Government of **Western Australia**
School Curriculum and Standards Authority

Western Australian Curriculum

Science

Scope and sequence | Pre-primary–Year 10
Revised curriculum | For familiarisation in 2025

Acknowledgement of Country

Kaya. The School Curriculum and Standards Authority (the Authority) acknowledges that our offices are on Whadjuk Noongar boodjar and that we deliver our services on the country of many traditional custodians and language groups throughout Western Australia. The Authority acknowledges the traditional custodians throughout Western Australia and their continuing connection to land, waters and community. We offer our respect to Elders past and present.

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Contents

Overview

The current Western Australian Curriculum: Science was adopted from the Australian Curriculum version 8.1.

The revised Western Australian Curriculum: Science is adopted and adapted from the Australian Curriculum version 9.

Guide to reading this document

The Scope and sequence shows the **mandated** curriculum for teaching, written as **content descriptions** across year levels so that a sequence of content can be viewed across the years of schooling from Pre-primary to Year 10. The **examples** illustrate the content and are **not mandated.** Teachers should use examples relevant to the context of the school and the needs of their students.

The document is organised by two Science strands: Science understanding and Science inquiry.

The Science understanding strand includes: Biological sciences; Chemical sciences; Earth and space sciences; and Physical sciences.

The Science inquiry strand includes: Questioning and predicting; Planning and conducting; Processing, modelling and analysing; Evaluating; Communicating; and Collaborating and applying.

The table below outlines the learning area organisation for the Pre-primary to Year 10 Science curriculum.

Science understanding			
Biological sciences	Chemical sciences	Earth and space sciences	Physical sciences

Science inquiry					
Questioning and predicting	Planning and conducting	Processing, modelling and analysing	Evaluating	Communicating	Collaborating and applying

Pre-primary–Year 6

Strand: Science understanding

Sub-strand: Biological sciences

Pre-primary	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Plants and animals have basic needs that are met by the places they live For example: • basic needs include air, food, water and shelter • the places plants and animals live include our homes and local areas, wetlands, forests, deserts and oceans • how connection to Country, roles and responsibilities	Plants and animals have external features that serve a purpose and by which they can be grouped For example: • the external features of plants can include leaves, stems, flowers, fruits and roots • the external features of animals can include eyes, body coverings, legs, wings, fins,	Plants and animals have life cycles through which they grow, change and have offspring For example: • living things have predictable characteristics at different stages of development, such as egg, larva, pupa, adult in insects • how these stages of development are used by Aboriginal and Torres Strait Islander peoples	Living things can be distinguished from non-living and once-living things, and grouped by their characteristics For example: • the characteristics of vertebrates, including fish, amphibians, reptiles, birds and mammals, and invertebrates, including insects, molluscs and arachnids, can be used to	Producers, consumers and decomposers have roles within a habitat and interact in ways that can be represented by food chains For example: • the Sun's role as the primary energy source in food chains, provided through photosynthesis in producers • representing the transfer and direction of the	Living things have structural and behavioural adaptations that enable their survival in their habitat For example: • the adaptations of animals and plants to Australia's desert environments, such as the large ears and nocturnal habit of the bilby, or thin, spiky leaves and deep root systems of	The growth and survival of living things are affected by the changing conditions of their environment and the influence of human activities For example: • the cause and effect of changes to salinity, substrate, sunlight or temperature, on plants and microorganisms • the effect of increased sea temperature on

Pre-primary	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
to care for plants and animals are important to Aboriginal and Torres Strait Islander peoples	antennae and claws • the body coverings of various groups of animals, such as fur, scales and feathers • Aboriginal and Torres Strait Islander peoples' use of tracks to identify, locate and follow animals	to know when to harvest different foods, such as the Noongar people in the South-West of Western Australia use the flowering of Moodjar (*Nuytsia floribunda*) to signal the transition from Djilba to Kambarang	classify them using a dichotomous key • the criteria for something to be recognised as living may be recalled with the mnemonic MRS GREN • systems of grouping living things used by Aboriginal and Torres Strait Islander peoples, such as by their purpose, age, stage in life cycle	flow of energy within a habitat with arrows • exploring local habitats, recognising producers, consumers and decomposers and representing these using a food chain • Aboriginal and Torres Strait Islander peoples' knowledge and use of food chains	desert plants, such as spinifex • the adaptations of animals and plants in ocean environments, such as a green sea turtle's flippers, protective shell and modified respiratory system or the horizontal rhizomes and air canal containing leaves of seagrass • camouflage is an adaptation to hide from predators and/or ambush prey	coral reefs, such as bleaching • Aboriginal and Torres Strait Islander peoples' observations of plant and animal responses to seasonal change allows them to effectively manage and farm food resources

Sub-strand: Chemical sciences

Pre-primary	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Objects are made of various materials that have observable properties For example: • observable properties of materials include colour, hardness, texture and flexibility	Materials can be changed physically without changing their composition For example: • materials can be physically changed to suit a particular purpose, such as twisting strands of cotton or wool together to make thread stronger • physical changes can include scrunching, twisting, pulling, stretching, melting, bending or breaking into smaller pieces by cutting, tearing or crushing	Materials can be combined for a particular purpose For example: • combining materials can change their properties, such as mixing water and cornflour to make a non-Newtonian fluid • the ways in which Aboriginal and Torres Strait Islander peoples combine different materials to produce tools, including hafting, weaving and gluing	The observable properties of solids and liquids and how adding or removing heat leads to a change of state For example: • freezing and solidification are caused by removing heat which slows the movement of particles in a liquid • melting is caused by adding heat which results in the particles of a solid moving faster and the bonds holding them weakening	Processed materials, including fibres, metals, glass and plastics, are made from raw materials, such as wool, ores, sand and oil, and have a range of physical properties that influence their use For example: • the physical properties of materials include flexibility, hardness, strength, absorbency and weight • reasons why materials, or combinations of materials, are used in familiar	The observable properties of solids, liquids and gases can be explained by the motion and arrangement of atoms and molecules (particles) For example: • substances can be classified as solids, liquids or gases based on their properties, including their ability to hold or change shape or volume and their ability to flow • the arrangement of atoms and molecules in each state of matter can be	Materials can undergo reversible changes and irreversible changes For example: • physical changes to materials, such as dissolving, and changes of state are reversible as the product is not chemically altered • chemical changes to materials, such as cooking, burning and rusting, produce new substances and are irreversible

Pre-primary	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
			• a solid will hold its shape while a liquid will fill the bottom of a container	objects, such as shoes, drink containers or backpacks • the use of raw and processed materials by Aboriginal and Torres Strait Islander peoples for different purposes, such as tools, clothing and shelter	represented using drawings or models • a change of state between solid, liquid and gas is caused by adding or removing heat which affects the distance between particles	

Sub-strand: Earth and space sciences

Pre-primary	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Daily and seasonal changes in the environment affect our local community and the world around us For example: • daily changes, such as temperature, wind strength and direction, rain and cloud cover, and how humans, plants and animals respond to them • seasonal changes, such as flowering and fruiting, activity of insects and bird behaviour	Water is a natural resource that comes from a range of sources and is used by people, plants and animals in different ways For example: • the key processes of the water cycle are evaporation (drying), condensation (clouds) and precipitation (rain) • plants and animals require water as a habitat and to maintain life • Aboriginal and Torres Strait	Earth is a planet in the solar system that orbits a star (the Sun) For example: • the revolution of Earth around the Sun • the solar system contains astronomical bodies, including planets, moons, asteroids and the Sun • patterns in the sky and their use by Aboriginal and Torres Strait Islander peoples	Soils, rocks and minerals are important Earth resources, and are used by humans and other living things in different and interconnected ways For example: • the use of soil by humans and other living things, such as for food, nutrients and habitat • minerals extraction methods, the potential environmental and ecological impacts, and the	Weathering, erosion, transportation and deposition cause slow or rapid change to Earth's surface For example: • weathering caused by mechanical means, such as wind abrasion, cycles of extreme heat and cold, and frost wedging; and biological means, such as by plants and tree roots • landforms created by these processes, such	The movement of Earth and other planets relative to the Sun and how Earth's rotation on its axis and revolution around the Sun relate to cyclic observable phenomena, including the day/night cycle For example: • the revolution and rotation of the planets of the solar system • the apparent movement of celestial bodies, such as the Moon, and objects, such as galaxies and	The effect of sudden geological events on Earth's surface, such as tsunamis, earthquakes and volcanic eruptions, and extreme weather, such as cyclones, extreme heat and floods For example: • the causes, magnitude and location of earthquakes, and where they most commonly occur, such as the Ring of Fire • types of extreme weather, the factors that cause these and

Pre-primary	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
• the seasonal calendars of Aboriginal and Torres Strait Islander peoples	Islander peoples' connections with and valuing of water and water resource management		strategies used to mitigate these • the properties of local soil types, including colour, depth, texture and structure • Aboriginal and Torres Strait Islander peoples' connection to and respect for land and their use of its resources, such as using ochre for painting and rock for grinding and tools	as dunes, canyons and caves • the significance to Aboriginal and Torres Strait Islander peoples of landforms, such as Katter Kich (Wave Rock) and its importance to Ballardong Noongar people	constellations, through the sky • Aboriginal and Torres Strait Islander peoples' understanding of the night sky and its use for timekeeping, navigation and storytelling	their effects, such as bushfires and floods

Sub-strand: Physical sciences

Pre-primary	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
The way objects move depends on factors, including their size, shape, material and the force applied For example: • comparing the movement of similar-shaped, but different sized objects, such as marbles and basketballs • the movement of traditional Aboriginal and Torres Strait Islander peoples' tools, such as boomerangs and wanna sticks	The strength and direction of a push or a pull force affects how an object moves or changes shape For example: • pushing or pulling on an object can start or stop its motion, change its direction and speed of travel or change its shape • push and pull forces can be represented using models, drawings or role-play • traditional games, such as	Sound energy is produced by a range of natural and human-made sources and can be sensed For example: • ways to produce sound using familiar objects and actions, such as striking, blowing, scraping, plucking and shaking, and the qualities of sounds, including volume and pitch • sound is transmitted, absorbed and reflected differently by	Energy can move from one thing to another (transfer), and change form (transform) For example: • energy transformation, such as from electrical energy to heat in a heater, or chemical energy to movement energy when running • energy transfer, such as when melting an ice cube or kicking a ball • designing and making a toy that uses elastic	Forces are exerted by one object on another through direct contact, such as friction, or from a distance, such as magnetism and gravity For example: • gravity is a non-contact force that pulls all objects towards the centre of Earth and acts on an object, regardless of whether it is moving or not moving • magnetic force is a non-contact force and can pull (attract) and	Light energy travels from a source in a straight path and can be absorbed, reflected, refracted, form shadows and be sensed For example: • materials selectively absorb, reflect or transmit light of different colours • opaque, translucent and transparent materials allow the transmission of light to differing degrees • light enters the eye and is refracted by the	The transfer and transformation of energy in electrical circuits, including the role of circuit components, insulators and conductors For example: • the necessary components of an electrical circuit include a source, conductor and load, such as a globe or a buzzer • circuits transfer and transform electrical energy into different forms that include light, sound or motion

Pre-primary	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Kendama, Daruma Otoshi, marbles and shuttlecock use push and pull forces	various materials and environments, affecting how it is heard and perceived • traditional Aboriginal and Torres Strait Islander peoples’ instruments, how they make their characteristic sounds and their use in communications and ceremonies	energy (stored energy) to move (kinetic energy)	push (repel) objects at a distance • friction is a contact force that occurs when two things touch and move against each other and slow down or stop moving • force arrows represent the direction and strength of forces acting on an object	lens onto the retina, where it is sensed	• common insulators and conductors and their practical applications in household appliances

Strand: Science inquiry

Sub-strand: Questioning and predicting

Pre-primary	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Pose questions and make predictions based on prior knowledge and shared experiences	Pose questions, explore ideas and make predictions based on knowledge and experiences		Pose questions and make predictions based on planned observations of phenomena that include variables to be measured and changed		Pose testable questions that include variables to be measured and changed, and apply science knowledge to make predictions	
For example: • posing questions, such as ▪ which blocks will roll down the ramp? ▪ will it rain today? • making predictions, such as ▪ when we visit the local wetland, I predict we will see ducks,	For example: • posing questions, such as ▪ what will happen if I pull playdough hard? • making predictions, such as ▪ if we leave a plate of water on a shelf, the water will disappear	For example: • posing questions, such as ▪ how long will it take for our silkworm eggs to hatch? • making predictions, such as ▪ if I loosen a string it will make a sound with a lower pitch	For example: • posing questions, such as ▪ what will happen to the rate ice melts if we place it in the sun? ▪ what will happen to the height a plant grows in a week if we plant it in potting mix?	For example: • posing questions, such as ▪ what will happen to the distance a toy car travels if the wheels are changed? ▪ which material is best to make a drink bottle from?	For example: • posing questions, such as ▪ how is the diameter of a balloon filled with air affected when the temperature of the area around it changes? ▪ what is the difference between the	For example: • posing questions, such as ▪ when placed in a simple circuit, which materials will conduct electricity and allow a globe to light? ▪ how is the growth of a bean sprout affected by the

Pre-primary	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
turtles and dragonflies ▪ we can build the tallest tower using wooden blocks		▪ if I mix paper and glue together, I can make a strong shape	• making predictions, such as ▪ seeds planted in potting mix will germinate faster than in sandy soil	• making predictions, such as ▪ the number of producers in a simulation will increase if predators are removed ▪ steeper slopes will have more erosion	length of day and night at different times of the year? • making predictions, such as ▪ shadows cast by a piece of dowel inserted vertically into the ground will grow shorter towards the middle of the day	concentration of salt in the water it is immersed? • making predictions, such as ▪ metals will conduct electricity, but plastics won't ▪ watering seeds with a salt solution will result in delayed germination compared to those watered with fresh water

Sub-strand: Planning and conducting

Pre-primary	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Participate in guided and self-initiated investigations making observations and assessing risks	Engage in guided investigations to explore and answer questions, test predictions, and assess risks		Plan and conduct investigations, including elements of fair tests, and consider the material and equipment risks		Plan and conduct fair, safe and repeatable investigations	
For example: • testing ideas using the five senses, such as how different surfaces are cool or warm to touch • discussing ways to conduct investigations safely	For example: • suggesting ways to conduct investigations safely, including wearing safety glasses and aprons • comparing how different objects move when pushed or pulled	For example: • demonstrating appropriate use of materials and equipment • following visual or verbal steps to construct a musical instrument	For example: • using a planner in a teacher-led activity to identify what to change, what to keep the same and what to measure in an investigation	For example: • planning a fair test, using a planner to test the amount of grip (friction) of a range of shoes • designing a rubber band car to test how increasing elastic force affects how far the car will travel	For example: • with guidance, planning and recording the method to be used in an investigation so that it can be repeated • making decisions on the variables to be controlled in fair tests	For example: • considering ways to approach investigations that include researching, trial-and-error, experimental testing, field observations, accessing digital tools to collect and manage data and virtual simulations

Pre-primary	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
						• making decisions on the variables to be controlled in fair tests
No content	Make and record observations, including informal measurements		Make and record observations, including formal measurements using familiar scaled instruments		Use equipment to observe, measure and record data	
No content	For example: • making observations using the senses to gather information and record it using text, drawing, counts or digital tools • using uniform informal units of measurement, such as handspans, walking paces, blocks or pop-stick lengths	For example: • making observations of the different life stages of silkworms or a germinating seed and recording the change of appearance by taking digital images and providing a description • observing and drawing the day and night sky and comparing the two	For example: • recording measurements made with familiar scaled instruments using tables or graphic organisers • exploring how to make readings with equipment, such as thermometers or measuring cylinders	For example: • making measurements with a variety of scaled instruments, such as force meters • recording observations in various ways, including photographs, videos, labelled drawings and tables	For example: • comparing the accuracy of different measuring instruments, such as a measuring jug and a cup, and discussing why accuracy is important • recording data using standard units, such as grams, seconds and metres	For example: • recording data in tables and diagrams or electronically, such as in spreadsheets • using tools, such as digital thermometers or soil moisture probes, to collect and record data over time

Sub-strand: Processing, modelling and analysing

Pre-primary	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Represent and discuss observations and identify patterns	Sort and order data using provided tables and represent data using visual or physical models		Organise and represent data using tables, column graphs and models to identify patterns		Organise and represent data using tables, graphs and models to identify the relationships between measured and changed variables	
For example: • discussing places where animals live and identifying patterns in their needs and features of their habitat • counting the number of drink bottles in the class made from different materials and representing this information using a picture graph	For example: • representing the number of plants or animals in a collection using a picture graph • using digital images to show how pushes and pulls affect the shape of an object and sorting images into before and after columns of a table	For example: • using a graphic organiser to sort images of musical instruments and the actions used to produce their sound • making and labelling models of the observed stages in the life cycle of a silkworm or a germinating seed	For example: • creating a visual representation of the layers of soil observed in the school garden	For example: • modelling with computer software, the number of producers and consumers in a habitat and how these change over time • graphing the volume of liquid absorbed by a variety of materials	For example: • representing diagrammatically the connection between animals, their environments and adaptations • modelling the movement of the planets in the solar system	For example: • mapping the location of tectonic activity and representing the magnitude of earthquakes using a key • graphing school electricity use to determine the times of the year when it is greatest • representing the growth of plants in soils of varying salinity over time using appropriate graphs

Sub-strand: Evaluating

Pre-primary	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Discuss similarities and differences between predictions and observations	Compare observations to predictions and identify further questions for investigation		Compare findings with those of others, and to predictions; consider if investigations were fair; and identify questions for further investigation		Compare findings with those of others, and to predictions; evaluate the fairness of an investigation and suggest improvements; and pose questions for further investigation	
For example: • discussing and comparing their observations of the weather in the afternoon to predictions made in the morning • predicting the plants and animals that will be found on a field trip to a local habitat and comparing these to observations	For example: • comparing observations of movement with predictions, such as how far an object may travel • comparing findings of water use surveys and discussing ways to investigate the differences	For example: • comparing the result of combining two materials, such as cornflour and water, to predictions • predicting whether the sound of a percussion instrument made from repurposed materials will be loud or soft, sharp or dull	For example: • discussing the factors that make investigations fair and evaluating the fairness of their own and others' investigations	For example: • comparing own findings from investigations with others and asking questions about factors that may have led to any differences in findings • identifying unexpected findings and posing questions for further investigation	For example: • comparing methods and findings with those of others to determine if the investigation was a fair test • identifying the strengths and weaknesses of their own and others' investigations, and improvements that can be made	For example: • recognising difficulties in conducting an investigation and planning for improvement • discussing similarities and differences in their findings and posing questions to investigate them

Sub-strand: Communicating

Pre-primary	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Share questions, predictions, observations and ideas with others	Communicate observations, ideas, and findings using everyday and scientific vocabulary		Communicate ideas using scientific vocabulary		Communicate ideas in a variety of ways, including scientific reports with appropriate language features	
For example: • describing observations to others through discussions, drawings or models • retelling the steps of an investigation and what happened	For example: • drawing or modelling the external features of a plant or animal and labelling with scientific terms • representing push and pull forces using role-play, labels, arrows or time lapse drawings and describing their representation	For example: • sequencing the stages in the life cycle of a plant or animal and using scientific terms to label them • representing the steps in an investigation using a series of captioned digital images	For example: • discussing how to prepare simple reports of their investigations to share predictions, methods, results and conclusions with their peers • representing energy transfer using diagrams, digital drawings, arrows or labels using scientific vocabulary	For example: • modelling landscapes using materials, such as sand, gravel, soil and rocks to show labelled effects of erosion by water • representing the direction and strength of forces using arrows, and labelling the forces	For example: • preparing a scientific report for an investigation using scientific vocabulary and data representations, such as tables and graphs • annotating digital photography or field sketches to describe structural adaptations of plants or animals	For example: • preparing a scientific report to share findings about how plants respond to changes in physical conditions, such as temperature or salinity • representing circuits using virtual simulations or circuit diagrams and indicating the direction of electricity flow

Sub-strand: Collaborating and applying

Pre-primary	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Use the senses to learn about the natural and physical world and develop scientific ideas	Use science knowledge and understandings to make decisions and choices in their environment		Use science knowledge to propose explanations for observed phenomena and solutions to problems		Use science knowledge to develop considered responses to problems, at a local and global level, through investigation and research	
For example: • responding to questions posed by teachers or children about the way different materials behave • interacting with stories or documentaries about scientists, such as Dame Jane Goodall or Sir Joseph Banks and noticing the ways they make their	For example: • describing the best way to push and pull a Kendama to consistently land the ball in the desired place	For example: • constructing an instrument made from materials and making choices based on the sounds and properties of each • investigating the stories of people who used multiple observations to develop scientific explanations, such as	For example: • observing evaporation and investigating ways to keep soil moist while conserving water • investigating how 18th-century physicists, such as Jan Ingenhousz and Sir Benjamin Thompson collected data on conduction of	For example: • designing an investigation to test how storage life for fruit may be increased • examining the wheels of different toys and evaluating which material has the most friction on different surfaces	For example: • applying knowledge of animal adaptations to propose solutions to prevent the extinction of an endangered species • participating in a citizen science project in the local community	For example: • researching structures resistant to seismic activity and the materials used in regions prone to such events to design a house that can withstand an earthquake • collaborating with other students to research a local

Pre-primary	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
observations, such as through drawings, collections, sound recordings and photography, and how they ask questions about what they think they will observe and find		17th-century entomologist and naturalist Maria Sibylla Merian, who was the first to record the nature of metamorphosis	heat to determine the best conductors or insulators			issue and suggest ways of solving it, such as ways to cool the classroom while reducing electricity usage

Years 7–10

Strand: Science understanding

Sub-strand: Biological sciences

Year 7	Year 8	Year 9	Year 10
Classification helps to order and organise the diversity of life on Earth into a hierarchy from kingdom to species; classification tools, including dichotomous keys, can be developed and used to classify organisms For example: • classifying organisms into taxonomic groups, such as organisms into kingdoms, arthropods and vertebrates into classes, mammals into monotremes, marsupials and placentals • developing a dichotomous key to classify organisms in a local ecosystem	Cells are the basic units of living things and can be viewed with a compound microscope; animal cells have specialised structures and functions, including the cell membrane, cytoplasm, nucleus and mitochondria; plant cells have specialised structures and functions, including the cell membrane, cytoplasm, nucleus, mitochondria, cell wall, chloroplasts and large vacuoles For example: • observing cell structures and determining cell size using a compound microscope • comparing the structure and function of plant and animal cells	Plants and animals have structural, behavioural and physiological adaptations that enable their survival in their environment For example: • plant adaptations to living in different ecosystems, such as local ecosystems, the south-west of Western Australia, deserts and mangroves • plant adaptations to bushfires • vertebrate adaptations to living in different ecosystems, such as local ecosystems, deserts, polar and marine ecosystems	Cell division processes of meiosis and mitosis produce new cells with chromosome numbers specific to their role; chromosomes contain genes that are composed of DNA (deoxyribonucleic acid) For example: • comparing the role and number of chromosomes in the cells produced by mitosis and meiosis • modelling the structure of DNA

Food chains and food webs can be used to represent energy flow in ecosystems and predict possible impacts of human activity
For example:
• role of photosynthesis and cellular respiration in the flow of energy in ecosystems
• feeding relationships in a local ecosystem
• predicting the possible impact of activities that remove an organism from an ecosystem, such as overfishing, spraying with pesticides and introducing predators
• impact of introduced species on interactions in a local ecosystem, such as foxes, cats, cane toads and Phytophthora dieback
	Flowering plant and vertebrate systems carry out specialised functions that enable them to survive and reproduce, including systems for gas exchange, transportation of materials around the organism and reproduction
	For example:
	• comparing flowering plant and vertebrate systems for
	  ▪ gas exchange, such as stomata and guard cells in flowering plants and respiratory systems in vertebrates
	  ▪ transportation of materials, through the xylem and phloem, and processes of capillarity and transpiration in flowering plants and the heart, blood vessels and blood in vertebrates
	  ▪ reproduction, such as the structure of the flower and vertebrate reproductive systems, and the processes of pollination and fertilisation
		Organisms have mechanisms to respond to changes in their environment; endotherms and ectotherms respond differently to changes in external temperature; tropisms help plants respond to external stimuli
		For example:
		• how endotherms, such as mammals and birds, and ectotherms, such as reptiles and fish, use heat transfer mechanisms to respond to changes in external temperature
		• tropisms, such as phototropism, geotropism and hydrotropism
		
		Population size and species diversity can be affected by abiotic and biotic factors; sampling techniques can be used to monitor abiotic factors and estimate numbers of organisms; ecological monitoring can be used to inform ecosystem health and impacts of human activity
			Patterns of monohybrid inheritance, including autosomal dominant/recessive and sex-linked recessive inheritance, can be predicted using pedigrees and Punnett square crosses
			For example:
			• interpreting pedigrees and predicting offspring for
			  ▪ autosomal dominant/recessive alleles, such as hair colour in guinea pigs, leaf colour in barley, seed shape and colour, and plant height in peas
			  ▪ sex-linked recessive alleles, such as red–green colour blindness and haemophilia
			
			The theory of evolution by natural selection explains the past and present diversity of living things, including variation within a species, adaptations and speciation
			For example:
			• natural selection can be used to explain
			  ▪ differences in organisms of the same species at different

Year 7	Year 8	Year 9	Year 10
		For example: • monitoring abiotic factors, such as temperature, pH, nutrients and salinity in a local ecosystem • effect of biotic factors, such as competition, predation, symbiosis and human activity on population size and species diversity • estimating population size in a local ecosystem using sampling techniques, such as capture/recapture and quadrats • monitoring data to inform sustainable practices	locations, such as colour, size and shape ▪ adaptations of organisms to changing environments, such as colour, size, and resistance to antibiotics and pesticides ▪ how isolation can result in one species becoming a different species over time, such as Australian marsupials, Galapagos finches • the importance of maintaining genetic diversity

Sub-strand: Chemical sciences

<table>
<tr><th>Year 7</th><th>Year 8</th><th>Year 9</th><th>Year 10</th></tr>
<tr>
<td>Properties of the different states of matter can be explained by the motion and arrangement of particles; states can change with the addition or removal of energy
For example:
comparing the motion and arrangement of atoms and molecules in solids, liquids and gases
relating the properties of solids, liquids and gases, such as volume, shape, flow and compressibility to the motion and arrangement of atoms and molecules
investigating the effect of heating and cooling on solids, liquids and gases
Mixtures, including solutions, contain a combination of pure substances that can be separated using a range of techniques, including decantation, filtration,</td>
<td>Matter is composed of atoms which contain protons, neutrons and electrons; matter can be classified as elements or compounds which can be compared using different representations, including symbols, formulae and models
For example:
recalling the symbols for common elements
using the formulae for molecules and compounds to identify the names and number/s of elements they contain
constructing models of elements, molecules and compounds
Elements of the periodic table can be classified as metals and non-metals based on their physical properties</td>
<td>The atomic number and mass number of an element can be used to determine the number of protons, neutrons and electrons in an atom of the element; isotopes of an element have the same number of protons but different numbers of neutrons in their nuclei and have the same chemical properties
For example:
determining the number of protons, neutrons and electrons in atoms of different elements
exploring the isotopes of elements, such as hydrogen and oxygen
The structure and properties of atoms relate to the organisation of the elements in the periodic table; elements in the same group on the periodic table have similar properties
For example:
exploring the periodic table to examine the similarities and differences between and within</td>
<td>The ability of atoms to form chemical bonds can be explained by the arrangement of electrons in the atom; ionic bonding involves electron transfer and covalent bonding involves sharing of electrons
For example:
comparing ionic and covalent bonds
using the naming conventions for ionic and covalent compounds
representing compounds using chemical formulae and models
using the periodic table and a table of common ions to write chemical formulae to represent ionic compounds
Reactions follow general patterns that help to predict the reaction products, including precipitation reactions and reactions of acids with bases, metals and carbonates; word and balanced chemical equations can be used to represent these reactions</td>
</tr>
</table>

Year 7	Year 8	Year 9	Year 10

evaporation, crystallisation, chromatography and distillation
For example:
• investigating saturated and unsaturated solutions and the solubility of different solutes
• selecting and using the appropriate techniques to separate
  ▪ insoluble substances from a mixture, such as sand and pebbles from water
  ▪ the solute and solvent from a solution, such as salt in water, pigments in felt pens
	For example:
	• exploring the properties of metals and non-metals, such as melting and boiling point, hardness, malleability, brittleness, ductility, heat and electrical conductivity, lustre and density
	• comparing the properties of metals and non-metals, and their position on the periodic table
		groups of elements, such as alkali metals, alkaline earth metals, transition metals, metalloids, non-metals, halogens and noble gases
		• exploring the reactivity of metals with water through experimentation and relating reactivity to their position on the periodic table
		• modelling the atomic structure of elements, including electron configuration
		• modelling the structure of atoms from the same and different groups on the periodic table to determine structural similarities and differences
			For example:
			• modelling the balancing of chemical equations using molecular modelling kits, diagrams or simulations
			• using indicators to identify acids and bases, and observing the changes in neutralisation reactions
			• everyday applications of
			  ▪ precipitation reactions, such as water testing and precipitation of magnesium and calcium oxides in kettles and water pipes
			  ▪ acid reactions, such as indigestion, fire extinguishers and the treatment of acidic soil and bee stings

Year 7	Year 8	Year 9	Year 10

	Changes to substances can be classified as physical or chemical; chemical changes involve the formation of new substances
	For example:
	• identifying physical changes, such as changing state, dissolving, mixtures, tearing paper, chopping wood
	• indicators of chemical changes, such as colour change, temperature change, formation of a precipitate, gas, odour, light
	• identifying the reactants and products in a chemical reaction
		Compounds are formed when atoms lose, gain or share electrons; non-metal elements combine to form covalent substances; positively charged ions and negatively charged ions combine to form ionic compounds; compounds can be represented using chemical formulae and models
		For example:
		• recalling the chemical formulae for common covalent substances, such as water, carbon dioxide, oxygen gas and hydrochloric acid
		• producing, collecting and testing covalent gases experimentally, such as oxygen, carbon dioxide and hydrogen
		• using a table of common ions to write chemical formulae to represent ionic compounds, such as sodium chloride, magnesium chloride and iron oxide
		• exploring the conductivity of salt solutions experimentally
			The rate at which a reaction occurs can be altered by changing factors, including temperature, concentration and the surface area of a reactant
			For example:
			• investigating factors affecting the rate of reactions, such as changing the
			  ▪ temperature of the reactants
			  ▪ concentration of one or more reactants
			  ▪ surface area of a solid reactant

Year 7	Year 8	Year 9	Year 10

		Chemical reactions involve rearranging atoms to form new substances; word and balanced chemical equations can be used to represent the rearrangement of atoms in a chemical reaction and demonstrate the law of conservation of mass
		For example:
		• demonstrating the law of conservation of mass to model the balancing of chemical equations
		  ▪ experimentally
		  ▪ using molecular modelling kits, diagrams or simulations
		• writing word equations and balanced chemical equations to demonstrate the law of conservation of mass when provided with the chemical formulae for reactants and products	

Year 7	Year 8	Year 9	Year 10
		• writing word equations and balanced chemical equations for chemical reactions observed in practical activities, such as the production of oxygen, carbon dioxide and hydrogen gas and reactivity of metals	

Sub-strand: Earth and space sciences

Year 7	Year 8	Year 9	Year 10
Celestial objects can be classified as planets, stars, moons, asteroids, meteors, comets, constellations and galaxies; planets in our solar system have distinguishing features, including composition, temperature, size, orbit, rotation, tilt of axis, moons and rings For example: • comparing the features of planets in our solar system • exploring the distortion of a planet's position due to gravitational lensing • researching Aboriginal and Torres Strait Islander peoples' knowledge of the night sky Predictable phenomena on Earth caused by its position relative to the Sun and the Moon, including lunar phases, eclipses, seasons and tides	The theory of plate tectonics explains global patterns of geological activity, including the formation of features at divergent, convergent and transform plate boundaries For example: • development of the theory of plate tectonics and evidence supporting the theories • correlating earthquake and volcanic activity to tectonic plates • examining why earthquakes occur within the Australian plate Rocks are composed of minerals; the key processes of the rock cycle are involved in the formation of igneous, sedimentary and metamorphic rocks; the properties of these rocks reflect their formation and influence their use	Global systems, including the carbon and water cycles, rely on interactions involving the biosphere, lithosphere, hydrosphere and atmosphere For example: • the impact of human activity on the carbon cycle • the impact of human activity on local freshwater availability • main potable water resources for Western Australia, such as surface water, ground water and desalinated water Changes to global systems can be used to explain patterns of global climate change	The formation of stars, galaxies and solar systems has continued since the time of the Big Bang; stars have a life cycle determined by their mass For example: • the life cycle of different types of stars • the formation of the Milky Way galaxy • the nebular hypothesis for the formation of our solar system Space exploration contributes to knowledge of the formation and evolution of the universe and Earth, as well as providing useful tools and technologies to improve our life on Earth

Year 7	Year 8	Year 9	Year 10
For example: • different regions on Earth experience different seasonal conditions • tidal variations on Earth result from the relative positions of the Sun and Moon with respect to Earth • exploring lunar eclipses and solar eclipses • investigating Aboriginal and Torres Strait Islander peoples' calendars and how they predict seasonal changes	For example: • classifying a range of common rocks using observable physical properties • linking key processes of the rock cycle and the formation of rock types to processes within and between tectonic plates • exploring the traditional geological knowledge of Aboriginal and Torres Strait Islander peoples in the selection of different rock types for different purposes Minerals can be classified using physical properties, including colour, streak, lustre, transparency, hardness and cleavage; useful resources can be extracted from minerals For example: • using a key to classifying minerals based on their physical properties • exploring a local mineral resource, such as bauxite, diamonds	For example: • indicators of climate change, such as changes in oceanic and atmospheric temperatures, sea levels, species distribution, permafrost and sea ice coverage • changes in global climate over time	For example: • data gathered through space rover and probe missions is providing information about the geology and atmosphere of moons and other planets in our solar system • data gathered through space exploration can be used to search for possible life beyond our solar system • applications of space technology, including remote sensing of Earth, communication systems and scientific exploration • importance of Australia's role in space exploration • contribution of the Square Kilometre Array (SKA) to space exploration • impact of space junk and satellites on future space exploration and Earth • impact of low gravity on biological systems

Sub-strand: Physical sciences

Year 7	Year 8	Year 9	Year 10
Change to an object’s motion is caused by unbalanced forces, including friction, gravitational, magnetic and electrostatic forces; the unit of measurement for force is the newton For example: • using arrows to represent the magnitude and direction of forces acting on an object • friction can be increased by pressing surfaces together with more force, increasing the surface area in contact and making the surface rougher • friction can be decreased by reducing the pressure between surfaces and surface area in contact, streamlining, polishing, lubricating and using rollers or ball bearings • the weight of an object on Earth is the result of the gravitational	The different forms of energy can be classified as either kinetic or potential energy; energy transformations and transfers cause change within systems For example: • electrical, thermal, sound and light energy can be classified as kinetic energy • gravitational, chemical, nuclear and elastic energy can be classified as potential energy • energy transformations in systems, such as gravitational potential energy to kinetic energy, elastic potential energy in rubber bands or springs to kinetic energy, chemical energy to thermal energy • energy transfers in systems, such as boiling water in a beaker, throwing a ball	Sound waves are longitudinal waves produced by vibrating objects; sound waves travel through solids, liquids and gases at different speeds; sound is reflected when coming into contact with a solid or liquid surface For example: • exploring why we see lightning before we hear thunder even though they occur at the same time • exploring resonance and its applications, such as musical instruments, shattering glass and bridge design • exploring echoes and their applications, such as echolocation in nature, ultrasound in medicine, depth sounding in oceanography and seismic surveying in mineral and oil exploration • exploring the energy transfers that occur as sound travels	Motion can be quantitatively determined; quantities, including time, distance, displacement, speed, velocity and acceleration can be classified as scalar or vector; vector diagrams can be used to represent the magnitude and direction of motion For example: • using vector diagrams to illustrate the difference between distance and displacement • exploring the relationship between time intervals and distance or displacement to calculate speed, velocity and acceleration

Year 7	Year 8	Year 9	Year 10
attraction between its mass and that of the Earth • exploring how electrostatic and magnetic forces cause motion		through the ear and to the brain, and hearing conditions, such as conductive and nerve deafness	
Simple machines, including levers, inclined planes and wheels and axles, provide a mechanical advantage, including force, distance and speed advantage For example: • the type of mechanical advantage provided by the different classes of levers, inclined planes and wheels and axles • illustrating where simple machines are used every day	Heat is transferred by conduction in solids, convection in liquids and gases, and radiation in all states; heat can be reflected and absorbed For example: • comparing heat transfer via particle and wave models • investigating conductors and insulators of heat • exploring the absorption and reflection of heat by different surfaces, such as shiny and dull surfaces, dark- and light-coloured surfaces	Light is an electromagnetic wave; light is made up of photons that have both particle and wave properties; light can be reflected from plane and curved mirrors and refracted when passing through concave and convex lenses For example: • exploring the refraction of light as it passes from one medium to another • investigating the size, nature and position of images formed by plane and curved mirrors, concave and convex lenses • pathway of light entering the eye and focusing on the retina and corrections for eye defects, such as short sightedness, long sightedness, astigmatism and cataracts	Newton's laws of motion can be used to predict motion; the relationship between force, mass and acceleration of objects can be quantitatively determined For example: • investigating Newton's three laws of motion • applying Newton's three laws of motion to everyday applications, such as sport and driving

Year 7	Year 8	Year 9	Year 10
	The flow of electricity through a circuit is affected by the type of circuit; a load placed in a circuit transforms electrical energy into other forms of energy; safety switches and circuit breakers are devices installed in buildings to protect people and electrical systems For example: • drawing circuit diagrams, using appropriate symbols, and constructing models of series and parallel circuits • comparing safety switches and circuit breakers and researching regulations regarding their use		The law of conservation of energy can be applied to analyse system efficiency in terms of energy inputs and outputs, transfers and transformations For example: • work is done when energy is transferred and transformed • energy and work are scalar quantities that can be quantitatively determined by calculating gravitational potential and kinetic energy • modelling the efficiency of energy transfers and transformations in a system using Sankey diagrams • calculating energy transformations in a system, such as a ball falling onto a surface and rebounding, a pendulum swing, a roller coaster changing height and speed around its track

Strand: Science inquiry

Sub-strand: Questioning and predicting

Year 7	Year 8	Year 9	Year 10
Propose investigable questions and make predictions based on scientific knowledge to explore scientific models, identify patterns and test relationships		Propose investigable questions and hypotheses to test relationships and develop explanatory models	
For example: • proposing investigable questions, such as ▪ how does the angle of sunlight affect the surface temperature of Earth? ▪ how does load carried affect the force of friction? • making predictions, such as ▪ if the closed seasons for fishing are removed, then the number of fish in the waterways will decrease ▪ if the temperature of a solvent is increased, then the solubility of a solute will increase	For example: • proposing investigable questions, such as ▪ how does car colour affect the internal temperature of a car? ▪ how does temperature affect the amount of transpiration from plant leaves? • making predictions, such as ▪ if more globes are added to a circuit, then the light produced by each globe gets dimmer ▪ if a saturated solution cools quickly, then the crystals formed will be smaller	For example: • proposing investigable questions, such as ▪ how do different lenses refract light? ▪ how does gravity affect plant root and shoot growth? • proposing hypotheses, such as ▪ plants that live in hot, dry climates have fewer stomata in their leaves ▪ sea ice reduces heat loss from oceans	For example: • proposing investigable questions, such as ▪ how do safety devices, such as seatbelts, reduce the likelihood of injury in a collision? ▪ are traits caused by dominant or recessive alleles more common in the class? • proposing hypotheses, such as ▪ the rate of a reaction increases as the temperature of reactants increases ▪ the steeper the slope of a ramp the greater the acceleration of an object down the slope

Sub-strand: Planning and conducting

Year 7	Year 8	Year 9	Year 10
Plan and conduct reproducible investigations to answer questions; recognising and managing risks and considering ethical issues		Plan and conduct valid and reproducible investigations to answer questions and test hypotheses, developing and following risk assessments, and considering ethical issues	
For example: • planning and conducting a variety of investigation types, such as fair test investigations, descriptive investigations, comparative investigations and analytical investigations • identifying risks and suggesting ways to manage them • considering ethical issues, such as human consent, animal ethics, ecological ethics, use of heritage sites and artefacts on Country	For example: • planning and conducting a variety of investigation types, such as fair test investigations, descriptive investigations, comparative investigations and analytical investigations • identifying risks and suggesting ways to manage them • considering ethical issues, such as human consent, animal ethics, ecological ethics, use of heritage sites and artefacts on Country	For example: • planning and conducting a variety of investigation types, such as fair test investigations, descriptive investigations, comparative investigations and analytical investigations • outlining strategies to control possible sources of systematic errors and random errors • developing risk assessments to identify potential hazards and prevent potential incidents and injuries • considering ethical issues, such as human consent, animal ethics, ecological ethics, use of heritage sites and artefacts on Country	For example: • planning and conducting a variety of investigation types, such as fair test investigations, descriptive investigations, comparative investigations and analytical investigations • outlining strategies to control possible sources of systematic errors and random errors • developing risk assessments to identify potential hazards and prevent potential incidents and injuries • considering ethical issues, such as human consent, animal ethics, ecological ethics, use of heritage sites and artefacts on Country

Year 7	Year 8	Year 9	Year 10
Select and use equipment to generate and record data with precision, using digital tools as appropriate		Select and use equipment to generate and record data with precision to obtain appropriate sample sizes and replicable data, using digital tools as appropriate	
For example: • selecting the appropriate equipment to collect data, such as using a measuring cylinder to measure volume • recording data in appropriate formats, such as tables, spreadsheets and digital images, using appropriate units of measurement • using digital tools, such as thermometers, electronic balances and force meters to collect data	For example: • selecting the appropriate equipment to collect data, such as using a measuring cylinder to measure volume • recording data in appropriate formats, such as tables, spreadsheets and digital images, using appropriate units of measurement • using digital tools, such as thermometers, electronic balances, microscopes, voltmeters and ammeters to collect data	For example: • recording data in appropriate formats, such as tables, spreadsheets and digital images, using appropriate units of measurement • obtaining reliable data through a large sample size, replicates and repeating an experiment • using digital tools, such as thermometers, electronic balances, pH meters, light meters and sound meters to collect data	For example: • recording data in appropriate formats, such as tables, spreadsheets and digital images, using appropriate units of measurement • obtaining reliable data through a large sample size, replicates and repeating an experiment • using digital tools, such as thermometers, electronic balances, pH meters, microscopes and motion sensors to collect data

Sub-strand: Processing, modelling and analysing

Year 7	Year 8	Year 9	Year 10
Construct appropriate representations, including tables, graphs, models and mathematical relationships, to organise and process data and information		Select and construct appropriate representations, including tables, graphs, descriptive statistics, models and mathematical relationships, to organise and process data and information	
For example: • constructing column graphs to represent discrete data and line graphs to represent continuous data • processing data by calculating mean and percentages • constructing models, such as solar system models, flow charts, force diagrams, dichotomous keys and simulations	For example: • constructing column graphs to represent discrete data and line graphs to represent continuous data • processing data by calculating mean, percentages and current • constructing models, such as element, molecule and compound models, scale diagrams of cells, electrical circuit diagrams, the rock cycle, flow charts and simulations	For example: • constructing column graphs to represent discrete data and line graphs to represent continuous data • processing data by calculating percentages and ratios, and using descriptive statistics, such as mean, mode, median and range • constructing models, such as chemical formulae, word and chemical equations, biogeochemical cycles, light ray diagrams, flow charts and simulations	For example: • constructing column graphs to represent discrete data and line graphs to represent continuous data • processing data by calculating percentages, ratios, speed, velocity, acceleration and force, and using descriptive statistics, such as mean, mode, median and range • constructing models, such as atomic models, chemical formulae, word and chemical equations, pedigrees, vector diagrams, flow charts and simulations

Year 7	Year 8	Year 9	Year 10
Analyse data and information to describe patterns and relationships, identify anomalies and draw conclusions based on evidence		Analyse and connect a variety of data and information to identify and explain patterns, relationships and anomalies, and draw conclusions based on evidence	
For example: • analysing data to describe patterns and relationships, such as the temperature on the surface of Earth is higher when the sun is directly overhead • drawing logical conclusions considering the method of data collection, quality of evidence and limitations or significance of a claim	For example: • analysing data to describe patterns and relationships, such as darker coloured cars absorb more heat • drawing logical conclusions considering the method of data collection, quality of evidence and limitations or significance of a claim	For example: • analysing data to describe patterns and relationships, such as plant shoots grow upwards and roots grow downwards • writing conclusions that describe patterns or relationships and providing evidence from the investigation and research to support the conclusion	For example: • analysing data to describe patterns and relationships, such as the steeper the slope of a ramp the greater the acceleration of an object as it travels down the slope • writing conclusions that describe patterns or relationships and providing evidence from the investigation and research to support the conclusion

Sub-strand: Evaluating

Year 7	Year 8	Year 9	Year 10
Reflect on scientific investigations, including evaluating the quality of the data collected, and identifying improvements		Evaluate validity and reliability of methods and validity of conclusions, including identifying possible sources of error, and describe specific ways to improve the quality of the data	
For example: • reflecting on the quality of the data in relation to the data collection method and amount of data collected • evaluating whether the investigation was valid and reliable • suggesting improvements to investigation methods to increase the accuracy of the data recorded, such as using ▪ the same electronic balance to measure the mass each time ▪ a digital force meter to measure force rather than a spring balance ▪ control of appropriate variables	For example: • reflecting on the quality of the data in relation to the data collection method and amount of data collected • evaluating whether the investigation was valid and reliable • suggesting improvements to investigation methods to increase the accuracy of the data recorded, such as using ▪ the same electronic balance to measure the mass each time ▪ a digital ammeter to measure current ▪ control of appropriate variables	For example: • comparing the data collected with the expected values and comment on the accuracy of the data • reflecting on the precision of the data collected and identifying sources of error • linking the quality of the data to the validity of the conclusion • suggesting specific improvements to the validity of the investigation, such as ▪ controlling all specific variables ▪ using a control for comparison ▪ increasing random samples • suggesting specific improvements to the reliability of the investigation, such as ▪ ensuring consistency of results ▪ having a large enough sample	For example: • comparing the data collected with the expected values and comment on the accuracy of the data • reflecting on the precision of the data collected and identifying sources of error • linking the quality of the data to the validity of the conclusion • suggesting specific improvements to the validity of the investigation, such as ▪ controlling all specific variables ▪ using a control for comparison ▪ increasing random samples • suggesting specific improvements to the reliability of the investigation, such as ▪ ensuring consistency of results ▪ having a large enough sample

Year 7	Year 8	Year 9	Year 10
		▪ repeating or replicating the investigation	▪ repeating or replicating the investigation
Construct evidence-based arguments to support conclusions or evaluate claims		Construct arguments based on analysis of a variety of evidence to support conclusions or evaluate claims	
For example: • using evidence provided by scientific investigations to evaluate claims or conclusions • evaluating the quality of evidence when constructing an argument to support a conclusion or claim • evaluating a claim that one brand of tyre is better on wet roads than another brand of tyre	For example: • using evidence provided by scientific investigations to evaluate claims or conclusions • evaluating the quality of evidence when constructing an argument to support a conclusion or claim • evaluating a claim that one brand of battery lasts longer than another brand of battery	For example: • constructing an argument supported by primary and secondary evidence and reasoning to support or reject hypotheses • evaluating the quality of primary and secondary evidence when constructing an argument to support a conclusion or claim • constructing a scientific argument showing how a range of evidence supports a claim relating to climate change	For example: • constructing an argument supported by primary and secondary evidence and reasoning to support or reject hypotheses • evaluating the quality of primary and secondary evidence when constructing an argument to support a conclusion or claim • constructing a scientific argument showing how a range of evidence supports the theory of natural selection

Sub-strand: Communicating

Year 7	Year 8	Year 9	Year 10
Communicate ideas, findings and arguments for specific purposes and audiences, including selection of appropriate content, language and text features, using digital tools as appropriate		Communicate scientific ideas and information for specific purposes and audiences, including constructing evidence-based arguments and selection of appropriate content, language and text features, using digital tools as appropriate	
For example: • reporting on scientific investigations, incorporating diagrams, graphical representations and data as appropriate, and including examination of accuracy and reproducibility of the data • writing a letter to the editor to express a view about the impact of spraying pesticides on a local ecosystem • creating an informative text for a younger audience to show how the moon affects tides on Earth	For example: • reporting on scientific investigations, incorporating diagrams, graphical representations and data as appropriate, and including examination of accuracy and reproducibility of the data • creating a documentary on the rock cycle, selecting appropriate language, models or analogies to engage a specific audience • creating a digital infographic to illustrate heat loss through conduction, convection and radiation	For example: • reporting on scientific investigations, incorporating background information, diagrams, graphical representations and data as appropriate, an explanation of the results using scientific knowledge, and a discussion that considers validity and reproducibility • summarising the findings of an investigation as a live or virtual poster presentation • creating a digital infographic to highlight the multiple lines of evidence from polar ice caps, ocean temperatures and extreme weather to explain how climate change is impacting Earth	For example: • reporting on scientific investigations, incorporating background information, diagrams, graphical representations and data as appropriate, an explanation of the results using scientific knowledge, and a discussion that considers validity and reproducibility • summarising the findings of an investigation as a live or virtual poster presentation • using animation or comic strip software to create an explanation of the Big Bang for an audience of their peers

Sub-strand: Collaborating and applying

Year 7	Year 8	Year 9	Year 10
Illustrate how the development of scientific knowledge has benefited from collaboration across disciplines and the contributions of people from a range of cultures		Illustrate how advances in scientific understanding often rely on developments in technologies and engineering and technological and engineering advances are often linked to scientific discoveries	
For example: • examining why it is important to recognise that different people in society have different perspectives on the introduction of biological controls to eradicate an invasive species • investigating how aeronautical engineers' understanding of the nature of the forces acting in flight have led to changes in the design of aircraft • exploring the contributions of Aboriginal and Torres Strait Islander peoples' knowledge to science, such as the identification of medicinal properties of endemic plants • reflecting on the role of contemporary Aboriginal and Torres Strait Islander	For example: • identifying how microscopes and medical imaging have led to improved understanding of cells and organs • investigating how the development of superstrong, lighter alloys has enabled engineers to improve structural components in building, transportation and industry • investigating how knowledge of the location and extraction of mineral resources relies on expertise from across disciplines • exploring how seismic data is collected and shared between governments across the Asia-Pacific region and how governments use this data for	For example: • investigating how computer modelling can be used to predict the changes in populations due to environmental changes, such as the impact of flooding or fire on rabbit or kangaroo populations • considering how computer modelling has improved knowledge and predictability of phenomena, such as climate change and atmospheric pollution • exploring Australian technological advances, such as the cochlear implant pioneered by Professor Graeme Clark and the Monash Vision Group's work on a bionic eye	For example: • exploring how the development of fast computers has made the analysis of DNA sequencing possible • examining how the work of Rosalind Franklin, James Watson, Francis Crick and Maurice Wilkins contributed to the development of the double helix structure of DNA • exploring how astronomer Vera Rubin's discovery of the existence of dark matter was validated • exploring how the development of fast computers has made possible the analysis of radio astronomy signals and other data generated by major international science projects, such as the

Year 7	Year 8	Year 9	Year 10
astronomers and astrophysicists, such as Wiradjuri astrophysicist and science communicator Kirsten Banks in promoting Aboriginal and Torres Strait Islander astronomy	alert systems, such as tsunami alerts		Event Horizon Telescope and the Square Kilometre Array (SKA) • examining how the discovery of gravity waves validated Einstein's theory of general relativity and why this discovery did not occur until 100 years after the theory was proposed
Illustrate how science understanding and skills have influenced the development of individual, community and workplace practices		Illustrate how proposed scientific responses to contemporary issues may impact on society	
For example: • investigating everyday applications of physical separation techniques, such as desalination plants, sorting waste materials, reducing pollution, extracting products from plants, separating blood products and cleaning up oil spills • exploring how tidal and seasonal changes affect people in a variety of activities, such as fishing and agriculture	For example: • exploring the development of spray-on skin by Professor Fiona Wood and Maria Stoner • exploring importance of insect pollination in flowering plants for human food security • examining the impact of mining on local ecosystems and the community • exploring how geologist and oceanographic cartographer Marie Tharp's topographic maps of the Atlantic Ocean floor	For example: • investigating strategies implemented to maintain part of the local environment, such as bushland, a beach, a lake, a desert or a shoreline • exploring how Marie Curie's discovery of new elements and work with radioisotopes contributed to the treatment of cancers • examining climate change mitigating technologies to reduce energy consumption, such as	For example: • using knowledge of science to test claims made in advertising • examining karyotypes and applications of biotechnologies, such as DNA profiling, gene therapy and genetic engineering • investigating why agricultural practices have changed to include widespread use of genetically engineered crops • examining how the recent use of female crash test dummies has shown women are at greater risk

Year 7	Year 8	Year 9	Year 10
• identifying endemic plants to revegetate a local ecosystem • exploring how Dame Jane Goodall's communication of her research resulted in changed individual viewpoints and conservation policies	provided support for the acceptance of the theory of plate tectonics	electric vehicles, solar panels and battery storage by individuals, industries and communities • considering the availability of the resource, and impacts, such as environmental, ethical, social and economic considerations, of using different renewable and non-renewable energy resources to produce electricity • considering safe sound levels for humans and implications in the workplace and leisure activities	of injury in a car accident and consider implications for changing car safety features • describing how science is used in the media to explain a natural event or justify people's actions