



## Science ( Year 7 )

### Thinking and Working Scientifically

#### Models and representations

7TWSm.01 Describe the strengths and limitations of a model.

7TWSm.02 Use symbols and formulae to represent scientific ideas.

#### Scientific enquiry: purpose and planning

7TWSp.01 Identify whether a given hypothesis is testable.

7TWSp.02 Describe how scientific hypotheses can be supported or contradicted by evidence from an enquiry.

7TWSp.03 Make predictions of likely outcomes for a scientific enquiry based on scientific knowledge and understanding.

7TWSp.04 Plan a range of investigations of different types, while considering variables appropriately, and recognise that not all investigations can be fair tests.

7TWSp.05 Know the meaning of hazard symbols, and consider them when planning practical work.

#### Carrying out scientific enquiry

7TWSc.01 Sort, group and classify phenomena, objects, materials and organisms through testing, observation, using secondary information, and making and using keys.

7TWSc.02 Decide what equipment is required to carry out an investigation or experiment and use it appropriately.

7TWSc.03 Evaluate whether measurements and observations have been repeated sufficiently to be reliable.

7TWSc.04 Take appropriately accurate and precise measurements, explaining why accuracy and precision are important.

7TWSc.05 Carry out practical work safely.

7TWSc.06 Evaluate a range of secondary information sources for their relevance and know that some sources may be biased.

7TWSc.07 Collect and record sufficient observations and/or measurements in an appropriate form.

#### Scientific enquiry: analysis, evaluation and conclusions

7TWSa.01 Describe the accuracy of predictions, based on results, and suggest why they were or were not accurate.

7TWSa.02 Describe trends and patterns in results, including identifying any anomalous results.

7TWSa.03 Make conclusions by interpreting results and explain the limitations of the conclusions.

7TWSa.04 Evaluate experiments and investigations, and suggest improvements, explaining any proposed changes.

7TWSa.05 Present and interpret observations and measurements appropriately.

### Biology

#### Structure and function

7Bs.01 Understand that all organisms are made of cells and microorganisms are typically single celled.

7Bs.02 Identify and describe the functions of cell structures (limited to cell membrane, cytoplasm, nucleus, cell wall, chloroplast, mitochondria and sap vacuole).

7Bs.03 Explain how the structures of some specialised cells are related to their functions (including red blood cells, neurones, ciliated cells, root hair cells and palisade cells).

7Bs.04 Describe the similarities and differences between the structures of plant and animal cells.

7Bs.05 Understand that cells can be grouped together to form tissues, organs and organ systems.

#### Life processes

7Bp.01 Describe the seven characteristics of living organisms.

7Bp.02 Discuss reasons for classifying viruses as living or non-living.

7Bp.03 Describe a species as a group of organisms that can reproduce to produce fertile offspring.

7Bp.04 Use and construct dichotomous keys to classify species and groups of related organisms.

#### Ecosystems

7Be.01 Know and describe the ecological role some microorganisms have as decomposers.

7Be.02 Construct and interpret food chains and webs which include microorganisms as decomposers.

### Chemistry

#### Materials and their structure

7Cm.01 Understand that all matter is made of atoms, with each different type of atom being a different element.

7Cm.02 Know that the Periodic Table presents the known elements in an order.

- 7Cm.03 Know metals and non-metals as the two main groupings of elements.  
7Cm.04 Describe the differences between elements, compounds and mixtures, including alloys as an example of a mixture.  
7Cm.05 Describe a vacuum as a space devoid of matter.  
7Cm.06 Describe the three states of matter as solid, liquid and gas in terms of the arrangement, separation and motion of particles.  
7Cm.07 Use the particle model to represent elements, compounds and mixtures.

#### **Properties of materials**

- 7Cp.01 Understand that all substances have chemical properties and physical properties.  
7Cp.02 Understand that the acidity or alkalinity of a substance is a chemical property and is measured by pH.  
7Cp.03 Use indicators (including Universal Indicator and litmus) to distinguish between acidic, alkaline and neutral solutions.  
7Cp.04 Use tests to identify hydrogen, carbon dioxide and oxygen gases.  
7Cp.05 Describe common differences between metals and non-metals, referring to their physical properties.  
7Cp.06 Understand that alloys are mixtures that have different chemical and physical properties from the constituent substances.  
7Cp.07 Use the particle model to explain the difference in hardness between pure metals and their alloys.

#### **Changes to materials**

- 7Cc.01 Identify whether a chemical reaction has taken place through observations of the loss of reactants and/or the formation of products which have different properties to the reactants (including evolving a gas, formation of a precipitate or change of colour).  
7Cc.02 Explain why a precipitate forms, in terms of a chemical reaction between soluble reactants forming at least one insoluble product.  
7Cc.03 Use the particle model to describe chemical reactions.  
7Cc.04 Describe neutralisation reactions in terms of change of pH.

#### **Physics**

##### **Forces and energy**

- 7Pf.01 Describe changes in energy that are a result of an event or process.  
7Pf.02 Know that energy tends to dissipate and in doing so it becomes less useful.  
7Pf.03 Describe gravity as a force of attraction between any two objects and describe how the size of the force is related to the masses of the objects.  
7Pf.04 Understand that there is no air resistance to oppose movement in a vacuum.

##### **Light and sound**

- 7Ps.01 Describe the vibration of particles in a sound wave and explain why sound does not travel in a vacuum.  
7Ps.02 Explain echoes in terms of the reflection of sound waves.

##### **Electricity and magnetism**

- 7Pe.01 Use a simple model to describe electricity as a flow of electrons around a circuit.  
7Pe.02 Describe electrical conductors as substances that allow electron flow and electrical insulators as substances that inhibit electron flow.  
7Pe.03 Know how to measure the current in series circuits.  
7Pe.04 Describe how adding components into a series circuit can affect the current (limited to addition of cells and lamps).  
7Pe.05 Use diagrams and conventional symbols to represent, make and compare circuits that include cells, switches, lamps, buzzers and ammeters.

##### **Earth and Space**

###### **Planet Earth**

- 7ESp.01 Describe the model of plate tectonics, in which a solid outer layer (made up of the crust and uppermost mantle) moves because of flow lower in the mantle.  
7ESp.02 Describe how earthquakes, volcanoes and fold mountains occur near the boundaries of tectonic plates.  
7ESp.03 Know that clean, dry air contains 78% nitrogen, 21% oxygen and small amounts of carbon dioxide and other gases, and this composition can change because of pollution and natural emissions.

###### **Cycles on Earth**

- 7ESc.01 Describe the water cycle (limited to evaporation, condensation, precipitation, water run-off, open water and groundwater).

###### **Earth in space**

- 7ESs.01 Describe how planets form from dust and gas, which are pulled together by gravity.  
7ESs.02 Know that gravity is the force that holds components of the Solar System in orbit around the Sun.  
7ESs.03 Describe tidal forces on Earth as a consequence of the gravitational attraction between the Earth, Moon and Sun.  
7ESs.04 Explain how solar and lunar eclipses happen.

###### **Science in Context**

- 7SIC.01 Discuss how scientific knowledge is developed through collective understanding and scrutiny over time.  
7SIC.02 Describe how science is applied across societies and industries, and in research.  
7SIC.03 Evaluate issues which involve and/or require scientific understanding.  
7SIC.04 Describe how people develop and use scientific understanding, as individuals and through collaboration, e.g. through peer-review.  
7SIC.05 Discuss how the uses of science can have a global environmental impact.