Indicative progress descriptions

The Victorian Curriculum F–10 has been designed as a continuum of learning, with achievement standards provided at the end of a level or, more typically, at the end of a band of levels. As students progress along the curriculum, indicative progress descriptions can be used by teachers to describe what student progress looks like *between* achievement standards. Such a description of a student’s progression of learning may be useful to a teacher when they need to assess and report the student’s learning progress *when they are only partially through teaching the level* and hence the student is still working towards the level achievement standard.

To assist teachers to develop their own indicative progress descriptions, the VCAA has provided an annotated example of indicative progress, a curriculum-specific example of indicative progress and indicative progress templates prepopulated with the curriculum-specific achievement standards (see below).

Teachers are encouraged to look at both the annotated example below and the curriculum-specific example of indicative progress (see page 2), before filling in the indicative progress template from page 3 onwards.

Annotated example of indicative progress

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| **Curriculum Area****Step 1:** *Identify the curriculum area and the levels the assessment will span.* Previous level’s achievement standard as a starting point of comparison Previous level’s achievement standard as a starting point of comparison  |
| **Context:** |
| **Content Descriptions:****Step 5:** *Develop a description of what a student would be expected to do, make, say or write as they progress towards the next achievement standard.* |
| **Level X Achievement Standard** | **Example of indicative progress towards achievement standard** | **Level Y Achievement Standard** |
| By the end of Level X students can: … | When progressing towards Level Y students can: …**Step 4:** *Highlight the specific elements of the achievement standard that are being targeted in this context.* | By the end of Level Y students can: …  |

**Step 2:** *Draw the context from the learning plan and include an outline of the unit or topic.*

**Step 3:** *Choose which content descriptions will be taught and assessed in this unit.*

Curriculum-specific example of indicative progress

Below is a curriculum-specific example with each step marked, to demonstrate how to complete an indicative progress template.

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| **CURRICULUM AREA: Science sequence towardLevel 10 achievement standard**1 |
| 2**Context:** Students explore nervous system functioning by investigating which of visual, auditory or tactile cues are more important in affecting reaction time. They work in pairs and use a ‘catching a dropped ruler’ method to test the effect of visual cues, auditory cues and tactile cues on reaction times. Stimulus questions may be used to prompt student inquiry: Are results more accurate and reliable if a ‘trial’ is conducted first? How many experiment repetitions are sufficient to obtain reliable results? Do students have a ‘dominant’ hand? Do males have different reaction times compared with females? Do athletes have a faster reaction time than non-athletes? The teaching and learning plan links biological and physical understandings and focuses primarily on the development of science inquiry skills in the context of data manipulation and quantitative science.3 |
| **Content Descriptions:****Science Understanding*** Scientific understanding, including models and theories, are contestable and are refined over time trough as process of review by the scientific community [(VCSSU114)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCSSU114)
* Multicellular organisms rely on coordinated and interdependent internal systems to respond to changes to their environment [(VCSSU117)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/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)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCSSU118)
* The 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)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCSSU133)

**Science Inquiry Skills*** Formulate questions or hypotheses that can be investigated scientifically, including identification of independent, dependent and controlled variables [(VCSIS134)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCSIS134)
* 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)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCSIS135)
* 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)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCSIS136)
* 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)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/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)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCSIS138)
* 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)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCSIS139)
* Communicate scientific ideas and information for a particular purpose, including constructing evidence-based arguments and using appropriate scientific language, conventions and representations [(VCSIS140)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCSIS140)
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| **Science Level 8 Achievement Standard**  | **Example of Indicative Progress toward Level 10 Achievement Standard** | **Science Level 10 Achievement Standard** |
| 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. | In **Science**, indicative progression towards the Level 10 achievement standard may be when students:* outline how scientific understanding has progressed from thinking that human mental processes were too fast to measure to empirically (such as, Donder’s work (1865) on the measurability of reaction time) to contemporary research that extended this thinking (such as, visual choice reaction times), but are not yet able to discuss the contestable aspects of the research.
* explain how messages are conveyed from receptor to effector in neural pathways related to reaction times, but are not yet able to account for touch and audio stimuli having faster reaction times, on average, than auditory stimuli.
* explain reaction time as a measure of how quickly an organism responds to a stimulus, but is not yet able to distinguish between voluntary and involuntary (reflex) responses or to account for the survival advantages for an organism of an involuntary reflex being faster than a voluntary reaction.
* provide qualitative explanations of the relationship between distance and speed and distinguish between distance and displacement, and speed and velocity, but are not yet able to apply provided physics formulas to evaluate and explain their predictions related to speed
* identify independent, dependent and controlled variables, but are not yet able to suggest further variables that may be manipulated to extend their investigation related to reaction times.
* collate class data related to reaction times and identify discrepant or conflicting results, but are not yet able to offer plausible reasons for differences in data or to suggest alternative explanations of differing results.
* represent investigation findings in graphical form, but may not yet be able to distinguish between the representations of continuous and discrete variables in a graph.
* use an appropriate ‘ruler drop’ method in the measurement of reaction times, but are not yet able to suggest how digital technologies may be used to generate more accurate, precise or reliable data.
* use data from their own investigations to support their conclusions, but are not yet able to incorporate the findings from other research into their own arguments.

4 | By the end of Level 10:5Students 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.  |

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| **CURRICULUM AREA – Science sequence toward Level 2 Achievement standard**Previous level’s achievement standard as a starting point of comparison Previous level’s achievement standard as a starting point of comparison  |
| **Context: [INSERT Context from the learning plan and include an outline of the unit or topic you are assessing]** |
| **Content Description(s): [INSERT Content description/s which will be taught and assessed in this unit]** |
| **Science Level 2 Achievement Standard**  | **Example of Indicative Progress toward Level 4 Achievement Standard** | **Science Level 4 Achievement Standard** |
| 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.
 | In **Science**, indicative progression towards the Level 4 achievement standard may be when students: | 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.
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| **CURRICULUM AREA – Science sequence toward Level 6 achievement standard**Previous level’s achievement standard as a starting point of comparison Previous level’s achievement standard as a starting point of comparison  |
| **Context:** |
| **Content Description(s):** |
| **Science Level 4 Achievement Standard**  | **Example of Indicative Progress toward Level 6 Achievement Standard** | **Science Level 6 Achievement Standard** |
| 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.
 | In **Science**, indicative progression towards the Level 6 achievement standard may be when students: | 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.
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| **CURRICULUM AREA – Science sequence toward Level 8 achievement standard**Previous level’s achievement standard as a starting point of comparison Previous level’s achievement standard as a starting point of comparison  |
| **Context:** |
| **Content Description(s):** |
| **Science Level 6 Achievement Standard**  | **Example of Indicative Progress toward Level 8 Achievement Standard** | **Science Level 8 Achievement Standard** |
| 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.
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* 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.
 | In **Science**, indicative progression towards the Level 8 achievement standard may be when students: | 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.
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| **CURRICULUM AREA – Science sequence toward Level 10 achievement standard**Previous level’s achievement standard as a starting point of comparison Previous level’s achievement standard as a starting point of comparison  |
| **Context:** |
| **Content Description(s):** |
| **Science Level 8 Achievement Standard**  | **Example of Indicative Progress toward Level 10 Achievement Standard** | **Science Level 10 Achievement Standard** |
| 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.
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* 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
 | In **Science**, indicative progression towards the Level 10 achievement standard may be when students: | 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.
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