



**Science Assessment Criteria
Year 7**

A student's attainment in Year 7 science is determined by tests completed during science lessons throughout the year. These tests will include all content taught up to that point. Prior to each test, a detailed list of topics will be given to students in class. Results will be shared with students in class along with information on how to improve.

Below is the list of topics covered in all subject areas:

Biology
Organisms (Cells and Movement) Genes (Human Reproduction and Variation) Ecosystems (Interdependence and Plant Reproduction)
Chemistry
Matter (Particles and Separating Mixtures) Chemical Reactions (Elements and Acids & Alkali)
Physics
Energy (Energy Transfer and Work Done) Forces (Speed and Forces) Electromagnets (Electricity and Circuits) Waves (Light and Sound Waves) Earth (Earth Structure and Universe)

BIOLOGY

Organisms

(Cells and Movement)

	Emerging – a student whose understanding of the Y7 science skills is still emerging will be able to:	Developing – a student who is developing their Y7 science skills will be able to:	Secure – a student who is secure in the skills in the Y7 science curriculum will be able to:	Mastered – a student who has mastered the skills in the Y7 science curriculum will be able to:
Identify an animal and a plant cell.	Recognise and label normal and specialised animal and plant cells; use a microscope to make observations.	Describe unicellular organisms – including yeast, bacteria, euglena, paramecium and amoeba – as being either prokaryotes or eukaryotes.	Describe the functions of the nucleus, cell membrane, mitochondria, cytoplasm, cell wall, vacuole and chloroplast.	Compare and contrast the similarities and differences between normal and specialised animal and plant cells.
		Describe the function of specialised parts of different unicellular organisms.	Explain how different structures help organisms to survive.	
	Recognise that substances are able to move in and out of cells.	Recognise the role of diffusion in living organisms.	Describe the process of diffusion, and name the materials needed by and those removed from the cell.	Explain the factors that affect diffusion.
	Name some common organs in the human body. Understand that our bodies are supported by a skeleton.	Put the terms cell, tissue, organ and organ system in order of hierarchy, naming some common tissues, organs and organ systems in humans. Identify the main bones of the skeleton.	Explain the terms cell, tissue, organ and organ system and the function of all the main organ systems in the body. Describe the functions of the skeleton.	Describe some benefits and disadvantages of multicellular organisms, compared to single-celled organisms. Explain how different parts of the skeleton are adapted to carry out particular functions.

Genes
(Human Reproduction and Variation)

Recognise that our skeleton is made of many bones joined together.	Describe the role of skeletal joints.	Identify some different joints and explain the role of tendons and ligaments in joints.	Compare the movement allowed at different joints and explain why different types of joints are needed.
Know that muscles can contract and relax.	Recall that muscles contract to move bones at joints.	Identify muscles that contract to cause specific movements.	Explain how muscles work antagonistically to bring about movement and evaluate a model.
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Name some of the parts of the human reproductive systems.	Name the main parts of the male and female human reproductive systems. Recognise changes that occur during adolescence.	Describe the structures and functions of the main parts of the male and female human reproductive systems; describe how fertility problems may arise. Describe how the menstruation cycle works.	Explain how the male and female reproductive structures are designed for fertilisation; describe methods to combat infertility. Explain how and why some problems occur with menstruation.
Identify a feature that is inherited.	Identify some features of different organisms that are inherited and some that are determined by the environment in which the organism lives.	Explain the difference between continuous and discontinuous variation; explain why offspring from the same parents can be very different.	Use ideas and evidence to evaluate the importance of genetic and environmental variation.

<h2><u>Genes</u></h2>	Know that genetic information is found in the nucleus of a cell.	Describe chromosomes and their role in transferring heredity information to offspring.	Explain the relationship between chromosomes, genes and DNA; explain why offspring of the same parents may look very different.	Explore the role of scientists in the discovery of DNA and evaluate the relative importance of their contributions.
	Know that offspring get half their genetic information from their Mum and half from their Dad.	Describe how fertilised egg cells contain half of the chromosomes from each parent with a random mix of genetic information from each parent.	Explain how every new individual produced by sexual reproduction is genetically unique.	Explain the impact of slight 'changes' to DNA passed on from parents to offspring.
	Know that different organisms are adapted to survive in different habitats.	Describe the adaptations of organisms which help them to survive different environmental conditions and help them fulfil their niche (e.g predator-prey adaptations, adaptations of organisms living in cold and hot climates)	Explain how the different adaptations of organisms help them to survive different environmental conditions and help them fulfil their niche giving specific examples (cacti, polar bear, camel etc.)	Evaluate the use of models for surface area to volume ratio experiments. Calculate and compare surface area to volume ratio of different cubes representing cells. Explain the importance of surface area to volume ratio for survival.
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<h2><u>Ecosystems</u></h2> <p>(Interdependence and Plant Reproduction)</p>	State a simple food chain.	Describe an example of a simple food web.	Explain how energy flows through a food web and explain factors that can affect food webs, such as	Explain the importance of predators in an environment and evaluate changes in a food web.

Matter

Understand that a theory starts as an idea.	Recognise how theories are developed.	Use observations to develop hypotheses.	Change hypotheses in the light of new evidence and use this evidence to develop theories.
Label a diagram with correct changes of state.	Use correct terminology and the particle model to describe changes of state, including evaporation.	Interpret and explain data relating to melting and boiling points.	Use the particle model to explain latent heat and how impurities affect melting and boiling points.
Identify some objects that float and some that sink.	Make predictions about floating and sinking using ideas about density.	Use the particle model to explain the density differences between gases and calculate density of solids.	Use the particle model to explain factors relating to density.
Identify solutions as more or less concentrated.	Describe what is meant by the terms 'concentration' and 'pressure'.	Calculate concentrations of solutions.	Use ideas about particles to explain the effects of pressure.
Understand that smells can spread across a room.	Describe how diffusion occurs in liquids and gases.	Explain observations relating to diffusion in terms of particles.	Make predictions, using ideas about particles, about factors affecting the rate of diffusion.
Identify whether a chemical reaction has taken place.	Describe features of physical and chemical changes, recognising how mass is conserved.	Use ideas about particles to describe separation processes.	Apply the particle model to explain physical and chemical changes, taking conservation of mass into account.

Matter

Emerging – a student whose understanding of the Y7 science skills is still emerging will be able to:	Developing – a student who is developing their Y7 science skills will be able to:	Secure – a student who is secure in the skills in the Y7 science curriculum will be able to:	Mastered – a student who has mastered the skills in the Y7 science curriculum will be able to:
Identify basic lab equipment.	Name and draw equipment and explain obvious laboratory risks.	Select and draw apparatus accurately; explain safety precautions.	Identify basic lab equipment.
Use 2D images to draw basic lab equipment.	Use 2D images to represent a range of laboratory equipment.	Use laboratory equipment safely to gather evidence.	Record evidence in an effective way.
Identify the equipment needed to separate mixtures.	Describe how to separate mixtures.	Select and explain appropriate separation techniques.	Explain the choice and method of separation using correct terms.
Know that some solids dissolve in liquids and some do not.	Describe the process of dissolving and the effect of temperature.	Describe methods for producing crystals of different sizes.	Use data to draw conclusions about solubility.
Know that some solids dissolve in liquids and some do not.	Understand that seawater is a mixture.	Explain why most water is not pure, and why this is not necessarily a problem.	Explain why contaminated water is a problem and identify what can be done about it.
	Identify sources and uses of salt.	Describe how salt is extracted.	Recognise advantages and disadvantages of salt extraction methods.
Understand the processes of evaporation and condensation.	Describe the process of distillation.	Explain the physical processes involved in distillation.	Identify the uses and advantages of distillation.

Chemical
Reactions
(Elements and
Acid&Alkali)

	Know that some solids will dissolve in water and some do not.	Identify mixtures using chromatography.	Explain how to separate a mixture using chromatography and interpret chromatograms.	Use chromatograms to explain the composition of mixtures; compare chromatography and DNA analysis.
		Explain the idea of a solvent.	Explain mass changes during dissolving; select solvents for different uses.	Use a model to explain dissolving and separation; link the uses of solvents to their properties.
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	Give some examples of elements.	Give some examples of elements, locate them in the Periodic Table and use the table to identify metals and non-metals.	Give examples of elements and explain how they are organised in the Periodic Table.	Define elements, use symbols, link the organisation of the Periodic Table to element features and explain how scientists organised the Periodic Table.
	Understand what a compound is.	Describe an example of a compound and represent a chemical reaction using a simple model.	Explain how compounds can be formed and explain a chemical reaction using simple models.	Make links between simple models of compounds and chemical symbols.

Chemical Reactions

Identify whether a chemical reaction has taken place.	Describe features of physical and chemical changes, recognising how mass is conserved.	Use ideas about particles to describe separation processes.	Apply the particle model to explain physical and chemical changes, taking conservation of mass into account.
Know that you have acids and alkalis in your house.	Identify some everyday substances that contain acids and alkalis.	Explain what all acids have in common and what all alkalis have in common.	Evaluate the hazards posed by some acids and alkalis and how these risks may be reduced.
Know that some chemicals change colour in acids and alkalis.	Give an example of an indicator and state why indicators are useful.	Explain what an indicator is and analyse results when using an indicator.	Compare the effectiveness of different indicators.
Know that acids are opposite to alkalis.	Describe some examples of neutralisation.	Describe the changes to indicators when acids and alkalis are mixed.	Explain the changes to indicators in terms of pH when acids and alkalis are mixed.
Know that water is not an acid is or alkali.	Recognise that water is one product of neutralisation.	Know that water is not an acid is or alkali.	Recognise that water is one product of neutralisation.
Understand that bubbles being produced show that a chemical reaction is taking place.	Describe the observations of reactions between acids and metal, and acids and carbonate, that tell us that a chemical change is taking place.	Explain the general reaction between an acid and a metal, and between an acid and a carbonate, using generic equations.	Summarise specific reactions between acids and metals and between acids and carbonates using word equations and particle drawings.

PHYSICS

Energy

(Energy Transfers and Work Done)

Emerging – a student whose understanding of the Y7 science skills is still emerging will be able to:	Developing – a student who is developing their Y7 science skills will be able to:	Secure – a student who is secure in the skills in the Y7 science curriculum will be able to:	Mastered – a student who has mastered the skills in the Y7 science curriculum will be able to:
Name a device that is able to store energy.	Describe different ways in which energy can be stored and different ways in which energy can be transferred.	Explain that energy is transferred from one type of energy store to another when change happens, and understand that energy transfer does not cause change.	Explain that all changes, physical or chemical, result in a transfer of energy.
State that hot objects give out heat.	Describe the transfer of energy by heating and cooling.	Explain the relationship between energy transfer and temperature difference.	Compare the transfer of energy by conduction and by radiation.
Recall that energy is measured in joules.	Recall the units used to measure quantities of energy, including joules, calories and kilowatt-hours.	Explain that energy can be neither created nor destroyed (the Law of Conservation of Energy).	Carry out calculations of quantities of stored and transferred energy.
	Describe what is meant by rate of energy transfer.	Identify the rate at which electrical appliances transfer energy (their power rating), using the correct units (watts or kilowatts).	Compare rates of energy transferred when electrical appliances are used.

Forces (Speed and Forces)

Emerging – a student whose understanding of the Y7 science skills is still emerging will be able to:	Developing – a student who is developing their Y7 science skills will be able to:	Secure – a student who is secure in the skills in the Y7 science curriculum will be able to:	Mastered – a student who has mastered the skills in the Y7 science curriculum will be able to:
List types of force.	List types of force and represent forces using force diagrams; use newton meters.	Describe the size and direction of forces using force diagrams.	Explain the how the size and direction of forces determines their effects.
Know that some forces push and some pull.	Identify gravity as a pulling force and distinguish between mass and weight.	Describe what is meant by mass, explain how gravity forces affect weight, explain why weight varies from planet to planet and explain the term 'weightless'.	Explain weight as a gravitational attraction between masses which decreases with distance; use scientific concepts to explain the difference between mass and weight.
Know that forces can lead to changes in shape.	Know that forces can lead to changes in shape and investigate the change of shape of a spring.	Explain the relationship between the amount of change in shape and the size of the force, and use data to state Hooke's Law.	Collect accurate data about forces changing the shape of an object, recognise when shape changes regularly with force size, and explain behaviour when the elastic limit is exceeded.
Know that forces can be balanced or unbalanced.	Identify some situations where forces are balanced and recognise that unbalanced forces are needed for a change to take place.	Identify forces acting in pairs, and apply an understanding of forces to explain how a force can cause a change in speed and direction.	Identify different examples of forces and reaction forces, and predict the changes of speed and direction that different forces can cause.

Forces

<p>Know that friction is a force.</p> <p>Recognise that streamlining helps objects move through air or water.</p>	<p>Recognise that friction is a force that slows objects down or stops them from moving.</p> <p>List examples where friction is useful and when it is unwanted, recognise that drag forces slow things down, and recognise that streamlining helps objects move through air or water.</p>	<p>Explain that friction is a contact force opposing the direction of movement.</p> <p>Compare contrasting situations involving friction, explain how friction can be increased or reduced, explain air and water resistance, and explain how streamlining reduces such resistance.</p>	<p>Provide a detailed explanation of friction between surfaces.</p> <p>Explain air and water resistance in terms of frictional drag, explain the forces on flying or falling objects, and explain streamlining using scientific vocabulary.</p>
<p>Know the units that speed can be measured in.</p>	<p>Explain how to find the speed of an object.</p>	<p>Explain the concept of speed and use understanding of speed to explain how the equation for speed is derived.</p>	<p>Independently derive the equation for speed and use understanding of the speed equation to explain how speed cameras work.</p>
<p>Identify the forces acting on an object</p>	<p>Identify the forces acting on an object and explain how they can cancel each other out so that a stationary object does not move.</p>	<p>Explain how opposing forces may or may not be in equilibrium and the effect that this has on a stationary object.</p>	<p>Explain how multiple forces may or may not be in equilibrium and identify the effect this has on an object.</p>
<p>Collect data about time taken on a journey.</p>	<p>Collect data about distance travelled and time taken for types of movement or journeys.</p> <p>Describe some features of distance– time graphs.</p>	<p>Present data you have collected or data you have been given as distance– time graphs.</p> <p>Analyse distance–time graphs to describe an object’s movement at</p>	<p>Construct distance–time graphs for complex journeys.</p> <p>Explain distance–time graphs for complex journeys, including where an object travels at different speeds and</p>

<p><u>Electromagnets</u> (Electricity and Circuits)</p>			different stages in a journey.	accelerates at different rates.
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	Understand that there are different ways of measuring electricity.	Describe what is meant by current, voltage and resistance.	Apply a range of models and analogies to describe current, voltage and resistance.	Evaluate different models and analogies for explaining current, voltage and resistance.
		Describe the relationship between current, voltage and resistance in a qualitative way.	Use data to identify a pattern between current, voltage and resistance.	Use data and a mathematical relationship between current, voltage and resistance, to carry out calculations.
	Use an ammeter and a voltmeter.	Make measurements of current and voltage in series and in parallel circuits.	Use models and simple calculations to explain and compare what happens to the current and voltage in series and parallel circuits.	Use calculations to make predictions about current and voltage in series and parallel circuits.
<p><u>Waves</u> (Light and Sound Waves)</p>	Emerging – a student whose understanding of the Y7 science skills is still emerging will be able to:	Developing – a student who is developing their Y7 science skills will be able to:	Secure – a student who is secure in the skills in the Y7 science curriculum will be able to:	Mastered – a student who has mastered the skills in the Y7 science curriculum will be able to:
	Understand that energy travels in waves.	Recognise that light can be reflected by some materials and absorbed by others.	Explain how some materials absorb energy, and the differences between	Use diagrams to explain the difference between diffuse and specular reflection.

Waves

			transparent, translucent and opaque materials.	
Represent a ray of light as straight line on a labelled diagram.	Describe the ray model of light using the idea that light travels in straight lines.	Explain the difference between reflection and refraction, and describe what happens when light waves are refracted.	Use ray diagrams to explain how a pinhole camera and the eye work.	
State the colours of the rainbow.	Describe the formation of a spectrum from white light.	Explain how white light can be split into a continuous spectrum of colours, called the visible spectrum.	Use the concepts of reflection and absorption of light to explain why some materials (transparent, translucent and opaque) are coloured.	
Recognise that sound energy is transferred by waves.	Recognise that sound energy is transferred by waves and describe how sound waves are made in different situations.	Explain how longitudinal waves carry sound. Relate the terms frequency and amplitude to sounds.	Interpret and devise wave diagrams to represent sounds of different wavelength and amplitude.	
Know that sound can be reflected.	Recognise an echo as a reflection of sound.	Describe how to measure the speed of sound, and how the speed of sound can be used in different applications to measure distances.	Use calculations to measure the speed of sound and the distance of objects in different applications, applying ideas about echoes.	

Earth
(Earth Structure and Universe)

Emerging – a student whose understanding of the Y7 science skills is still emerging will be able to:	Developing – a student who is developing their Y7 science skills will be able to:	Secure – a student who is secure in the skills in the Y7 science curriculum will be able to:	Mastered – a student who has mastered the skills in the Y7 science curriculum will be able to:
Know the different layers of the earth.	Describe the structure and composition of the layers of the earth.	Describe how earthquakes take place and name the waves released during and earthquake.	Explain how seismic waves can be used to collect information about the structure of the earth.
Name different types of rocks.	Describe the structure of different types of rocks and where they are found.	Describe the stages of the rock cycle and explain how each type of rock is produced.	Evaluate the use of different types of rocks for different purposes.
Describe what weathering is.	Name and describe the types of weathering.	Explain how freeze-thaw weathering takes place using the idea of expansion and constriction.	Evaluate whether weathering is harmful or useful.
Name the planets in our solar system.	List the planets according to their sizes and according to their distances from the earth.	Explain the features of each planet and how their features are related to their distances from the sun and from the earth.	Compare explanations about the motion and structure of the Universe from different periods in history.
Name some phases of the Moon and show the different phases of the Moon using models provided.	Describe the phases of the Moon. Describe the appearance of the Moon from diagrams of the Earth, Sun and Moon.	Explain phases of the Moon using the models provided. Describe evidence that led to a change in the model of the Solar System.	Predict phases of the Moon at a given time. Explain how total eclipses are linked to phases of the Moon. Predict the phases of the Moon using models provided.