selection of plants and look at the way water is transported within it. **Dissection of plants resource** Investigate soil and how water from the soil is transported to the plant. **Suck It Up celery experiment** **Roots and shoots resource** Find out which soils retain the most water. Why? **Soil types resource** **Do plants need soil to grow?** https://www.stem.org.uk/resources/elibrary/resource/314741/do-plants-need-soil-grow Look at a range of flowering plants and develop an understanding of how they are pollinated – find out about the role of bees. Plant a selection of appropriate flowering plants and observe bees in action. **Pollination resource** **Pollination pack resource** How are seeds formed within plants? What is seed dispersal? How can seeds be dispersed? **Seeds pack resource** Seed dispersal video link: https://www.bbc.co.uk/bitesize/clips/znvfb9q

BIOLOGY 2 **Understand animals and humans** This concept involves becoming familiar with different types of animals, humans and the life processes they share.	• Identify that humans and some animals have skeletons and muscles for support, protection and movement. • Describe the simple functions of the vital organs in the human body.	Look at a range of different skeletons. How are the bones arranged and held together? **Make a skeleton resource** What is the role of muscles? How do we protect and keep muscles healthy? Identify and locate the major organs of the human body – what is their function? **Muscles and Making muscles resource** How do we keep our organs healthy? Look at diet, healthy lifestyle, exercise etc

BIOLOGY 3 **Investigate living things** This concept involves becoming familiar with a wider range of living things, including insects and understanding life processes.	• Recognise that living things can be grouped in a variety of ways. • Explore and use more complex classification keys. • Recognise that environments can change and that this can sometimes pose dangers to specific habitats.	Recall and build upon key learning from KS1 and year 3. How do we group animals? Sort a diverse range of animals and give reasons for their grouping. Use a range of more complex keys to identify different animals with similar features. **Classification keys resources** Look at a range of environments and how they have changed. Discuss the effect of environmental change on the animals in that habitat. Use Planet Earth 2 **Plastics in the ocean resource** Explore the Arctic/ Antarctica /Great Barrier Reef etc – what is happening to these environments and what is the effect on the living things who live there? What can we do to stop this happening? Explore climate change – how and why it is happening. **Climate Change resource** What is our role in the future of the planet?

BIOLOGY 4 **Understand evolution and inheritance** This concept involves understanding that organisms come into existence, adapt, change and evolve and become extinct.	• Identify how plants and animals, including humans, resemble their parents in many features. • Identify how animals and plants are suited to and adapt to their environment in different ways.	Explore resemblance **Evolution and Inheritance resource** Look at a range of animals and plants in their natural environment. Why do they survive there? Explore the concept of adaptation by looking at how the features of the plants and animals enable them to cope in their environment. Use Planet Earth 2 as a resource.

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 materials together, according to whether they are solids, liquids or gases. • Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.	Recall and build on prior knowledge from KS1 and year 3. Define the terms solid, liquid and gas. Give examples of each. In a group, demonstrate the structure of each and explain why this gives them certain properties. Observe, investigate and sort a range of materials according to the definition. Experiment with sand and corn flour. Observe and discuss why they are difficult to classify. **Biscuit bashing video resource:** https://www.stem.org.uk/resources/elibrary/resource/33266/biscuit-bashing States of matter video: https://www.stem.org.uk/resources/elibrary/resource/30642/what-stuff-does **Melting chocolate** https://www.stem.org.uk/resources/elibrary/resource/315591/what-temperature-does-chocolate-melt **Do all types of chocolate melt at the same temperature?** Understand the concept of evaporation. Design and carry out a fair test to find out which conditions are best for the evaporation of water from clothes. Understand the concept of condensation **Evaporation and condensation experiments resource** **Evaporation and condensation video resource:** https://www.stem.org.uk/resources/elibrary/resource/32074/evaporation-and-condensation-robinson-crusoe-makes-drinking-water **The Water Cycle resource** Recall the water cycle and explain the role of evaporation and condensation

PHYSICS 1 **Understand movement, forces and magnets** This concept involves understanding what causes motion.	• Compare how things move on different surfaces. • Notice that some forces need contact between two objects. • Identify the effect of forces, such as friction that act between surfaces.	Understand the concept of friction. Carry out jelly chopsticks experiment and explain how and why it works as it does. **Jelly chopstick resource** Jelly cubes on a ramp experiment. Design and carry out a fair test to see how quickly a jelly cube can slide down a ramp covered in different substances such as vegetable oil, syrup, paper, foil, carpet etc. Make measurements and use them to draw conclusions. Present using an Enliven presentation.
PHYSICS 2 **Understand light and seeing** This concept involves understanding how light and reflection affect sight.	• 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.	Recall and build upon prior knowledge from KS1 and year 3. Discuss how shadows are formed. Design and carry out a fair test experiment to measure the size of a shadow when it is closer to/further away from the light source. Measure distance and shadow size with accuracy, recording results. Draw an evidence based conclusion. Create a presentation to illustrate findings. **Light ideas resource** **Light sources video clip:** https://www.bbc.co.uk/bitesize/clips/zjkc87h

PHYSICS 3 **Investigate sound and hearing** This concept involves understanding how sound is produced, how it travels and how it is heard.	• Find patterns between the volume and pitch of a sound and the strength of the vibrations that produced it.	**Sound experiment resource – pitch and volume of a sound** https://www.stem.org.uk/resources/elibrary/resource/315610/what-factors-affect-pitch-and-volume-sound **Sound resource experiments**
PHYSICS 4 **Understand electrical circuits** This concept involves understanding circuits and their role in electrical applications.	• Construct a range of electrical circuits, using switches for a purpose. • Use recognised symbols when representing a simple circuit in a diagram.	Recall and build upon knowledge from KS1 and year 3. Create a range of circuits using switches. Draw the circuits using recognised symbols. Create a room/stadium etc burglar alarm/ intruder lighting etc using hidden switches. Explain how the circuits work. **Become an Apprentice Electrician resource:** https://www.stem.org.uk/resources/elibrary/resource/30673/apprentice-electrician