

ISS SCIENCE SCOPE & SEQUENCE

Year 6	Year 7	Year 8
<p>Scientific enquiry</p> <p>Ideas and evidence</p> <ul style="list-style-type: none"> ➤ Consider how scientists have combined evidence from observation and measurement with creative thinking to suggest new ideas and explanations for phenomena. ➤ Collect evidence and data to test ideas including predictions. <p>Plan investigative work</p> <ul style="list-style-type: none"> ➤ Discuss how to turn ideas into a form that can be tested. ➤ Make predictions using scientific knowledge and understanding. ➤ Choose what evidence to collect to investigate a question, ensuring that the evidence is sufficient. ➤ Identify factors that are relevant to a particular situation. ➤ Choose which equipment to use. <p>Obtain and present evidence</p> <ul style="list-style-type: none"> ➤ Make a variety of relevant observations and measurements using simple apparatus correctly. ➤ Decide when observations and measurements need to be checked by repeating to give more reliable data. ➤ Use tables, bar charts and line graphs to present results. <p>Consider evidence and approach</p> <ul style="list-style-type: none"> ➤ Make comparisons. ➤ Evaluate repeated results. ➤ Identify patterns in results and results that do not appear to fit the pattern. ➤ Use results to draw conclusions and to make further predictions. ➤ Suggest and evaluate explanations for predictions using scientific knowledge and understanding and communicate these clearly to others. ➤ Say if and how evidence supports any prediction made. 	<p>Scientific enquiry</p> <p>Ideas and evidence</p> <ul style="list-style-type: none"> ➤ Be able to talk about the importance of questions, evidence and explanations. ➤ Make predictions and review them against evidence. <p>Plan investigative work</p> <ul style="list-style-type: none"> ➤ Suggest ideas that may be tested. ➤ Outline plans to carry out investigations, considering the variables to control, change or observe. ➤ Make predictions referring to previous scientific knowledge and understanding. ➤ Identify appropriate evidence to collect and suitable methods of collection. ➤ Choose appropriate apparatus and use it correctly. <p>Obtain and present evidence</p> <ul style="list-style-type: none"> ➤ Make careful observations including measurements. ➤ Present results in the form of tables, bar charts and line graphs. ➤ Use information from secondary sources. <p>Consider evidence and approach</p> <ul style="list-style-type: none"> ➤ Make conclusions from collected data, including those presented in a graph, chart or spreadsheet. ➤ Recognise results and observations that do not fit into a pattern, including those presented in a graph, chart or spreadsheet. ➤ Consider explanations for predictions using scientific knowledge and understanding and communicate these. ➤ Present conclusions using different methods. 	<p>Scientific enquiry</p> <p>Ideas and evidence</p> <ul style="list-style-type: none"> ➤ Discuss the importance of developing empirical questions which can be investigated, collecting evidence, developing explanations and using creative thinking. ➤ Test predictions with reference to evidence gained. <p>Plan investigative work</p> <ul style="list-style-type: none"> ➤ Select ideas and turn them into a form that can be tested. ➤ Plan investigations to test ideas. ➤ Identify important variables; choose which variables to change, control and measure. ➤ Make predictions using scientific knowledge and understanding. <p>Obtain and present evidence</p> <ul style="list-style-type: none"> ➤ Take appropriately accurate measurements. ➤ Use a range of equipment correctly. ➤ Discuss and control risks to themselves and others. ➤ Present results as appropriate in tables and graphs. <p>Consider evidence and approach</p> <ul style="list-style-type: none"> ➤ Make simple calculations. ➤ Identify trends and patterns in results (correlations). ➤ Compare results with predictions. ➤ Identify anomalous results and suggest improvements to investigations. ➤ Interpret data from secondary sources. ➤ Discuss explanations for results using scientific knowledge and understanding. Communicate these clearly to others. ➤ Present conclusions to others in appropriate ways.

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<p>Biology</p> <p>Humans and animals</p> <ul style="list-style-type: none"> ➤ Use scientific names for some major organs of body systems. ➤ Identify the position of major organs in the body. ➤ Describe the main functions of the major organs of the body. ➤ Explain how the functions of the major organs are essential. <p>Living things in their environment</p> <ul style="list-style-type: none"> ➤ Explore how humans have positive and negative effects on the environment, e.g. loss of species, protection of habitats. ➤ Explore a number of ways of caring for the environment, e.g. recycling, reducing waste, reducing energy consumption, not littering, encouraging others to care for the environment. ➤ Know how food chains can be used to represent feeding relationships in a habitat and present these in text and diagrams. ➤ Know that food chains begin with a plant (the producer), which uses energy from the sun. ➤ Understand the terms <i>producer, consumer, predator</i> and <i>prey</i>. ➤ Explore and construct food chains in a particular habitat. 	<p>Biology</p> <p>Plants</p> <ul style="list-style-type: none"> ➤ Recognise the positions, and know the functions of the major organs of flowering plants, e.g. root, stem, leaf. <p>Humans as organisms</p> <ul style="list-style-type: none"> ➤ Explore the role of the skeleton and joints and the principle of antagonistic muscles. ➤ Recognise the positions and know the functions of the major organ systems of the human body. Secondary sources can be used. ➤ Research the work of scientists studying the human body. <p>Cells and organisms</p> <ul style="list-style-type: none"> ➤ Identify the seven characteristics of living things and relate these to a wide range of organisms in the local and wider environment. ➤ Know about the role of micro-organisms in the breakdown of organic matter, food production and disease, including the work of Louis Pasteur. ➤ Identify the structures present in plant and animal cells as seen with a simple light microscope and/or a computer microscope. ➤ Compare the structure of plant and animal cells. ➤ Relate the structure of some common cells to their functions. Secondary sources can be used. ➤ Understand that cells can be grouped together to form tissues, organs and organisms. <p>Living things in their environment</p> <ul style="list-style-type: none"> ➤ Describe how organisms are adapted to their habitat, drawing on locally occurring examples. Secondary sources can be used. ➤ Draw and model simple food chains. ➤ Discuss positive and negative influence of humans on the environment, e.g. the effect on food chains, pollution and ozone depletion. ➤ Discuss a range of energy sources and distinguish between renewable and non-renewable resources. Secondary sources can be used. <p>Variation and classification</p> <ul style="list-style-type: none"> ➤ Understand what is meant by a species. ➤ Investigate variation within a species. Secondary sources can be used. ➤ Classify animals and plants into major groups, using 	<p>Biology</p> <p>Plants</p> <ul style="list-style-type: none"> ➤ Explore how plants need carbon dioxide, water and light for photosynthesis in order to make biomass and oxygen. ➤ Describe the absorption and transport of water and mineral salts in flowering plants. <p>Humans as organisms</p> <ul style="list-style-type: none"> ➤ Identify the constituents of a balanced diet and the functions of various nutrients. Secondary sources can be used. ➤ Understand the effects of nutritional deficiencies. ➤ Recognise the organs of the alimentary canal and know their functions. Secondary sources can be used. ➤ Understand the function of enzymes as biological catalysts in breaking down food to simple chemicals. ➤ Recognise and model the basic components of the circulatory system and know their functions. ➤ Understand the relationship between diet and fitness. ➤ Discuss how conception, growth, development, behaviour and health can be affected by diet, drugs and disease. ➤ Recognise the basic components of the respiratory system and know their functions. ➤ Define and describe aerobic respiration, and use the word equation. ➤ Explain gaseous exchange. ➤ Describe the effects of smoking. Secondary sources can be used. ➤ Discuss the physical and emotional changes that take place during adolescence. ➤ Describe the human reproductive system, including the menstrual cycle, fertilisation and foetal development.

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<p>Chemistry</p> <p>Material changes</p> <ul style="list-style-type: none"> ➤ Distinguish between reversible and irreversible changes. ➤ Explore how solids can be mixed and how it is often possible to separate them again. ➤ Observe, describe, record and begin to explain changes that occur when some solids are added to water. ➤ Explore how, when solids do not dissolve or react with water, they can be separated by filtering, which is similar to sieving. ➤ Explore how some solids dissolve in water to form solutions and, although the solid cannot be seen, the substance is still present. <p>Physics</p> <p>Forces and motion</p> <ul style="list-style-type: none"> ➤ Distinguish between mass measured in kilograms (kg) and weight measured in Newtons, noting that kilograms are used in everyday life. ➤ Recognise and use units of force, mass and weight and identify the direction in which forces act. ➤ Understand the notion of energy in movement. ➤ Recognise friction (including air resistance) as a force which can affect the speed at which objects move and which sometimes stops things moving. <p>Electricity and magnetism</p> <ul style="list-style-type: none"> ➤ Investigate how some materials are better conductors of electricity than others. ➤ Investigate how some metals are good conductors of electricity while most other materials are not. ➤ Know why metals are used for cables and wires and why plastics are used to cover wires and as covers for plugs and switches. ➤ Predict and test the effects of making changes to circuits, including length or thickness of wire and the number and type of components. ➤ Represent series circuits with drawings and conventional symbols. 	<p>some locally occurring examples.</p> <p>Chemistry</p> <p>States of matter</p> <ul style="list-style-type: none"> ➤ Show in outline how the particle theory of matter can be used to explain the properties of solids, liquids and gases, including changes of state. <p>Material properties</p> <ul style="list-style-type: none"> ➤ Distinguish between metals and non-metals. ➤ Describe everyday materials and their physical properties. <p>Material changes</p> <ul style="list-style-type: none"> ➤ Use a pH scale. ➤ Understand neutralisation and some of its applications. ➤ Use indicators to distinguish acid and alkaline solutions. <p>The Earth</p> <ul style="list-style-type: none"> ➤ Observe and classify different types of rocks and soils. ➤ Research simple models of the internal structure of the Earth. ➤ Examine fossils and research the fossil record. ➤ Discuss the fossil record as a guide to estimating the age of the Earth. ➤ Learn about most recent estimates of the age of the Earth. <p>Physics</p> <p>Forces and motion</p> <ul style="list-style-type: none"> ➤ Describe the effects of forces on motion, including friction and air resistance. ➤ Describe the effect of gravity on objects. Secondary sources can be used. <p>Energy</p> <ul style="list-style-type: none"> ➤ Understand that energy cannot be created or destroyed and that energy is always conserved. ➤ Recognise different energy types and energy transfers. <p>The Earth and beyond</p> <ul style="list-style-type: none"> ➤ Describe how the movement of the Earth causes the apparent daily and annual movement of the sun and the stars. ➤ Describe the relative position and movement of the planets and the sun in the solar system. ➤ Discuss the impact of the ideas and discoveries of Copernicus, Galileo and more recent scientists. ➤ Understand that the sun and other stars are sources of light and that planets and other bodies are seen by reflected light. 	<p>Chemistry</p> <p>States of matter</p> <ul style="list-style-type: none"> ➤ Show how the particle theory of matter can be used to explain the properties of solids, liquids and gases, including changes of state, gas pressure and diffusion. <p>Material properties</p> <ul style="list-style-type: none"> ➤ Describe and explain the differences between metals and non-metals. ➤ Give chemical symbols for the first twenty elements of the Periodic Table. ➤ Understand that elements are made of atoms. ➤ Explain the idea of compounds. ➤ Name some common compounds including oxides, hydroxides, chlorides, sulfates and carbonates. ➤ Distinguish between elements, compounds and mixtures. <p>Material changes</p> <ul style="list-style-type: none"> ➤ Use a word equation to describe a common reaction. Secondary sources can be used. ➤ Describe chemical reactions which are not useful, e.g. rusting. <p>Physics</p> <p>Forces and motion</p> <ul style="list-style-type: none"> ➤ Calculate average speeds, including through the use of timing gates. ➤ Interpret simple distance/time graphs. <p>Sound</p> <ul style="list-style-type: none"> ➤ Explain the properties of sound in terms of movement of air particles. ➤ Recognise the link between loudness and amplitude, pitch and frequency, using an oscilloscope. <p>Light</p> <ul style="list-style-type: none"> ➤ Use light travelling in a straight line to explain the formation of shadows and other phenomena. ➤ Describe how non-luminous objects are seen. ➤ Describe reflection at a plane surface and use the law of reflection. ➤ Investigate refraction at the boundary between air and glass or air and water. ➤ Explain the dispersion of white light. ➤ Explain colour addition and subtraction, and the absorption and reflection of coloured light. <p>Magnetism</p> <ul style="list-style-type: none"> ➤ Describe the properties of magnets. ➤ Recognise and reproduce the magnetic field pattern of a bar magnet. ➤ Construct and use an electromagnet.

