



Truganina College

Inspiring Excellence in Learning to Believe, Achieve and Succeed.

Years 7-9 Science/STEM Overview 2023

Our school community is one with high expectations. We are collaborative and inclusive of all. We deliver a 21st century guaranteed and viable curriculum that results in outstanding student achievement.

The Science/STEM Curriculum links directly to:

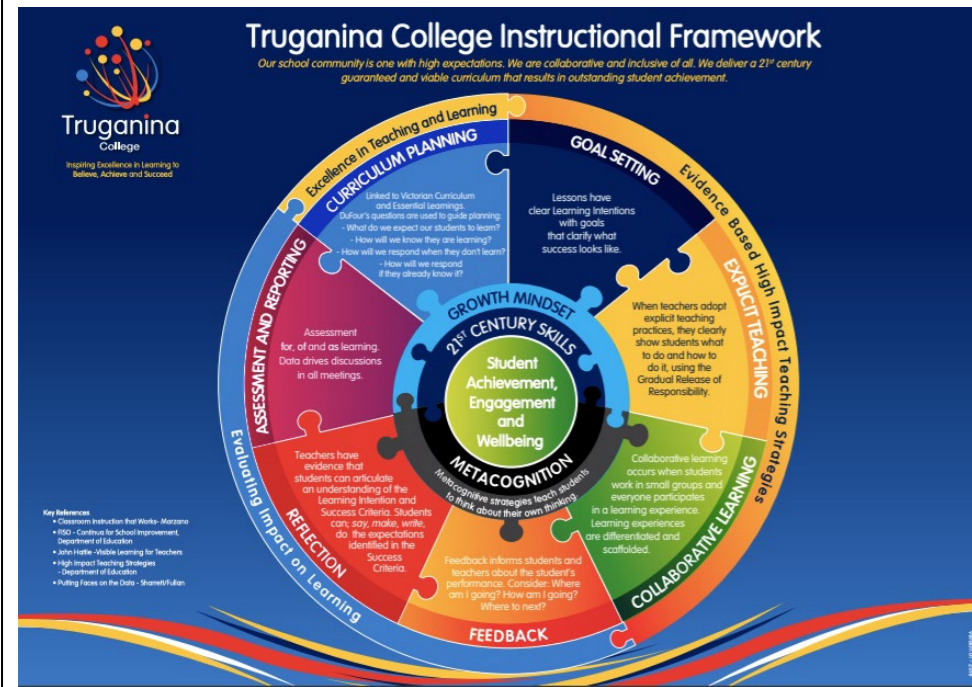
HIGH IMPACT TEACHING STRATEGIES (HITS)



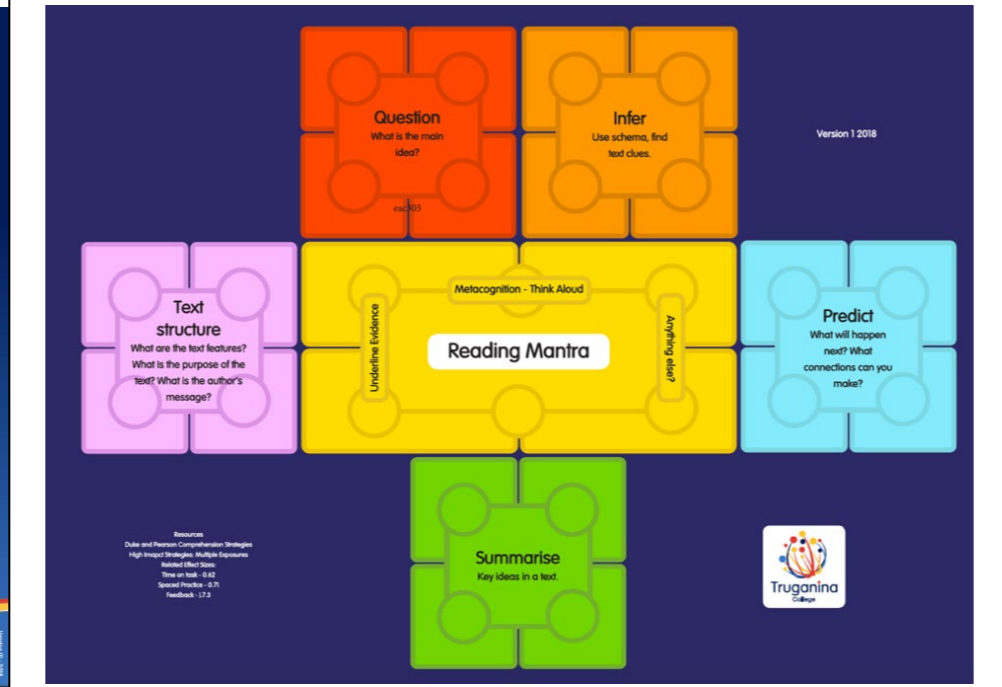
The planning, teaching and learning of the Science/STEM Curriculum link directly to the College's Strategic Plan goals:

- Goal 1: To improve student learning outcomes in literacy and numeracy.
- Goal 2: To empower students to become independent and self-regulating learners.
- Goal 3: To enhance the health and wellbeing of all students.

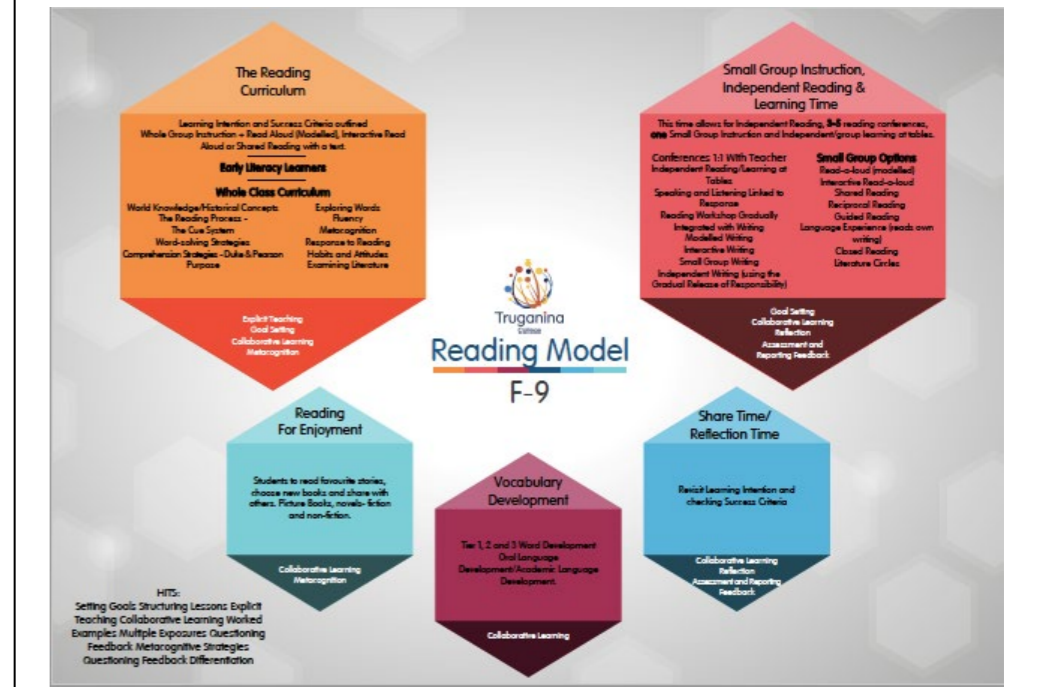
Instructional Framework



Reading Mantra



Reading Model



- Curriculum Planning - Refer to DuFour's questions**
 - What do we need our students to learn?
 - How will we know they are learning?
 - What will we do if they have already learned it?
 - What will we do if they have not learned?
- Assessment & Reporting - Data drives discussion in all meetings**
- 21st century learning**
 - Ways of Thinking: Creativity & Innovation, Critical Thinking, Problem Solving & Decision Making, Learning to Learn
 - Ways of Working: Communication & Collaboration
 - Ways of Living in the World: Local & Global Citizenship, Personal & Social Responsibility, Life & Career
 - Tools for Working: Information Literacy, Information & Communication Technology (ICT) Literacy
- Duke & Pearson Comprehension Strategies**
- Critical & Creative Thinking**

	Term 1 - Chemical Sciences	Term 2 - Biological Sciences	Term 3 - Physical Sciences	Term 4 - Earth and Space Sciences
Year 7	<p>Science Understanding</p> <p>(VCSSU096) -The properties of the different states of matter can be explained in terms of the motion and arrangement of particles</p> <p>(VCSSU095) - Mixtures, including solutions, contain a combination of pure substances that can be separated using a range of techniques</p> <p>Meta- Cognition</p> <p>(VCCCTM042) Consider how problems can be segmented into discrete stages, new knowledge synthesised during problem-solving and criteria used to assess emerging ideas and proposals</p> <p>Setting A Purpose Inferring</p>	<p>Science Understanding</p> <p>(VCSSU091) - There are differences within and between groups of organisms; classification helps organise this diversity</p> <p>(VCSSU092) - Cells are the basic units of living things and have specialised structures and functions</p> <p>Meta- Cognition</p> <p>(VCCCTM041) Examine a range of learning strategies and how to select strategies that best meet the requirements of a task</p> <p>Metacognition Text Structure</p>	<p>Science Understanding</p> <p>(VCSSU103) - 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</p> <p>Meta- Cognition</p> <p>(VCCCTM042) Consider how problems can be segmented into discrete stages, new knowledge synthesised during problem-solving and criteria used to assess emerging ideas and proposals</p> <p>Predicting Monitoring Comprehension</p>	<p>Science Understanding</p> <p>(VCSSU099) - Predictable phenomena on Earth, including seasons and eclipses, are caused by the relative positions of the Sun, Earth and the Moon</p> <p>Questions and Possibilities</p> <p>(VCCCTQ032) Consider how to approach and use questions that have different elements, including factual, temporal and conceptual elements</p> <p>Reasoning</p> <p>(VCCCTR035) Examine common reasoning errors including circular arguments and cause and effect fallacies</p> <p>Visualising Questioning</p>
	Digital Technologies		Digital Technologies	
	<p>Define and decompose real-world problems taking into account functional requirements and sustainability (economic, environmental, social), technical and usability constraints (VCDTCD040)</p> <p>Evaluate how well student-developed solutions and existing information systems meet needs, are innovative and take account of future risks and sustainability (VCDTCD044)</p>		<p>Define and decompose real-world problems taking into account functional requirements and sustainability (economic, environmental, social), technical and usability constraints (VCDTCD040)</p> <p>Evaluate how well student-developed solutions and existing information systems meet needs, are innovative and take account of future risks and sustainability (VCDTCD044)</p>	
	Design and Technologies		Design and Technologies	
<p>Examine and prioritise competing factors including social, ethical, economic and sustainability considerations in the development of technologies and designed solutions to meet community needs for preferred futures (VCDSTS043)</p> <p>Analyse how food and fibre are produced when creating managed environments and how these can become more sustainable (VCDSTC046)</p> <p>Analyse how characteristics and properties of food determine preparation techniques and presentation when creating solutions for healthy eating (VCDSTC047)</p> <p>Investigating</p> <p>Critique needs or opportunities for designing and investigate, analyse and select from a range of materials, components, tools, equipment and processes to develop design ideas (VCDSCD049)</p> <p>Generating</p> <p>Generate, develop and test design ideas, plans and processes using appropriate technical terms and technologies including graphical representation techniques (VCDSCD050)</p>		<p>Examine and prioritise competing factors including social, ethical, economic and sustainability considerations in the development of technologies and designed solutions to meet community needs for preferred futures (VCDSTS043)</p> <p>Analyse how food and fibre are produced when creating managed environments and how these can become more sustainable (VCDSTC046)</p> <p>Analyse how characteristics and properties of food determine preparation techniques and presentation when creating solutions for healthy eating (VCDSTC047)</p> <p>Investigating</p> <p>Critique needs or opportunities for designing and investigate, analyse and select from a range of materials, components, tools, equipment and processes to develop design ideas (VCDSCD049)</p> <p>Generating</p> <p>Generate, develop and test design ideas, plans and processes using appropriate technical terms and technologies including graphical representation techniques (VCDSCD050)</p>		

	<p>Producing Effectively and safely use a broad range of materials, components, tools, equipment and techniques to produce designed solutions (VCDSCD051)</p> <p>Evaluating Independently develop criteria for success to evaluate design ideas, processes and solutions and their sustainability (VCDSCD052)</p>		<p>Producing Effectively and safely use a broad range of materials, components, tools, equipment and techniques to produce designed solutions (VCDSCD051)</p> <p>Evaluating Independently develop criteria for success to evaluate design ideas, processes and solutions and their sustainability (VCDSCD052)</p>	
Year 8	<p style="text-align: center;">Science Understanding</p> <p>VCSSU097 - Differences between elements, compounds and mixtures can be described by using a particle model</p> <p>VCSSU098 - Chemical change involves substances reacting to form new substances</p> <p>Meta-cognition Consider how problems can be segmented into discrete stages, new knowledge synthesised during problem-solving and criteria used to assess emerging ideas and proposals (VCCCTM042)</p> <p>Setting A Purpose Inferring</p>	<p style="text-align: center;">Science Understanding</p> <p>VCSSU093 - Interactions between organisms can be described in terms of food chains and food webs and can be affected by human activity</p> <p>VCSSU094 - Multicellular organisms contain systems of organs that carry out specialised functions that enable them to survive and reproduce</p> <p>Meta- Cognition Examine a range of learning strategies and how to select strategies that best meet the requirements of a task (VCCTM041)</p> <p>Metacognition Text Structure</p>	<p style="text-align: center;">Science Understanding</p> <p>VCSSU104 - 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</p> <p>VCSSU105 - 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</p> <p>VCSSU106 - The properties of sound can be explained by a wave model</p> <p>Meta-cognition Consider a range of strategies to represent ideas and explain and justify thinking processes to others (VCCCTM040)</p> <p>Predicting Monitoring Comprehension</p>	<p style="text-align: center;">Science Understanding</p> <p>VCSSU100 - Some of Earth's resources are renewable, but others are non-renewable</p> <p>VCSSU101 - Water is an important resource that cycles through the environment</p> <p>VCSSU102 - Sedimentary, igneous and metamorphic rocks contain minerals and are formed by processes that occur within Earth over a variety of timescales</p> <p>Meta- cognition Consider how problems can be segmented into discrete stages, new knowledge synthesised during problem-solving and criteria used to assess emerging ideas and proposals (VCCCTM042)</p> <p>Visualizing Questioning</p>

	Digital Technologies		Digital Technologies	
	Investigate how data is transmitted and secured in wired, wireless and mobile networks (VCDTDS035) Design algorithms represented diagrammatically and in English, and trace algorithms to predict output for a given input and to identify errors (VCDTCD042)		Investigate how data is transmitted and secured in wired, wireless and mobile networks (VCDTDS035) Design algorithms represented diagrammatically and in English, and trace algorithms to predict output for a given input and to identify errors (VCDTCD042)	
	Design and Technologies		Design and Technologies	
	Investigate the ways in which designed solutions evolve locally, nationally, regionally and globally through the creativity, innovation and enterprise of individuals and groups (VCDSTS044) Analyse how motion, force and energy are used to manipulate and control electromechanical systems when creating simple, engineered solutions (VCDSTC045) Analyse ways to create designed solutions through selecting and combining characteristics and properties of materials, systems, components, tools and equipment (VCDSTC048)		Investigate the ways in which designed solutions evolve locally, nationally, regionally and globally through the creativity, innovation and enterprise of individuals and groups (VCDSTS044) Analyse how motion, force and energy are used to manipulate and control electromechanical systems when creating simple, engineered solutions (VCDSTC045) Analyse ways to create designed solutions through selecting and combining characteristics and properties of materials, systems, components, tools and equipment (VCDSTC048)	
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	Planning and Managing Use project management processes to coordinate production of designed solutions (VCDSCD053)		Planning and Managing Use project management processes to coordinate production of designed solutions (VCDSCD053)	
	Science Understanding		Science Understanding	
Year 9	VCSSU123 - The atomic structure and properties of elements are used to organise them in the periodic table	VCSSU121 - Ecosystems consist of communities of interdependent organisms and abiotic components of the environment; matter and energy flow through these systems	VCSSU132 - Energy flow in Earth's atmosphere can be explained by the processes of heat transfer	VCSSU129 - The Universe contains features including galaxies, stars and solar systems; the Big Bang theory can be used to explain the origin of the Universe
	VCSSU124 - Chemical reactions involve rearranging atoms to form new substances; during a chemical reaction mass is not created or destroyed	VCSSU117 - Multicellular organisms rely on coordinated and interdependent internal systems to respond to changes to their environment	VCSSU130 - 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	VCSSU127 - The theory of plate tectonics explains global patterns of geological activity and continental movement
	Meta- cognition Critically examine their own and others' thinking processes and discuss the factors that	Meta- Cognition	Meta-cognition Investigate the kind of criteria that can be used to rationally evaluate the quality of ideas and	Meta – cognition Investigate the kind of criteria that can be used to rationally evaluate the quality of ideas

<p>influence thinking, including cognitive biases (VCCCTM051)</p> <p>Setting A Purpose Inferring</p>	<p>Suspend judgements to allow new possibilities to emerge and investigate how this can broaden ideas and solutions (VCCCTQ044)</p> <p>Metacognition Text Structure</p>	<p>proposals, including the qualities of viability and workability (VCCCTM053)</p> <p>Predicting Monitoring Comprehension</p>	<p>and proposals, including the qualities of viability and workability (VCCCTM053)</p> <p>Visualising Questioning</p>
<p align="center">Digital Technologies</p>		<p align="center">Digital Technologies</p>	
<p>Define and decompose real-world problems precisely, taking into account functional and non-functional requirements and including interviewing stakeholders to identify needs (VCDTCD050)</p> <p>Manage and collaboratively create interactive solutions for sharing ideas and information online, taking into account social contexts and legal responsibilities (VCDTDI049)</p> <p align="center">Design and Technologies</p>	<p>Define and decompose real-world problems precisely, taking into account functional and non-functional requirements and including interviewing stakeholders to identify needs (VCDTCD050)</p> <p>Manage and collaboratively create interactive solutions for sharing ideas and information online, taking into account social contexts and legal responsibilities (VCDTDI049)</p> <p align="center">Design and Technologies</p>	<p>Define and decompose real-world problems precisely, taking into account functional and non-functional requirements and including interviewing stakeholders to identify needs (VCDTCD050)</p> <p>Manage and collaboratively create interactive solutions for sharing ideas and information online, taking into account social contexts and legal responsibilities (VCDTDI049)</p> <p align="center">Design and Technologies</p>	<p>Define and decompose real-world problems precisely, taking into account functional and non-functional requirements and including interviewing stakeholders to identify needs (VCDTCD050)</p> <p>Manage and collaboratively create interactive solutions for sharing ideas and information online, taking into account social contexts and legal responsibilities (VCDTDI049)</p> <p align="center">Design and Technologies</p>
<p>Explain how designed solutions evolve with consideration of preferred futures and the impact of emerging technologies on design decisions (VCDSTS055)</p> <p>Investigate and make judgements on how the principles of food safety, preservation, preparation, presentation and sensory perceptions influence the creation of food solutions for healthy eating (VCDSTC058)</p> <p>Investigating Critique needs or opportunities to develop design briefs and investigate and select an increasingly sophisticated range of materials, systems, components, tools and equipment to develop design ideas (VCDSCD060)</p> <p>Generating Apply design thinking, creativity, innovation and enterprise skills to develop, modify and communicate design ideas of increasing sophistication (VCDSCD061)</p> <p>Producing Work flexibly to safely test, select, justify and use appropriate technologies and processes to make designed solutions (VCDSCD062)</p> <p>Evaluating Evaluate design ideas, processes and solutions against comprehensive criteria for success recognising the need for sustainability (VCDSCD063)</p>	<p>Explain how designed solutions evolve with consideration of preferred futures and the impact of emerging technologies on design decisions (VCDSTS055)</p> <p>Investigate and make judgements on how the principles of food safety, preservation, preparation, presentation and sensory perceptions influence the creation of food solutions for healthy eating (VCDSTC058)</p> <p>Investigating Critique needs or opportunities to develop design briefs and investigate and select an increasingly sophisticated range of materials, systems, components, tools and equipment to develop design ideas (VCDSCD060)</p> <p>Generating Apply design thinking, creativity, innovation and enterprise skills to develop, modify and communicate design ideas of increasing sophistication (VCDSCD061)</p> <p>Producing Work flexibly to safely test, select, justify and use appropriate technologies and processes to make designed solutions (VCDSCD062)</p> <p>Evaluating Evaluate design ideas, processes and solutions against comprehensive criteria for success recognising the need for sustainability (VCDSCD063)</p>	<p>Explain how designed solutions evolve with consideration of preferred futures and the impact of emerging technologies on design decisions (VCDSTS055)</p> <p>Investigate and make judgements on how the principles of food safety, preservation, preparation, presentation and sensory perceptions influence the creation of food solutions for healthy eating (VCDSTC058)</p> <p>Investigating Critique needs or opportunities to develop design briefs and investigate and select an increasingly sophisticated range of materials, systems, components, tools and equipment to develop design ideas (VCDSCD060)</p> <p>Generating Apply design thinking, creativity, innovation and enterprise skills to develop, modify and communicate design ideas of increasing sophistication (VCDSCD061)</p> <p>Producing Work flexibly to safely test, select, justify and use appropriate technologies and processes to make designed solutions (VCDSCD062)</p> <p>Evaluating Evaluate design ideas, processes and solutions against comprehensive criteria for success recognising the need for sustainability (VCDSCD063)</p>	<p>Explain how designed solutions evolve with consideration of preferred futures and the impact of emerging technologies on design decisions (VCDSTS055)</p> <p>Investigate and make judgements on how the principles of food safety, preservation, preparation, presentation and sensory perceptions influence the creation of food solutions for healthy eating (VCDSTC058)</p> <p>Investigating Critique needs or opportunities to develop design briefs and investigate and select an increasingly sophisticated range of materials, systems, components, tools and equipment to develop design ideas (VCDSCD060)</p> <p>Generating Apply design thinking, creativity, innovation and enterprise skills to develop, modify and communicate design ideas of increasing sophistication (VCDSCD061)</p> <p>Producing Work flexibly to safely test, select, justify and use appropriate technologies and processes to make designed solutions (VCDSCD062)</p> <p>Evaluating Evaluate design ideas, processes and solutions against comprehensive criteria for success recognising the need for sustainability (VCDSCD063)</p>