

Stage 4

Thinking and Working Scientifically

Models and representations

- **4TWSm.01** Know that models are not fully representative of a real world situation and/or scientific idea.
- **4TWSm.02** Use models to show relationships, quantities or scale.
- **4TWSm.03** Draw a diagram to represent a real world situation and/or scientific idea.

Scientific enquiry: purpose and planning

- **4TWSp.01** Ask scientific questions that can be investigated.
- **4TWSp.02** Know that there are five main types of scientific enquiry (research, fair testing, observing over time, identifying and classifying, and pattern seeking).
- **4TWSp.03** Make a prediction describing some possible outcomes of an enquiry.
- **4TWSp.04** Identify variables that need to be taken into account when doing a fair test.
- **4TWSp.05** Identify risks and explain how to stay safe during practical work.

Carrying out scientific enquiry

- **4TWSc.01** Use observations and tests to sort, group and classify objects.
- **4TWSc.02** Use keys to identify objects, materials and living things.
- **4TWSc.03** Choose equipment from a provided selection and use it appropriately.
- **4TWSc.04** Describe how repeated measurements and/or observations can give more reliable data.
- **4TWSc.05** Take measurements in standard units, describing the advantage of standard units over non-standard units.
- **4TWSc.06** Carry out practical work safely.
- **4TWSc.07** Use secondary information sources to research an answer to a question.
- **4TWSc.08** Collect and record observations and/or measurements in tables and diagrams.

Scientific enquiry: analysis, evaluation and conclusions

- **4TWSa.01** Identify whether results support, or do not support, a prediction.
- **4TWSa.02** Describe simple patterns in results.
- **4TWSa.03** Make a conclusion from results and relate it to the scientific question being investigated.
- **4TWSa.04** Present and interpret results using tables, bar charts and dot plots.

Biology**Structure and function**

- **4Bs.01** Identify some of the important bones in the human body (limited to skull, jaw, rib cage, hip, spine, leg bones and arm bones).
- **4Bs.02** Know that bones move because pairs of muscles that are attached to them contract and relax.
- **4Bs.03** Describe some of the important functions of skeletons (limited to protecting and supporting organs, enabling movement and giving shape to the body).
- **4Bs.04** Know that some animals have an exoskeleton.
- **4Bs.05** Identify vertebrates as animals with a backbone and invertebrates as animals without a backbone.

Life processes

- **4Bp.01** Know that medicines can be used to treat some illnesses, and describe how to use them safely.
- **4Bp.02** Know that plants and animals can have infectious diseases, and vaccinations can prevent some infectious diseases of animals.
- **4Bp.03** Know that plants and animals need energy to grow, live and be healthy, and plants get their energy from light while animals get their energy from eating plants or other animals.
- **4Bp.04** Describe the importance of movement in maintaining human health.

Ecosystems

- **4Be.01** Know that different animals are found in, and suited to, different habitats.
- **4Be.02** Know plants and animals can survive in environments other than their habitats.
- **4Be.03** Describe food chains as being made of producers and consumers, and classify consumers as herbivores, omnivores, carnivores, predators and/or prey.

Chemistry

Materials and their structure

- **4Cm.01** Describe the particle model for solids and liquids.
- **4Cm.02** Understand the difference between materials, substances and particles.
- **4Cm.03** Know that particles are in constant motion, even when in a solid.

Properties of materials

- **4Cp.01** Use the particle model to explain the properties of solids and liquids.
- **4Cp.02** Describe and explain how some solids can behave like liquids (e.g. powders), referring to the particle model.

Changes to materials

- **4Cc.01** Describe solidification/freezing and melting, using the particle model to describe the change of state.
- **4Cc.02** Understand that the change of state of a substance is a physical process.
- **4Cc.03** Know that some substances will react with another substance to produce one or more new substances and this is called a chemical reaction.

Physics

Forces and energy

- **4Pf.01** Know that energy is present in all matter and in sound, light and heat.
- **4Pf.02** Know that energy cannot be made, lost, used up or destroyed but it can be transferred.
- **4Pf.03** Know that energy is required for any movement or action to happen.
- **4Pf.04** Know that not all energy is transferred from one object to another, but often some energy during a process can be transferred to the surrounding environment and this can be detected as sound, light or temperature increase.

Light and sound

- **4Ps.01** Know that light travels in straight lines and this can be represented with ray diagrams.
- **4Ps.02** Know that light can reflect off surfaces.
- **4Ps.03** Describe how objects which are not light sources are seen.

Electricity and magnetism

- **4Pe.01** Know that an electrical device will not work if there is a break in the circuit.
- **4Pe.02** Describe how a simple switch is used to open and close a circuit.
- **4Pe.03** Describe how changing the number or type of components in a series circuit can make a lamp brighter or dimmer.
- **4Pe.04** Know some materials are good electrical conductors, especially metals, and some are good electrical insulators.

Earth and Space

Planet Earth

- **4ESp.01** Describe the model of the structure of the Earth which includes a core, a mantle and a crust.
- **4ESp.02** Describe common features of volcanoes and know they are found at breaks in the Earth's crust.
- **4ESp.03** Know that the Earth's crust moves and when parts move suddenly this is called an earthquake.

Earth in space

- **4ESs.01** Explain why the spinning of the Earth on its axis leads to the apparent movement of the Sun, night and day, and changes in shadows.
- **4ESs.02** Name the planets in the Solar System.
- **4ESs.03** Know that the Sun is at the centre of the Solar System.
- **4ESs.04** Know that planetary systems can contain stars, planets, asteroids and comets.

Science in Context

- **4SIC.01** Describe how scientific knowledge and understanding changes over time through the use of evidence gained by enquiry.
- **4SIC.02** Describe how science is used in their local area.
- **4SIC.03** Use science to support points when discussing issues, situations or actions.
- **4SIC.04** Identify people who use science, including professionally, in their area and describe how they use science.
- **4SIC.05** Discuss how the use of science and technology can have positive and negative environmental effects on their local area.