# Science – comparison of curriculums

**The following tables show the relationship between the Victorian Curriculum F–10 Version 1.0 (VC1) and the Victorian Curriculum F–10 Version 2.0 (VC2).**

## Foundation to Level 2

### Achievement standard

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| By the end of Level 2, students describe examples of how people use science in their daily lives. They identify and describe examples of the external features and basic needs of living things. They describe how different places meet the needs of living things. They describe the properties, behaviour, uses and the effects of interacting with familiar materials and objects. They discuss how light and sound can be produced and sensed. They identify and describe the changes to objects, materials, resources, living things and things in their local environment. They suggest how the environment affects them and other living things.  Students pose and respond to questions about familiar objects and events and predict outcomes of investigations.  They use their senses to explore the world around them and record informal measurements to make and compare observations. They record, sort and represent their observations and communicate their ideas to others. | By the end of Level 2, students make and compare observations about the world around them. They describe situations in their lives where they ask questions about natural phenomena and use patterns from their observations to make scientific predictions.  Students group plants and animals based on observable features, and identify how living things meet their needs in the places they live. They explain how the features of plants and animals enable their survival. They describe the observable properties of the materials that make up objects. They provide examples of objects and mixtures that are made from a combination of materials, and distinguish between the properties of objects or mixtures and those of the materials from which they are made. They identify ways to change materials without changing their material composition. They identify daily and seasonal changes and describe ways these changes affect everyday life. They identify celestial objects and describe patterns they see in the sky. They suggest ways that the use of common materials can be reduced, re-used and recycled, and explain the importance of these actions for sustainability. They identify factors that influence the movement of objects. They describe and predict how different strengths and directions of pushes and pulls change the motion and shape of objects. They describe the effect of sound energy on objects and demonstrate how different sounds can be produced.  Students pose questions about observed patterns or relationships and make predictions related to familiar objects and events. They suggest steps to be followed in an investigation, and follow safe procedures to make and record observations, including informal measurements. They use provided tables and organisers to sort and order data, and represent simple patterns in data. With guidance, they compare their own observations and predictions with those of others, and identify further questions for investigation. They use everyday and some scientific vocabulary to communicate observations, findings and ideas. | Refined for clarity to ensure that the achievement standard aligns with new and revised content descriptions |
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### Content descriptions

#### VC2 strand: Science as a Human Endeavour

##### Sub-strand: Nature and development of science

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
|  | scientific knowledge is based on observations of the natural world using the senses, and scientific tools and instruments  VC2S2H01 | New content description |

##### Sub-strand: Use and influence of science

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| People use science in their daily lives (VCSSU041) | science is used by people in their daily lives, including asking questions and using patterns from observations of the world around them to make scientific predictions  VC2S2H02 | Refined for clarity |

#### VC2 strand: Science Understanding

##### Sub-strand: Biological sciences

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| Living things have a variety of external features and live in different places where their basic needs, including food, water and shelter, are met (VCSSU042) | plants and animals have observable features that can be used to group them in different ways  VC2S2U01 | Refined for clarity and introduction of the concept of classification |
| Living things have a variety of external features and live in different places where their basic needs, including food, water and shelter, are met (VCSSU042) | plants and animals have basic needs, including air, water, food and shelter; the places where they live meet those needs  VC2S2U02 | Refined for clarity in identifying ‘basic needs’ |
| Living things grow, change and have offspring similar to themselves (VCSSU043) | plants and animals have external features that perform different functions to enable their survival; in plants these features include roots, stems, leaves, flowers, fruit, bulbs, trunks and branches, while different features in animals enable them to move, breathe, eat and respond to their environment  VC2S2U03 | Refined for greater clarity, and to introduce concepts that link structure to function in plants and animals |

##### Sub-strand: Chemical sciences

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| Objects are made of materials that have observable properties (VCSSU044) | objects can be made of one or more different materials; these materials have observable properties  VC2S2U04 | VC2 clarifies that this refers to one or more different materials |
| Everyday materials can be physically changed or combined with other materials in a variety of ways for particular purposes (VCSSU045) | materials can be combined in a variety of ways for particular purposes; the properties of objects and mixtures can differ from the properties of the materials from which they are made  VC2S2U05 | VC2 conflates the concepts of physical change and material combination |
| materials can be changed physically by different actions without changing their material composition, including by bending, twisting, stretching, crushing, squashing and breaking into smaller pieces  VC2S2U06 | VC2 conflates the concepts of physical change and material combination |

##### Sub-strand: Earth and space sciences

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| Observable changes occur in the sky and landscape; daily and seasonal changes affect everyday life (VCSSU046) | daily and seasonal changes in the weather and the environment can be observed and affect decisions made in everyday life  VC2S2U07 | Included a clear reference to decision-making based on observations |
| Observable changes occur in the sky and landscape; daily and seasonal changes affect everyday life (VCSSU046)  Earth is part of a system of planets orbiting around a star (the Sun) (VCSSU078) | Earth is one of 8 planets in our solar system; observing the sky reveals patterns in the changing positions of the Sun, Moon, planets and stars  VC2S2U08 | Greater clarity about what should be observed in the sky and decision-making about daily and seasonal changes. Specific landscape changes are considered separately in terms of resource sustainability. Shift of solar system planets from Levels 5 and 6 to Foundation to Level 2 |
| Earth’s resources are used in a variety of ways (VCSSU047) | taking care of Earth’s water, land and air involves consideration of reducing, re-using and recycling materials to conserve Earth’s resources  VC2S2U09 | Clearer focus on sustainability |

##### Sub-strand: Physical sciences

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| The way objects move depends on a variety of factors including their size and shape: a push or a pull affects how an object moves or changes shape (VCSSU048) | the way objects move depends on a variety of factors including their size, shape and material  VC2S2U10 | Refined for clarity by specifying the factors that affect motion |
| pushes and pulls are forces that can change an object’s movement or shape and can be represented in terms of strength and direction  VC2S2U11 | Refined for clarity, including the use of scientific language (forces) and representations |
| Light and sound are produced by a range of sources and can be sensed (VCSSU049) | sound can make materials vibrate and vibrating materials can make sound; different actions can be used to produce sounds of varying pitch and volume  VC2S2U12 | Focus at this level is on sound, including concepts of ‘pitch’ and ‘volume’. ‘Light’ has shifted to Levels 5 and 6 |

#### VC2 strand: Science Inquiry

##### Sub-strand: Questioning and predicting

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| Respond to and pose questions, and make predictions about familiar objects and events (VCSIS050) | experiences can be used as a basis for posing questions to explore observed patterns and relationships, and to make predictions  VC2S2I01 | Refined for clarity, with reference to experiences |

##### Sub-strand: Planning and conducting

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| Participate in guided investigations, including making observations using the senses, to explore and answer questions (VCSIS051) | scientific questions and predictions can be investigated safely by following procedures that have sequenced steps  VC2S2I02 | Removed reference to ‘guided’ investigations |
| Use informal measurements in the collection and recording of observations (VCSIS052) | observations are made using the senses and recorded, including informal measurements, using digital tools as appropriate  VC2S2I03 | Refined to include reference to using the senses to make observations, and use of digital tools |

##### Sub-strand: Processing, modelling and analysing

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| Use a range of methods, including drawings and provided tables, to sort information (VCSIS053) | data and information can be sorted and ordered using provided tables and organisers, and visual or physical models to show simple patterns  VC2S2I04 | Refined for clarity |

##### Sub-strand: Evaluating

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| Compare observations and predictions with those of others (VCSIS054) | observations can be compared to predictions and the observations of others, which may lead to further questions being identified  VC2S2I05 | Refined for clarity and inclusion of skill of identifying further questions |

##### Sub-strand: Communicating

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| Represent and communicate observations and ideas about changes in objects and events in a variety of ways (VCSIS055) | observations, findings and ideas can be shared with others by using everyday and some scientific vocabulary  VC2S2I06 | Refined for clarity, and included the use of some scientific vocabulary |

## Levels 3 and 4

### Achievement standard

| Victorian Curriculum F–10 Version 1.0 | **Victorian Curriculum F–10 Version 2.0** | Comment |
| --- | --- | --- |
| By the end of Level 4, students describe situations where science understanding can influence their own and others’ actions. They explain the effects of Earth’s rotation on its axis. They distinguish between temperature and heat and use examples to illustrate how heat is produced and transferred. They explain how heat is involved in changes of state between solid and liquid. They link the physical properties of materials to their use. They discuss how natural and human processes cause changes to Earth’s surface. They use contact and non-contact forces to describe interactions between objects. They group living things based on observable features and distinguish them from non-living things. They describe relationships that assist the survival of living things. They compare the key stages in the life cycle of a plant and an animal and relate life cycles to growth and survival.  Students describe how they use science investigations to identify patterns and relationships and to respond to questions. They follow instructions to identify questions that they can investigate about familiar contexts and make predictions based on prior knowledge. They discuss ways to conduct investigations and suggest why a test was fair or not. They safely use equipment to make and record formal measurements and observations. They use provided tables and column graphs to organise and identify patterns and trends in data. Students suggest explanations for observations and compare their findings with their predictions. They use formal and informal scientific language to communicate their observations, methods and findings. | By the end of Level 4, students explain the role of data in scientific inquiry. They provide examples to explain how needs have been met or problems have been solved through applying scientific knowledge, skills and data.  Students classify and compare the characteristics of living, once-living and non-living things. They compare the life cycles of different plants and animals, and describe similarities and differences between parents and offspring at different stages of growth. They identify the roles of organisms in a habitat, and construct food chains. They classify solids, liquids and gases based on observable properties, and describe how heating and cooling can cause a change of state. They relate the use and re-use of materials to the materials’ properties. They explain how Earth’s resources can be used in a variety of ways. They list sources of water on Earth, identify key processes in the water cycle, and describe how water can cycle through the environment. They distinguish between weather and climate and explain how human activity can impact climate, and how these impacts may be reduced. They identify different sources of heat energy and measure temperature changes that may occur when heat is transferred from one object to another. They identify forces acting on objects and describe the effects of these.  Students pose questions to identify patterns and relationships, and make predictions based on observations. They plan investigations using planning scaffolds, identify key components of fair tests and describe how they conduct investigations safely. They use familiar classroom instruments and simple procedures to record observations and results, including formal measurements. They construct representations to organise data and information, and identify patterns and simple relationships. They compare their findings with those of others, assess the fairness of their investigations, propose further questions for investigation and draw conclusions. They communicate observations, findings and ideas for an identified purpose and audience, using scientific vocabulary and digital tools where appropriate. | Refined for clarity to ensure that the achievement standard aligns with new and revised content descriptions |
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### Content descriptions

#### VC2 strand: Science as a Human Endeavour

##### Sub-strand: Nature and development of science

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
|  | data from observations obtained through scientific inquiry can be used to develop explanations of natural phenomena  VC2S4H01 | New content description |

##### Sub-strand: Use and influence of science

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| Science knowledge helps people to understand the effects of their actions (VCSSU056) | scientific knowledge, skills and data can be used by people to explain how they will meet a need or solve a problem  VC2S4H02 | Shift from understanding effects of actions (VC1) to meeting needs or solving problems (VC2) |

#### VC2 strand: Science Understanding

##### Sub- strand: Biological sciences

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| Living things can be grouped on the basis of observable features and can be distinguished from non-living things (VCSSU057) | living things have characteristics that distinguish them from non-living things and things that were once living, including fossils  VC2S4U01 | Refined for clarity and specificity to include ‘things that were once living’ and ‘fossils’ |
| Different living things have different life cycles and depend on each other and the environment to survive (VCSSU058) | plants and animals have different life cycles; offspring are similar, but not identical, to their parents  VC2S4U02 | Refined to introduce concepts related to change and continuity (evolution). Concepts related to ecosystem relationships have been separated for clarity |
| consumers, producers and decomposers have different roles and interactions within a habitat; food chains can be used to represent feeding relationships  VC2S4U03 | Refined for clarity with the specification of the terms ‘habitats’ and ‘food chains’ |

##### Sub- strand: Chemical sciences

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| A change of state between solid and liquid can be caused by adding or removing heat (VCSSU059) | solids, liquids and gases have observable properties; adding or removing heat energy leads to a change of state between solids, liquids and gases  VC2S4U04 | Changed to include gases |
| Natural and processed materials have a range of physical properties; these properties can influence their use (VCSSU060) | the properties of natural and made materials, including fibres, metals, glass and plastics, influence their use and re-use  VC2S4U05 | Refined for clarity and to include sustainability concepts |

##### Sub- strand: Earth and space sciences

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| Earth’s resources are used in a variety of ways (VCSSU047) | rocks, minerals and soils are important Earth resources and have observable properties that enable them to be used in a variety of ways  VC2S4U06 | VC1 includes this as a more general inclusion at Foundation to Level 2; the VC2 content is more specific in nominating rocks, minerals and soils |
| Water is an important resource that cycles through the environment (VCSSU101) | water is an important Earth resource that originates from various sources; water cycles through the environment by moving through the sky, landscape and ocean, and involves processes including precipitation, evaporation, transpiration, condensation, melting, freezing, crystallisation, infiltration and run-off  VC2S4U07 | Water cycle content moved from Levels 7 and 8 |
| Earth’s surface changes over time as a result of natural processes and human activity (VCSSU062) | weather events and climate have impacts on the land, air, water and living things; human activity can affect climate  VC2S4U08 | Refined for clarity in VC2 with stronger links to sustainability concepts |

##### Sub-strand: Physical sciences

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| Heat can be produced in many ways and can move from one object to another; a change in the temperature of an object is related to the gain or loss of heat by the object (VCSSU063) | heat energy can be generated from different sources; temperature changes may happen when heat is transferred from one object to another  VC2S4U09 | Refined for clarity |
| Forces can be exerted by one object on another through direct contact or from a distance (VCSSU064) | forces, including frictional, gravitational, electrostatic and magnetic, can be exerted by one object on another through direct contact or from a distance and affect the motion (speed and direction) of objects  VC2S4U10 | Refined for clarity and specificity of scientific vocabulary |

#### VC2 strand: Science inquiry

##### Sub-strand: Questioning and predicting

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| With guidance, identify questions in familiar contexts that can be investigated scientifically and predict what might happen based on prior knowledge (VCSIS065) | observations can be used as a basis for posing questions to identify patterns and relationships, and to predict the outcomes of investigations  VC2S4I01 | No reference is made to making predictions based on prior knowledge, which broadens the context for making predictions |

##### Sub-strand: Planning and conducting

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| Suggest ways to plan and conduct investigations to find answers to questions including consideration of the elements of fair tests (VCSIS066)  Safely use appropriate materials, tools, equipment and technologies (VCSIS067) | scientific investigations to answer questions or test predictions can be planned and conducted using provided scaffolds, including identifying the attributes of fair tests, and considering the safe use of materials and equipment VC2S4I02 | Conflation of 2 content descriptions (VCSIS066 and VCSIS067) and refined for clarity |
| Safely use appropriate materials, tools, equipment and technologies (VCSIS067)  Use formal measurements in the collection and recording of observations (VCSIS068) | observations, including formal measurements, can be made and recorded by following procedures to use familiar scaled instruments and digital tools as appropriate  VC2S4I03 | Conflated parts of 2 content descriptions related to the use of technology and formal measurements, and included reference to making and recording observations |

##### Sub-strand: Processing, modelling and analysing

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| Use a range of methods including tables and column graphs to represent data and to identify patterns and trends (VCSIS069) | data and information can be organised and represented to identify patterns and simple relationships by constructing tables, graphs and visual or physical models  VC2S4I04 | Refined for clarity |

##### Sub-strand: Evaluating

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| Compare results with predictions, suggesting possible reasons for findings (VCSIS070)  Reflect on an investigation, including whether a test was fair or not (VCSIS071) | findings can be compared to those of others, including, as appropriate, whether a test was fair or not, to enable conclusions to be drawn, and may lead to the identification of further questions for investigation  VC2S4I05 | Conflated 2 VC1 content descriptions and refined for clarity |

##### Sub-strand: Communicating

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| Represent and communicate observations, ideas and findings to show patterns and relationships using formal and informal scientific language (VCSIS072) | observations, findings and ideas can be communicated for an identified purpose and audience by using scientific vocabulary and digital tools as appropriate  VC2S4I06 | Refined for clarity |

## Levels 5 and 6

### Achievement standard

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| By the end of Level 6, students explain how scientific knowledge is used in decision making and develops from many people’s contributions. They discuss how scientific understandings, discoveries and inventions affect peoples’ lives. They compare the properties and behaviours of solids, liquids and gases. They compare observable changes to materials and classify these changes as reversible or irreversible. They explain everyday phenomena associated with the absorption, reflection and refraction of light. They compare different ways in which energy can be transformed from one form to another to generate electricity and evaluate their suitability for particular purposes. They construct electric circuits and distinguish between open and closed circuits. They explain how natural events cause rapid change to Earth’s surface and use models to describe the key features of our Solar System. They analyse how structural and behavioural adaptations of living things enhance their survival, and predict and describe the effect of environmental changes on individual living things.  Students follow procedures to develop questions that they can investigate and design investigations into simple cause-and-effect relationships. When planning experimental methods, they identify and justify the variables they choose to change and measure in fair tests. They make predictions based on previous experiences or general rules. They identify and manage potential safety risks. They make and record accurate observations as tables, diagrams or descriptions. They organise data into tables and graphs to identify and analyse patterns and relationships. They compare patterns in data with their predictions when explaining their findings. They suggest where improvements to their experimental methods or research could improve the quality of their data. They refer to data when they report findings and use appropriate representations and simple reports to communicate their ideas, methods, findings and explanations. | By the end of Level 6, students describe examples of advances in science achieved by scientists who work individually and in teams, building on the work of others. They discuss examples that illustrate how individuals and communities use scientific knowledge, skills and data to inform their actions and make decisions.  Students explain how natural and human-induced changes in the physical conditions of a habitat affect the survival of organisms. They provide examples of how organisms have changed over time and explain how the structural features and behaviours of organisms enable them to survive. They relate the movement and arrangement of the particles present in solids, liquids and gases to their observable properties, and model the particles in different mixtures. They classify and compare reversible and irreversible changes to substances. They model key processes that change Earth’s surface. They identify natural hazards and propose human actions that can reduce their impacts. They model the relationship between the Sun and planets of the solar system and explain how the relative positions of Earth and the Sun relate to the observable phenomena of variable day and night length. They identify sources of light and model different pathways of light to explain observed phenomena. They distinguish between electrical insulators and conductors, and identify the role of circuit components in the transfer and transformation of electrical energy.  Students make reasoned predictions, describe patterns and test relationships when investigating observable phenomena. They plan different scientific investigations including fair tests, describe how risks and ethical issues associated with investigations have been managed, and identify cultural considerations when planning fieldwork. They use equipment to generate and record data, including repeat trials. They construct representations to organise and process data and information, and describe patterns, trends and relationships. They compare their methods and findings with those of others including identification of possible sources of error, suggest improvements to their own and others’ investigations, pose questions for further investigation and select evidence to develop reasoned conclusions. They communicate ideas, findings, patterns, trends and relationships for a specific purpose and audience, including using various presentation formats, scientific vocabulary and digital tools where appropriate. | Refined for clarity to ensure that the achievement standard aligns with new and revised content descriptions |
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### Content descriptions

#### VC2 strand: Science as a Human Endeavour

##### Sub-strand: Nature and development of science

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
|  | scientific knowledge changes over time, often resulting from collaboration or by building on the work of others, and leads to advances in science  VC2S6H01 | New content description |

##### Sub-strand: Use and influence of science

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| Scientific understandings, discoveries and inventions are used to inform personal and community decisions and to solve problems that directly affect people’s lives (VCSSU073) | scientific knowledge, skills and data can be used by individuals and communities to identify problems, consider responses and make decisions  VC2S6H02 | Refined for clarity |

#### VC2 strand: Science Understanding

##### Sub-strand: Biological sciences

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| The growth and survival of living things are affected by the physical conditions of their environment (VCSSU075) | habitats can be described by their physical conditions; changing the physical conditions of a habitat, including by human activity, may affect the growth and survival of organisms  VC2S6U01 | Refined for clarity, with more precise scientific vocabulary including ‘habitats’ and sustainability concepts |
| Living things have structural features and adaptations that help them to survive in their environment (VCSSU074) | organisms have evolved over time, as seen in fossils and scientific records; the structural features and behaviours of living organisms enable them to thrive in their environments  VC2S6U02 | Refined for clarity, with more precise scientific language including ‘habitats’ and ‘evolution’ |

##### Sub-strand: Chemical sciences

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| Solids, liquids and gases behave in different ways and have observable properties that help to classify them (VCSSU076) | the observable properties of matter (solids, liquids and gases) can be explained by modelling the motion and arrangement of their particles; mixtures (including solutions) can be formed by combining 2 or more different substances  VC2S6U03 | Refined for clarity, with specification of mixtures |
| Changes to materials can be reversible, including melting, freezing, evaporating, or irreversible, including burning and rusting (VCSSU077) | changes to substances may be reversible, in which case the substance may be recovered, or irreversible, in which case new substances are formed; for most substances a change of state or dissolving in water is reversible, while irreversible changes include cooking and rusting  VC2S6U04 | Refined for clarity |

##### Sub-strand: Earth and space sciences

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| Sudden geological changes or extreme weather conditions can affect Earth’s surface (VCSSU079) | geological processes including weathering, erosion, transportation and deposition can cause slow or rapid changes to Earth’s surface  VC2S6U05 | Refined for clarity |
| sudden geological changes or extreme weather conditions can affect Earth’s surface and atmosphere; the impacts of natural hazards, including earthquakes, volcanic eruptions, wildfires and floods, can be reduced by human actions and technological innovations  VC2S6U06 | Refined for clarity and inclusion of sustainability concepts |
| Earth’s rotation on its axis causes regular changes, including night and day (VCSSU061)  Earth is part of a system of planets orbiting around a star (the Sun) (VCSSU078) | the force of gravity keeps Earth and other planets in the solar system in orbit around the Sun; cyclic observable phenomena, including variable day and night length, can be related to Earth’s tilt, rotation on its axis and revolution around the Sun  VC2S6U07 | Refined for clarity with some content moved to Foundation to Level 2 |

##### Sub-strand: Physical sciences

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| Light from a source forms shadows and can be absorbed, reflected and refracted (VCSSU080) | light can be produced from many sources; light travels in a straight path, can form shadows, and can be absorbed, transmitted, reflected or refracted by objects  VC2S6U08 | Refined for clarity and light transmission has been included |
| Energy from a variety of sources can be used to generate electricity; electric circuits enable this energy to be transferred to another place and then to be transformed into another form of energy (VCSSU081) | materials may be electrical insulators or conductors; energy can be transferred and transformed in electrical circuits where the components of a circuit play particular roles in the function of the circuit  VC2S6U09 | Included insulators and conductors in VC2 |

#### VC2 strand: Science inquiry

##### Sub-strand: Questioning and predicting

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| With guidance, pose questions to clarify practical problems or inform a scientific investigation, and predict what the findings of an investigation might be based on previous experiences or general rules (VCSIS082) | investigable questions and reasoned predictions can be used in guiding investigations to identify patterns and test relationships  VC2S6I01 | Emphasis has been placed on the identification of patterns and testing of relationships in VC2 |

##### Sub-strand: Planning and conducting

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| With guidance, plan appropriate investigation types to answer questions or solve problems and use equipment, technologies and materials safely, identifying potential risks (VCSIS083)  Decide which variables should be changed, measured and controlled in fair tests and accurately observe, measure and record data (VCSIS084) | repeatable scientific investigations to answer questions can be planned and conducted, including, as appropriate, deciding the variables to be changed, measured and controlled in fair tests, considering potential risks, planning for the safe and ethical use of equipment and materials, and obtaining permissions for investigations conducted on Country and Place or in protected areas  VC2S6I02 | Conflated aspects of 2 content descriptions (VCSIS083 and VCSIS084) and refined for clarity |
| With guidance, plan appropriate investigation types to answer questions or solve problems and use equipment, technologies and materials safely, identifying potential risks (VCSIS083)  Decide which variables should be changed, measured and controlled in fair tests and accurately observe, measure and record data (VCSIS084) | equipment can be used to observe, generate, measure and record data with reasonable precision for repeated measurements, using digital tools as appropriate  VC2S6I03 | Conflated aspects of 2 content descriptions(VCSIS083 and VCSIS084) and refined for clarity |

##### Sub-strand: Processing, modelling and analysing

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| Construct and use a range of representations, including tables and graphs, to record, represent and describe observations, patterns or relationships in data (VCSIS085) | data and information can be organised and processed to show patterns, trends and relationships by constructing representations including tables, graphs and visual or physical models  VC2S6I04 | Refined for clarity and relevance to the sub-strand (i.e. this sub-strand is not about recording observations) |

##### Sub-strand: Evaluating

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| Compare data with predictions and use as evidence in developing explanations (VCSIS086)  Suggest improvements to the methods used to investigate a question or solve a problem (VCSIS087) | methods and findings can be compared with those of others to identify sources of error, to select evidence in support of reasoned explanations and conclusions, and to develop further questions for investigation  VC2S6I05 | Conflated 2 content descriptions (VCSIS086 and VCSISO87) and refined for clarity and relevance to the sub-strand |

##### Sub-strand: Communicating

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| Communicate ideas and processes using evidence to develop explanations of events and phenomena and to identify simple cause-and-effect relationships (VCSIS088) | scientific ideas, findings, patterns, trends and relationships can be communicated for a specific purpose and audience, using various presentation formats, scientific vocabulary and digital tools as appropriate  VC2S6I06 | Edited to better align with the sub-strand |

## Levels 7 and 8

### Achievement standard

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| By the end of Level 8, students explain how evidence has led to an improved understanding of a scientific idea. They discuss how science knowledge can be applied to generate solutions to contemporary problems and explain how these solutions may impact on society. They investigate different forms of energy and explain how energy transfers and transformations cause change in simple systems. They use examples to illustrate how light forms images. They use a wave model to explain the properties of sound. They use the particle model to predict, compare and explain the physical and chemical properties and behaviours of substances. They describe and apply techniques to separate pure substances from mixtures. They provide evidence for observed chemical changes in terms of colour change, heat change, gas production and precipitate formation. They analyse the relationship between structure and function at cell, organ and body system levels. They identify and classify living things. They explain how living organisms can be classified into major taxonomic groups based on observable similarities and differences. They predict the effect of environmental changes on feeding relationships between organisms in a food web. They distinguish between different types of simple machines and predict, represent and analyse the effects of unbalanced forces, including Earth’s gravity, on motion. They compare processes of rock formation, including the time scales involved, and analyse how the sustainable use of resources depends on the way they are formed and cycle through Earth systems. They model how the relative positions of Earth, the Sun and the Moon affect phenomena on Earth.  Students identify and construct questions and problems that they can investigate scientifically and make predictions based on scientific knowledge. They plan experiments, identifying variables to be changed, measured and controlled. They consider accuracy and ethics when planning investigations, including designing field or experimental methods. Students summarise data from different sources and construct representations of their data to reveal and analyse patterns and relationships, and use these when justifying their conclusions. They explain how modifications to methods could improve the quality of their data and apply their scientific knowledge and investigation findings to evaluate claims made by others. They use appropriate scientific language, representations and simple word equations to communicate science ideas, methods and findings. | By the end of Level 8, students explain how new evidence can lead to changes in scientific knowledge. They discuss how people with different understandings, skills, perspectives and worldviews have worked in multidisciplinary teams to develop scientific knowledge. They discuss the relevant ethical, environmental, social and economic considerations associated with a proposed scientific response to a selected socio-scientific issue. They analyse the importance of science communication in shaping viewpoints, policies and regulations.  Students explain how biological diversity is ordered and organised. They explain the role of specialised cell structures and organelles in cellular function, and distinguish between cells in selected examples of plants and animals, and unicellular and multicellular organisms. They analyse the relationship between structure and function at organ and body system levels for a selected plant and an animal, and explain how a disorder in the cells, tissues or organs of these systems affects the survival of each organism. They represent flows of matter and energy in ecosystems and use real and hypothetical scenarios and population data to interpret and predict the effects of environmental changes. They use the particle and kinetic theories of matter to explain the structure, properties and behaviour of substances. They distinguish between pure substances and mixtures, and design procedures to separate mixtures. They classify and represent matter as elements, compounds or mixtures, and distinguish between physical and chemical changes. They distinguish between renewable and non-renewable resources, evaluate the sustainable use of different resources, and compare the benefits and risks of resource extraction and energy production. They apply the theory of plate tectonics to explain geological phenomena including volcanoes, earthquakes, mountain formation and the distribution of earthquakes and volcanic zones around the globe. They explain how the properties of rocks relate to their formation and influence their use. They model the Earth–Sun–Moon system’s cyclic changes to explain the observable phenomena of seasons and tides. They demonstrate how simple machines can be used for a purpose. They represent and explain the effects of forces acting on objects. They compare different forms of energy and represent energy transfers and transformations in simple systems. They undertake a household energy audit and propose ways to decrease energy consumption. They design and construct series and parallel circuits, and observe and make predictions about voltage and current and about energy transfer in the circuits.  Students develop hypotheses and make reasoned predictions to identify patterns, test relationships and analyse and evaluate scientific models when investigating phenomena at various scales. They plan a range of reproducible scientific investigations, document procedures and identify potential ethical issues and intercultural considerations required for fieldwork or use of secondary data. They select and use equipment to generate and record data with precision. They select and construct appropriate representations to organise and process data and information. They analyse and connect data and information to identify and explain patterns, trends, relationships and anomalies. They identify assumptions and sources of error in methods and analyse conclusions and claims with reference to conflicting evidence and unanswered questions. They provide science-based explanations for findings, and use evidence to support conclusions and evaluate claims. They select and use appropriate presentation formats, scientific vocabulary, models and other representations when communicating their ideas, findings and arguments for specific purposes to specific audiences. | Refined for clarity and to ensure that the achievement standard aligns with new and revised content descriptions |
|

### Content descriptions

#### VC2 strand: Science as a Human Endeavour

##### Sub-strand: Nature and development of science

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| Scientific knowledge and understanding of the world changes as new evidence becomes available; science knowledge can develop through collaboration and connecting ideas across the disciplines and practice of science (VCSSU089) | scientific knowledge, including models and theories, can change because of new evidence  VC2S8H01 | Refined for clarity, including reference to ‘theories’ and ‘models’ |
| Scientific knowledge and understanding of the world changes as new evidence becomes available; science knowledge can develop through collaboration and connecting ideas across the disciplines and practice of science (VCSSU089) | multidisciplinary endeavours to advance scientific knowledge make use of people’s different perspectives and worldviews  VC2S8H02 | VC1 included reference to ‘collaboration’, which has been introduced at Levels 5 and 6 in VC2 |

##### Sub-strand: Use and influence of science

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| Science and technology contribute to finding solutions to a range of contemporary issues; these solutions may impact on other areas of society and involve ethical considerations (VCSSU090) | proposed scientific responses to socio-scientific issues impact on society and may involve ethical, environmental, social and economic considerations  VC2S8H03 | Refined for clarity |
|  | communication of scientific knowledge has a role in informing individual viewpoints, and community policies and regulations  VC2S8H04 | New content description, to include the role of science communication |

#### VC2 strand: Science Understanding

##### Sub-strand: Biological sciences

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| There are differences within and between groups of organisms; classification helps organise this diversity (VCSSU091) | there are similarities and differences within and between groups of organisms living on Earth; the development and use of classification tools, including dichotomous keys, help order and organise human understanding of the diversity of life  VC2S8U01 | Refined for clarity by including reference to similarities |
| Cells are the basic units of living things and have specialised structures and functions (VCSSU092) | cell theory describes cells as the basic units of life; organisms may be unicellular or multicellular and have specialised structures and organelles (including cell walls, cell membranes, cytoplasm, nuclei containing DNA, mitochondria, ribosomes, chloroplasts and vacuoles) that perform specific functions  VC2S8U02 | Refined for clarity, including specified cell components and reference to unicellular and multicellular organisms |
| Multicellular organisms contain systems of organs that carry out specialised functions that enable them to survive and reproduce (VCSSU094) | the structure of cells, tissues and organs in a plant and an animal organ system are related to their function; plant and animal organ systems enable survival of the organism  VC2S8U03 | Reproduction included at Levels 9 and 10 in VC2; included requirement that both a plant and animal organ system are studied |
| Ecosystems consist of communities of interdependent organisms and abiotic components of the environment; matter and energy flow through these systems (VCSSU121)  Interactions between organisms can be described in terms of food chains and food webs and can be affected by human activity (VCSSU093) | matter and energy flow through ecosystems and can be represented using models, including food webs and food pyramids; populations will be affected by changing biotic and abiotic factors in an ecosystem including habitat loss, climate change, seasonal migration and introduction or removal of species  VC2S8U04 | Refined for clarity. Conflation of VC1 content descriptions (including one from Levels 9 and 10). Included food pyramids and reference to sustainability |

##### Sub-strand: Chemical sciences

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| The properties of the different states of matter can be explained in terms of the motion and arrangement of particles (VCSSU096) | the particle and kinetic theories of matter can be used to describe the arrangement and motion of particles in a substance, including the attraction between particles, and to explain the properties and behaviour of substances, including melting point, boiling point, density, compressibility, gas pressure, viscosity, diffusion, sublimation, and expansion and contraction  VC2S8U05 | Refined for clarity and scope by specifying theories and properties |
| Mixtures, including solutions, contain a combination of pure substances that can be separated using a range of techniques (VCSSU095) | matter can be classified as pure substances such as elements and compounds or impure substances such as mixtures (including solutions), and can be modelled using the particle model; mixtures may have a uniform (homogenous) or non-uniform (heterogeneous) composition and can be separated based on the properties of their components using techniques including filtration, decantation, evaporation, crystallisation, magnetic separation, distillation and chromatography  VC2S8U06 | Refined for specificity of separation techniques, inclusion of solutions and reference to heterogeneous and homogeneous mixtures |
| Differences between elements, compounds and mixtures can be described by using a particle model (VCSSU097) | the atomic theory of matter can be used to model and explain the difference between elements, compounds and mixtures; elements, compounds and mixtures can be represented as two-dimensional and three-dimensional models, elements can be represented by symbols, and molecules and compounds can be represented by chemical formulas  VC2S8U07 | Atomic theory is used in preference to a particle model, building on understanding from Levels 5 and 6 |
| Chemical change involves substances reacting to form new substances (VCSSU098) | physical changes can be distinguished from chemical changes; a chemical change can be identified by a colour change, a temperature change, the production of a gas (including laboratory preparation and testing of oxygen, carbon dioxide and hydrogen gases) or the formation of a precipitate  VC2S8U08 | Refined for clarity and specificity. Included tests for common gases in VC2 |

##### Sub-strand: Earth and space sciences

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| Some of Earth’s resources are renewable, but others are non-renewable (VCSSU100) | the sustainable use of Earth’s resources is influenced by whether the resources are renewable or non-renewable; the processes involved in resource extraction and energy production come with both benefits and risks to sustainability  VC2S8U09 | Changed to include sustainability concepts |
| The theory of plate tectonics explains global patterns of geological activity and continental movement (VCSSU127) | Earth is a dynamic planet as demonstrated by tectonic activity, including the formation of geological features at divergent, convergent and transform plate boundaries; the theory of plate tectonics is supported by scientific evidence  VC2S8U10 | Refined for clarity and greater specificity. VC2. Included evidence for theory  Content moved from Levels 9 and 10 |
| Sedimentary, igneous and metamorphic rocks contain minerals and are formed by processes that occur within Earth over a variety of timescales (VCSSU102) | key processes of the rock cycle occur over different timescales; the properties of sedimentary, igneous and metamorphic rocks not only reflect their formation but also impact their usefulness and determine the methods used when mined  VC2S8U11 | Refined for clarity |
| Predictable phenomena on Earth, including seasons and eclipses, are caused by the relative positions of the Sun, Earth and the Moon (VCSSU099) | cyclic changes in the relative positions of Earth, the Sun and the Moon can be modelled to show how these cycles cause eclipses and influence predictable phenomena on Earth, including seasons and tides  VC2S8U12 | Refined to include modelling |

##### Sub-strand: Physical sciences

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
|  | simple machines, including the lever, inclined plane, wedge, pulley, screw, and wheel and axle, alter the direction and magnitude of forces  VC2S8U13 | New content description |
| Change to an object’s motion is caused by unbalanced forces acting on the object; Earth’s gravity pulls objects towards the centre of Earth (VCSSU103) | balanced and unbalanced forces acting on objects, including gravitational force, may be investigated and represented using force diagrams; changes in an object’s motion can be related to its mass and the magnitude and direction of the forces acting on it  VC2S8U14 | Refined for clarity |
| Energy appears in different forms including movement (kinetic energy), heat, light, chemical energy and potential energy; devices can change energy from one form to another (VCSSU104) | energy exists in different forms, including thermal, chemical, gravitational and elastic, and may be classified as kinetic or potential; energy transfers (conduction, convection and radiation) and transformations occur in simple systems and can be analysed in terms of energy efficiency  VC2S8U15 | Refined for clarity and inclusion of energy efficiency |
|  | household energy consumption can be analysed using an energy audit and is affected by appliance choice, building design, season and climate  VC2S8U16 | New content description. Included links to sustainability |
| Electric circuits can be designed for diverse purposes using different components; the operation of circuits can be explained by the concepts of voltage and current (VCSSU130) | electrical circuits transfer energy when current flows and can be designed for diverse purposes using different components; the operation of circuits can be explained using the concepts of voltage and current  VC2S8U17 | This content has been shifted from VC1 Levels 9 and 10 to VC2 Levels 7 and 8 |
| Light can form images using the reflective feature of curved mirrors and the refractive feature of lenses, and can disperse to produce a spectrum which is part of a larger spectrum of radiation (VCSSU105) |  | Lenses not included in curriculum. Electromagnetic spectrum included at Levels 9 and 10 |
| The properties of sound can be explained by a wave model (VCSSU106) |  | ‘Sound’ is included as part of ‘waves’ at VC2 Levels 9 and 10 |

#### VC2 strand: Science inquiry

##### Sub-strand: Questioning and predicting

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| Identify questions, problems and claims that can be investigated scientifically and make predictions based on scientific knowledge (VCSIS107) | investigable questions, reasoned predictions and hypotheses can be developed in guiding investigations to identify patterns, test relationships and analyse and evaluate scientific models  VC2S8I01 | Refined for clarity and practicality since predictions at this level may not necessarily be based on scientific knowledge |

##### Sub-strand: Planning and conducting

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| Collaboratively and individually plan and conduct a range of investigation types, including fieldwork and experiments, ensuring safety and ethical guidelines are followed (VCSIS108)  In fair tests, measure and control variables, and select equipment to collect data with accuracy appropriate to the task (VCSIS109) | reproducible investigations to answer questions and test hypotheses can be planned and conducted, including identifying independent, dependent and controlled variables where applicable, stating assumptions, recognising and managing risks, considering ethical issues and following protocols when accessing cultural sites and artefacts on Country and Place  VC2S8I02 | Conflated aspects of 2 content descriptions (VCSIS108 and VCSIS109) and refined for clarity. Focus placed on different types of scientific investigations |
| In fair tests, measure and control variables, and select equipment to collect data with accuracy appropriate to the task (VCSIS109) | equipment can be selected and used to generate and record data with attention to precision, using digital tools as appropriate  VC2S8I03 | Focus of VC2 is on the selection and use of equipment, and includes ‘precision’ rather than ‘accuracy’ since precision relates to reproducibility |

##### Sub-strand: Processing, modelling and analysing

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| Construct and use a range of representations including graphs, keys and models to record and summarise data from students’ own investigations and secondary sources, and to represent and analyse patterns and relationships (VCSIS110) | data and information can be organised and processed by selecting and constructing representations including tables, graphs, keys, models and mathematical relationships  VC2S8I04 | Refined for clarity |
| Construct and use a range of representations including graphs, keys and models to record and summarise data from students’ own investigations and secondary sources, and to represent and analyse patterns and relationships (VCSIS110) | information and processed data can be analysed to show patterns, trends and relationships, and to identify anomalies  VC2S8I05 | Refined for clarity |

##### Sub-strand: Evaluating

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| Reflect on the method used to investigate a question or solve a problem, including evaluating the quality of the data collected, and identify improvements to the method (VCSIS112) | scientific methods, conclusions and claims can be analysed to identify assumptions, possible sources of error, conflicting evidence and unanswered questions  VC2S8I06 | Refined to focus on the analysis of methods and data, before formulating conclusions |
| Use scientific knowledge and findings from investigations to identify relationships, evaluate claims and draw conclusions (VCSIS111) | evidence-based arguments can be constructed to support conclusions or evaluate claims, including consideration of ethical issues and protocols associated with using or citing secondary data or information  VC2S8I07 | Refined for clarity |

##### Sub-strand: Communicating

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| Communicate ideas, findings and solutions to problems including identifying impacts and limitations of conclusions and using appropriate scientific language and representations (VCSIS113) | communicating ideas, findings and arguments for specific purposes and audiences involves the selection and use of appropriate presentation formats, scientific vocabulary, models and other representations, and may include the use of digital tools  VC2S8I08 | Refined for clarity and to better align with the sub-strand |

## Levels 9 and 10

### Achievement standard

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| By the end of Level 10, students analyse how models and theories have developed over time and discuss the factors that prompted their review. They predict how future applications of science and technology may affect people’s lives. They explain the concept of energy conservation and model energy transfer and transformation within systems. They analyse how biological systems function and respond to external changes with reference to the interdependencies between individual components, energy transfers and flows of matter. They evaluate the evidence for scientific theories that explain the origin of the Universe and the diversity of life on Earth. They explain the role of DNA and genes in cell division and genetic inheritance. They apply geological timescales to elaborate their explanations of both natural selection and evolution. They explain how similarities in the chemical behaviour of elements and their compounds and their atomic structures are represented in the way the periodic table has been constructed. They compare the properties of a range of elements representative of the major groups and periods in the periodic table. They use atomic symbols and balanced chemical equations to summarise chemical reactions, including neutralisation and combustion. They explain natural radioactivity in terms of atoms and energy change. They explain how different factors influence the rate of reactions. They explain global features and events in terms of geological processes and timescales, and describe and analyse interactions and cycles within and between Earth’s spheres. They give both qualitative and quantitative explanations of the relationships between distance, speed, acceleration, mass and force to predict and explain motion. They use the concepts of voltage and current to explain the operation of electric circuits and use a field model to explain interactions between magnets.  Students develop questions and hypotheses that can be investigated using a range of inquiry skills. They independently design and improve appropriate methods of investigation including the control and accurate measurement of variables and systematic collection of data. They explain how they have considered reliability, precision, safety, fairness and ethics in their methods and identify where digital technologies can be used to enhance the quality of data. They analyse trends in data, explain relationships between variables and identify sources of uncertainty. When selecting evidence and developing and justifying conclusions, they account for inconsistencies in results and identify alternative explanations for findings. Students evaluate the validity and reliability of claims made in secondary sources with reference to currently held scientific views, the quality of the methodology and the evidence cited.  They construct evidence-based arguments and use appropriate scientific language, representations and balanced chemical equations when communicating their findings and ideas for specific purposes. | By the end of Level 10, students analyse the importance of different scientific methods, critique, replication, publication and peer review in the development of scientific knowledge. They examine the relationship between science, engineering and technologies. They examine how different projected outcomes of the application of scientific knowledge to a selected socio-scientific issue may lead to varied support from individuals and groups in society. They discuss how scientific information and misinformation may inform personal and social decision-making and influence priorities for scientific research.  Students describe how the processes of sexual and asexual reproduction enable survival of the species. They explain the processes that underpin heredity and genetic diversity, and predict the outcomes of monohybrid crosses. They explain how the nervous and endocrine systems use negative feedback to support homeostasis in the body’s internal environment. They distinguish between infectious and non-infectious disease, and compare different infectious disease control measures. They describe the evidence supporting the theory of evolution by natural selection. They explain how ideas about the structure of the atom have changed over time, and model natural radioactive decay to illustrate how stable atoms are formed. They describe patterns and trends in the periodic table. They demonstrate the Law of Conservation of Mass in chemical reactions, and write word and balanced chemical equations for these reactions. They classify energy changes in chemical reactions as exothermic or endothermic. They predict the products of reactions and the effect of changing reaction conditions. They explain how interactions within and between Earth’s interrelated systems affect the carbon cycle. They describe trends in patterns of global climate change and propose strategies to mitigate contributing factors. They discuss the advantages and disadvantages of space exploration. They distinguish between different features in the universe and sequence key events in the origin and evolution of the universe, including an outline of the supporting evidence for the big bang theory. They explain how wave and particle models describe energy transfer, and compare the properties, features and applications of waves. They analyse and represent energy conservation, including efficiency, in systems, and model how different forms of energy are transformed into electrical energy. They use Newton’s laws to describe and predict the motion of objects in a system.  Students formulate and refine questions and hypotheses to make reasoned predictions, test relationships, and develop explanatory models when investigating scientific questions, problems and claims. They plan a range of valid, reproducible and safe scientific investigations and explain how they have addressed any ethical and cultural considerations when generating or using primary and secondary data. They select and use equipment to generate and record data, ensuring the use of suitable sample sizes and assessing the precision of multiple measurement readings. They select and construct a range of appropriate representations to organise, process and summarise data and information. They analyse and compare a variety of data and information to identify and explain qualitative and quantitative patterns, trends, relationships, assumptions and anomalies. They evaluate the validity and reproducibility of investigation methods including ways to improve the quality of data, and the validity of conclusions and claims. They provide evidence-based explanations for findings and construct logical arguments based on the evaluation of multiple sources of evidence to justify conclusions and assess claims. They select and use appropriate presentation formats, scientific content, vocabulary, models, conventions, formulas and other representations to achieve their purpose when communicating and justifying their ideas, findings, arguments and proposals to diverse audiences. | Refined for clarity and new content added to align the achievement standard to new and revised content descriptions |
|

### Content descriptions

#### VC2 strand: Science as a Human Endeavour

##### Sub-strand: Nature and development of science

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| Scientific understanding, including models and theories, are contestable and are refined over time through a process of review by the scientific community (VCSSU114) | scientific knowledge is contestable and is validated and refined over time through expanding scientific methods, replication, publication, peer review and consensus  VC2S10H01 | Refined for clarity |
| Advances in scientific understanding often rely on developments in technology and technological advances are often linked to scientific discoveries (VCSSU115) | advances in technologies have enabled advances in science, while science has contributed to developments in technologies and engineering  VC2S10H02 | Refined for clarity |

##### Sub-strand: Use and influence of science

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
|  | the use of scientific knowledge to address socio-scientific issues and shape a more sustainable future for humans and the environment may have diverse projected outcomes that affect the extent to which scientific knowledge and practices are adopted more broadly by society  VC2S10H03 | New content description |
| The values and needs of contemporary society can influence the focus of scientific research (VCSSU116) | scientific knowledge may be interpreted in different ways by individuals and groups in society; the values and needs of society can influence the focus of scientific research  VC2S10H04 | Refined for clarity |

#### VC2 strand: Science Understanding

##### Sub-strand: Biological sciences

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| Multicellular organisms contain systems of organs that carry out specialised functions that enable them to survive and reproduce (VCSSU094) | the structures of reproductive cells and organs in plants and animals are related to their functions; processes of sexual and asexual reproduction enable survival of a species  VC2S10U01 | Content builds on reproductive cells and organs included at Levels 7 and 8. Greater specificity of content focus on reproduction |
| Multicellular organisms rely on coordinated and interdependent internal systems to respond to changes to their environment (VCSSU117)  An animal’s response to a stimulus is coordinated by its central nervous system (brain and spinal cord); neurons transmit electrical impulses and are connected by synapses (VCSSU118) | the nervous and endocrine systems work together to regulate and coordinate the body’s response to stimuli, ensuring homeostasis, including through negative feedback mechanisms  VC2S10U02 | Refined for clarity and cohesion |
|  | infectious and non-infectious diseases are caused by different organisms and agents; measures to control the transmission of infectious diseases include personal hygiene, quarantine protocols, medical treatment and public education programs  VC2S10U03 | New content description |
| The transmission of heritable characteristics from one generation to the next involves DNA and genes (VCSSU119) | genetic inheritance involves the function of DNA, chromosomes, genes and alleles, and the roles of mitosis and meiosis in passing on genetic information to the next generation; the principles of Mendelian inheritance can be used to predict ratios of genotypes and phenotypes in monohybrid crosses involving dominant and recessive traits  VC2S10U04 | Refined for clarity and specificity |
| The theory of evolution by natural selection explains the diversity of living things and is supported by a range of scientific evidence (VCSSU120) | the theory of evolution by natural selection includes the processes of variation, isolation and adaptation and is supported by evidence including the fossil record, biogeography and comparative embryology; the theory explains past and present biodiversity and demonstrates how all organisms have some degree of relatedness to each other  VC2S10U05 | Refined for clarity and specificity |

##### Sub-strand: Chemical sciences

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| All matter is made of atoms which are composed of protons, neutrons and electrons; natural radioactivity arises from the decay of nuclei in atoms (VCSSU122) | the model of the atom changed following the discovery of electrons, protons and neutrons; natural radioactive decay results in a change from unstable to stable atoms  VC2S10U06 | Refined for clarity |
| The atomic structure and properties of elements are used to organise them in the periodic table (VCSSU123) | the organisation of the elements in the periodic table is related to the structure and properties of atoms; patterns and trends include the significance of rows and periods, metallic and non-metallic properties, atomic size and reactivity  VC2S10U07 | Refined for clarity |
| Chemical reactions involve rearranging atoms to form new substances; during a chemical reaction mass is not created or destroyed (VCSSU124) | chemical reactions are described by the Law of Conservation of Mass and involve the rearrangement of atoms; they can be modelled using a range of representations, including word and simple balanced chemical equations  VC2S10U08 | Refined for clarity and inclusion of writing of word and simple balanced equations (added here from another VC1 content description, VCSSU125) |
| Different types of chemical reactions are used to produce a range of products and can occur at different rates; chemical reactions may be represented by balanced chemical equations (VCSSU125) | chemical reactions include synthesis, decomposition and displacement reactions and can be classified as exothermic or endothermic; reaction rates are affected by factors including temperature, concentration, surface area of solid reactants, and catalysts  VC2S10U09 | Refined for clarity, and inclusion of exothermic and endothermic reactions |

##### Sub-strand: Earth and space sciences

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| Global systems, including the carbon cycle, rely on interactions involving the atmosphere, biosphere, hydrosphere and lithosphere (VCSSU128)  Chemical reactions, including combustion and the reactions of acids, are important in both non-living and living systems and involve energy transfer (VCSSU126) | carbon is cycled on Earth through key processes including photosynthesis, respiration, fire, weathering, vulcanism and the combustion of fossil fuels; these processes change the composition of Earth’s interrelated systems (atmosphere, biosphere, hydrosphere and lithosphere) over time  VC2S10U10 | Refined for clarity and links to sustainability principles |
| Global systems, including the carbon cycle, rely on interactions involving the atmosphere, biosphere, hydrosphere and lithosphere (VCSSU128) | the dynamics of global climate change can be modelled and explained by examining the interactions between greenhouse gas emissions and energy exchanges within and between Earth’s systems; mitigating human-induced climate change requires addressing various activities including power generation, deforestation, manufacturing, transportation, food production and resource consumption  VC2S10U11 | Refined to include reference to climate change and sustainability principles |
|  | space exploration seeks to expand knowledge of the origins and structure of the universe and to resolve the challenges of humans travelling and living away from Earth’s surface  VC2S10U12 | New content description |
| The Universe contains features including galaxies, stars and solar systems; the Big Bang theory can be used to explain the origin of the Universe (VCSSU129) | the universe contains features including galaxies, stars, solar systems and black holes; the big bang theory models the origin and evolution of the universe and is supported by evidence  VC2S10U13 | Refined for clarity |

##### Sub-strand: Physical sciences

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| Light can form images using the reflective feature of curved mirrors and the refractive feature of lenses, and can disperse to produce a spectrum which is part of a larger spectrum of radiation (VCSSU105)  The properties of sound can be explained by a wave model (VCSSU106) | wave and particle models can be used to describe energy transfer (conduction, convection and radiation) through different media; waves (electromagnetic and mechanical) have different properties, features (including amplitude, wavelength, frequency and speed) and applications  VC2S10U14 | Refined to include the concept of ‘waves’ and their general properties and uses; sound and light can be used as examples/contexts |
| Energy flow in Earth’s atmosphere can be explained by the processes of heat transfer (VCSSU132) | the Law of Conservation of Energy can be analysed in systems, including Earth systems, by assessing the efficiency of energy inputs, outputs, transfers and transformations  VC2S10U15 | Energy efficiency is considered in VC2 |
| The interaction of magnets can be explained by a field model; magnets are used in the generation of electricity and the operation of motors (VCSSU131) | electricity can be generated as alternating current (AC) using magnets (via turbines turned by wind, water, tides or steam that is generated by the combustion of oil, gas or coal or by nuclear energy) or as direct current (DC) using photovoltaic cells or batteries  VC2S10U16 | Broadened ways of producing electricity, including sustainability principles |
| The description and explanation of the motion of objects involves the interaction of forces and the exchange of energy and can be described and predicted using the laws of physics (VCSSU133) | Newton’s laws of motion can be used to quantitatively analyse the relationship between force, mass and acceleration of objects  VC2S10U17 | Refined for clarity |

#### VC2 strand: Science Inquiry

##### Sub-strand: Questioning and predicting

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| Formulate questions or hypotheses that can be investigated scientifically, including identification of independent, dependent and controlled variables (VCSIS134) | investigable questions, reasoned predictions and hypotheses can be used in guiding investigations to test and develop explanatory models and relationships  VC2S10I01 | Included developing explanatory models and relationships |

##### Sub-strand: Planning and conducting

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| Independently plan, select and use appropriate investigation types, including fieldwork and laboratory experimentation, to collect reliable data, assess risk and address ethical issues associated with these investigation types (VCSIS135) | valid, reproducible investigations to answer questions and test hypotheses can be planned and conducted, including identifying and controlling for possible sources of error and bias in sampling or in making observations; safe, ethical investigations include undertaking risk assessments and following protocols when accessing cultural sites and artefacts on Country and Place  VC2S10I02 | Included ‘reproducible investigations’ and has not specified laboratory experimentation and fieldwork, but has kept scientific methodologies open |
| Select and use appropriate equipment and technologies to systematically collect and record accurate and reliable data, and use repeat trials to improve accuracy, precision and reliability (VCSIS136) | equipment can be selected and used to generate and record data sets that show precision, including consideration of sample size and using digital tools as appropriate  VC2S10I03 | Does not reference accuracy since repeat trials may not necessarily improve accuracy |

##### Sub-strand: Processing, modelling and analysing

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| Construct and use a range of representations, including graphs, keys, models and formulas, to record and summarise data from students’ own investigations and secondary sources, to represent qualitative and quantitative patterns or relationships, and distinguish between discrete and continuous data (VCSIS137) | data and information can be organised, processed and summarised by selecting and constructing representations including tables, graphs, descriptive statistics, models, symbols, formulas and mathematical relationships  VC2S10I04 | Focus is placed on processing data and includes ‘descriptive statistics’ rather than referencing ‘quantitative relationships’, but does not reference ‘discrete and continuous data’ |
| Construct and use a range of representations, including graphs, keys, models and formulas, to record and summarise data from students’ own investigations and secondary sources, to represent qualitative and quantitative patterns or relationships, and distinguish between discrete and continuous data (VCSIS137)  Analyse patterns and trends in data, including describing relationships between variables, identifying inconsistencies in data and sources of uncertainty, and drawing conclusions that are consistent with evidence (VCSIS138) | information and processed data can be analysed and compared to identify and explain qualitative and quantitative patterns, trends, relationships and anomalies  VC2S10I05 | Focus is placed on data analysis and conflates aspects of 2 content descriptions |

##### Sub-strand: Evaluating

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| Use knowledge of scientific concepts to evaluate investigation conclusions, including assessing the approaches used to solve problems, critically analysing the validity of information obtained from primary and secondary sources, suggesting possible alternative explanations and describing specific ways to improve the quality of data (VCSIS139) | the validity and reproducibility of investigation methods and the validity of conclusions and claims can be evaluated, including by identifying assumptions, conflicting evidence, biases that may influence observations and conclusions, sources of error and areas of uncertainty  VC2S10I06 | Focuses on evaluation of methods, conclusions and claims and refers to reproducibility, but does not suggest ways to improve the quality of data |
| Use knowledge of scientific concepts to evaluate investigation conclusions, including assessing the approaches used to solve problems, critically analysing the validity of information obtained from primary and secondary sources, suggesting possible alternative explanations and describing specific ways to improve the quality of data (VCSIS139) | arguments based on a variety of evidence can be constructed to support conclusions or evaluate claims, including consideration of any ethical issues and cultural protocols associated with accessing, using or citing secondary data or information  VC2S10I07 | Refined for clarity and to align with the sub-strand. Focuses on constructing arguments and conclusions by evaluating evidence |

##### Sub-strand: Communicating

| Victorian Curriculum F–10 Version 1.0 | Victorian Curriculum F–10 Version 2.0 | Comment |
| --- | --- | --- |
| Communicate scientific ideas and information for a particular purpose, including constructing evidence-based arguments and using appropriate scientific language, conventions and representations (VCSIS140) | communicating and justifying scientific ideas, findings and arguments for diverse audiences involves the selection of appropriate presentation formats, content, scientific vocabulary, conventions, models and other representations, and may include the use of digital tools  VC2S10I08 | Refined for clarity |