



Truganina College

Inspiring Excellence in Learning to Believe, Achieve and Succeed.

# Years 7 - 9 Science/STEM Overview 2024

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

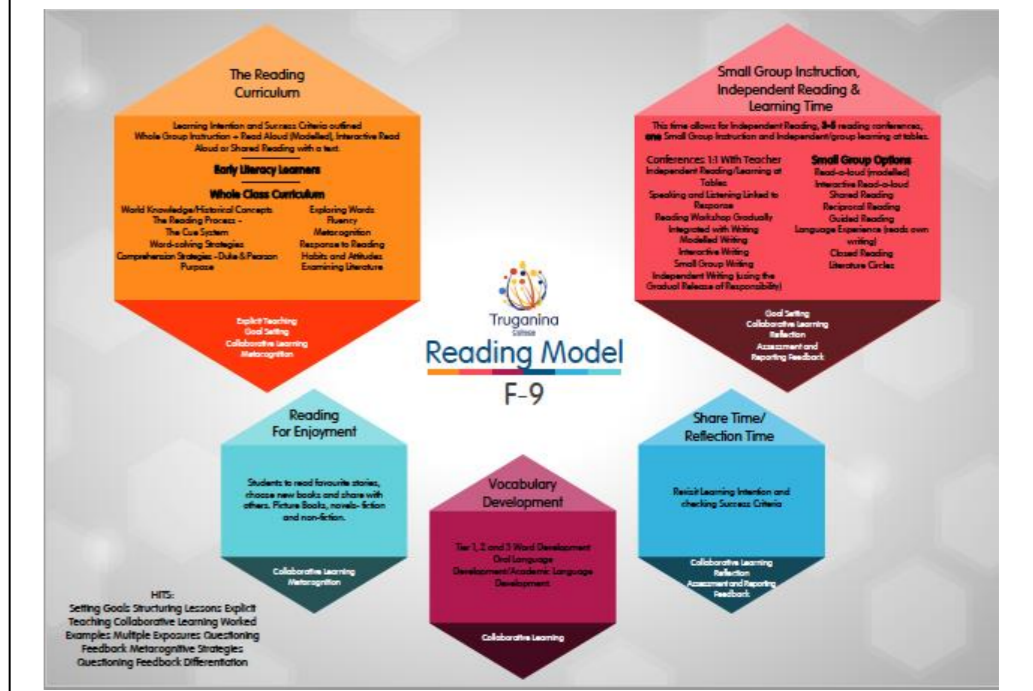
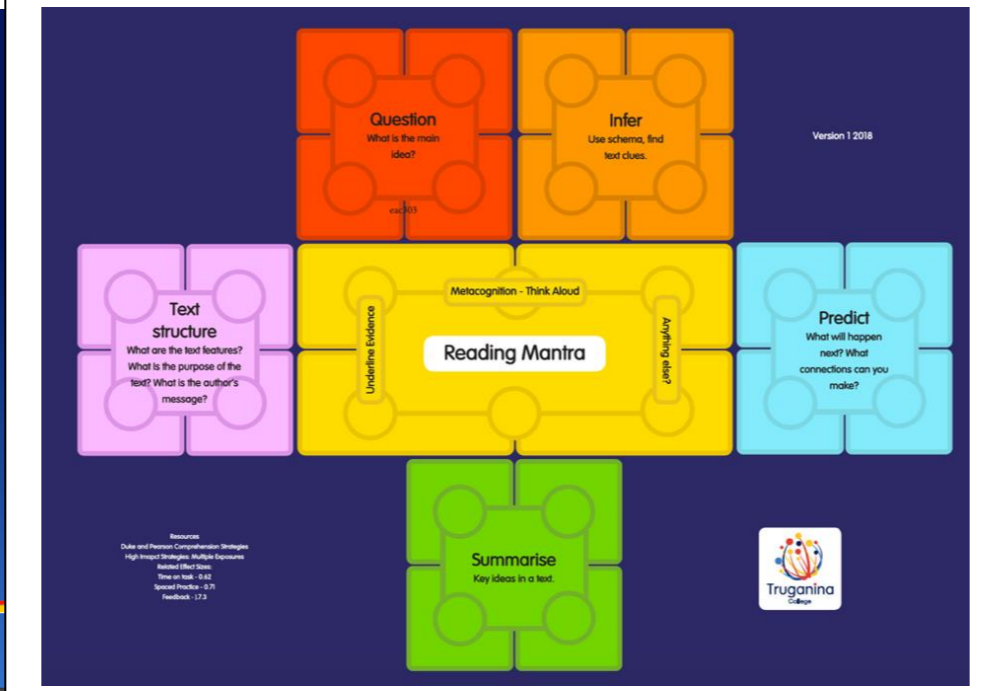
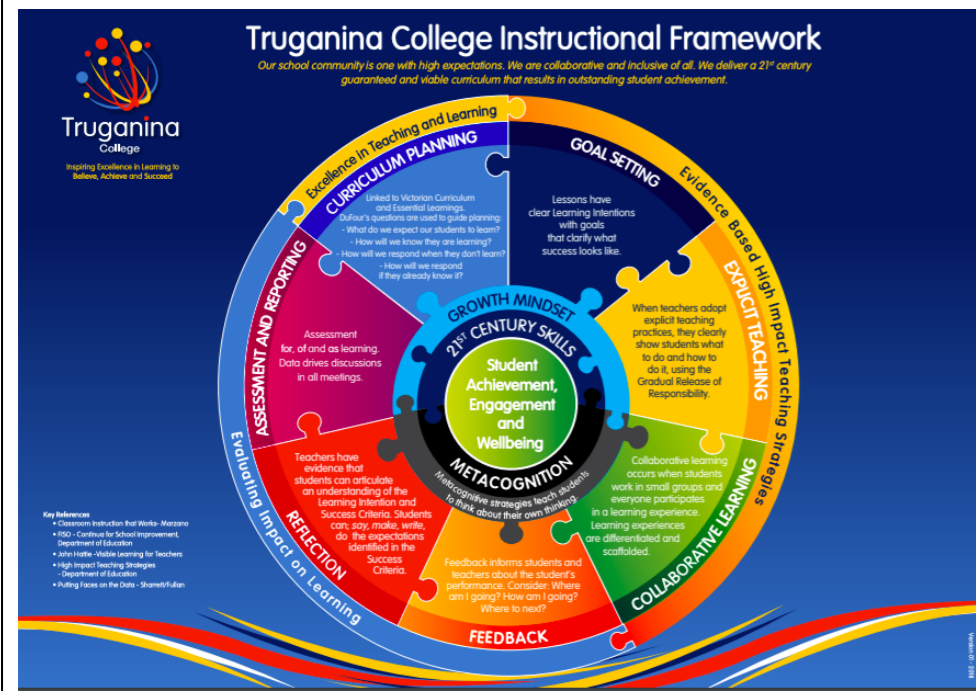
## The Science/STEM Curriculum links directly to High Impact Teaching Strategies (HITS)



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**
- 21<sup>st</sup> 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><b>Meta- Cognition</b></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><b>Meta- Cognition</b></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><b>Meta- Cognition</b></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><b>Questions and Possibilities</b></p> <p>(VCCCTQ032) Consider how to approach and use questions that have different elements, including factual, temporal and conceptual elements.</p> <p><b>Reasoning</b></p> <p>(VCCCTR035) Examine common reasoning errors including circular arguments and cause-and-effect fallacies.</p> <p>Visualising Questioning</p>
	<p><b>Digital Technologies</b></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>		<p><b>Digital Technologies</b></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>	
	<p><b>Design and Technologies</b></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><b>Investigating</b></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><b>Generating</b></p> <p>Generate, develop and test design ideas, plans and processes using appropriate technical terms and technologies including graphical representation techniques (VCDSCD050)</p> <p><b>Producing</b></p> <p>Effectively and safely use a broad range of materials, components, tools, equipment and techniques to produce designed solutions (VCDSCD051)</p> <p><b>Evaluating</b></p> <p>Independently develop criteria for success to evaluate design ideas, processes and solutions and their sustainability (VCDSCD052)</p>		<p><b>Design and Technologies</b></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><b>Investigating</b></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><b>Generating</b></p> <p>Generate, develop and test design ideas, plans and processes using appropriate technical terms and technologies including graphical representation techniques (VCDSCD050)</p> <p><b>Producing</b></p> <p>Effectively and safely use a broad range of materials, components, tools, equipment and techniques to produce designed solutions (VCDSCD051)</p> <p><b>Evaluating</b></p> <p>Independently develop criteria for success to evaluate design ideas, processes and solutions and their sustainability (VCDSCD052)</p>	

Year 8	<p>Science Understanding</p> <p><b>(VCSU097)</b> - Differences between elements, compounds and mixtures can be described by using a particle model.</p> <p><b>(VCSU098)</b> - Chemical change involves substances reacting to form new substances.</p> <p><b>Meta-cognition</b></p> <p>Consider how problems can be segmented into discrete stages, new knowledge synthesised during problem-solving and criteria used to assess emerging ideas and proposals <b>(VCCCTM042)</b></p> <p>Setting A Purpose Inferring</p>	<p>Science Understanding</p> <p><b>(VCSU093)</b> - Interactions between organisms can be described in terms of food chains and food webs and can be affected by human activity.</p> <p><b>(VCSU094)</b> - Multicellular organisms contain systems of organs that carry out specialised functions that enable them to survive and reproduce.</p> <p><b>Meta- Cognition</b></p> <p>Examine a range of learning strategies and how to select strategies that best meet the requirements of a task <b>(VCCTM041)</b></p> <p>Metacognition Text Structure</p>	<p>Science Understanding</p> <p><b>(VCSU104)</b> - 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><b>(VCSU105)</b> - 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><b>(VCSU106)</b> - The properties of sound can be explained by a wave model.</p> <p><b>Meta-cognition</b></p> <p>Consider a range of strategies to represent ideas and explain and justify thinking processes to others <b>(VCCCTM040)</b></p> <p>Predicting Monitoring Comprehension</p>	<p>Science Understanding</p> <p><b>(VCSU100)</b> - Some of Earth's resources are renewable, but others are non-renewable.</p> <p><b>(VCSU101)</b> - Water is an important resource that cycles through the environment.</p> <p><b>(VCSU102)</b> - Sedimentary, igneous and metamorphic rocks contain minerals and are formed by processes that occur within Earth over a variety of timescales.</p> <p><b>Meta- cognition</b></p> <p>Consider how problems can be segmented into discrete stages, new knowledge synthesised during problem-solving and criteria used to assess emerging ideas and proposals <b>(VCCCTM042)</b></p> <p>Visualizing Questioning</p>
	Digital Technologies		Digital Technologies	
	<p>Investigate how data is transmitted and secured in wired, wireless and mobile networks (VCDTDS035)</p> <p>Design algorithms represented diagrammatically and in English, and trace algorithms to predict output for a given input and to identify errors (VCDTCD042)</p> <p>Design and Technologies</p>		<p>Investigate how data is transmitted and secured in wired, wireless and mobile networks (VCDTDS035)</p> <p>Design algorithms represented diagrammatically and in English, and trace algorithms to predict output for a given input and to identify errors (VCDTCD042)</p> <p>Design and Technologies</p>	
	<p>Investigate the ways in which designed solutions evolve locally, nationally, regionally and globally through the creativity, innovation and enterprise of individuals and groups (VCDSTS044)</p> <p>Analyse how motion, force and energy are used to manipulate and control electromechanical systems when creating simple, engineered solutions (VCDSTC045)</p> <p>Analyse ways to create designed solutions through selecting and combining characteristics and properties of materials, systems, components, tools and equipment (VCDSTC048)</p> <p><b>Investigating</b></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><b>Generating</b></p> <p>Generate, develop and test design ideas, plans and processes using appropriate technical terms and technologies including graphical representation techniques (VCDSCD050)</p> <p><b>Producing</b></p> <p>Effectively and safely use a broad range of materials, components, tools, equipment and techniques to produce designed solutions (VCDSCD051)</p> <p><b>Evaluating</b></p> <p>Independently develop criteria for success to evaluate design ideas, processes and solutions and their sustainability (VCDSCD052)</p> <p><b>Planning and Managing</b></p> <p>Use project management processes to coordinate production of designed solutions (VCDSCD053)</p>		<p>Investigate the ways in which designed solutions evolve locally, nationally, regionally and globally through the creativity, innovation and enterprise of individuals and groups (VCDSTS044)</p> <p>Analyse how motion, force and energy are used to manipulate and control electromechanical systems when creating simple, engineered solutions (VCDSTC045)</p> <p>Analyse ways to create designed solutions through selecting and combining characteristics and properties of materials, systems, components, tools and equipment (VCDSTC048)</p> <p><b>Investigating</b></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><b>Generating</b></p> <p>Generate, develop and test design ideas, plans and processes using appropriate technical terms and technologies including graphical representation techniques (VCDSCD050)</p> <p><b>Producing</b></p> <p>Effectively and safely use a broad range of materials, components, tools, equipment and techniques to produce designed solutions (VCDSCD051)</p> <p><b>Evaluating</b></p> <p>Independently develop criteria for success to evaluate design ideas, processes and solutions and their sustainability (VCDSCD052)</p> <p><b>Planning and Managing</b></p> <p>Use project management processes to coordinate production of designed solutions (VCDSCD053)</p>	

Year 9	<p><b>Science Understanding</b></p> <p><b>VCSSU123)</b> - The atomic structure and properties of elements are used to organise them in the periodic table.</p> <p><b>VCSSU124)</b> - Chemical reactions involve rearranging atoms to form new substances; during a chemical reaction mass is not created or destroyed.</p> <p><b>Meta- cognition</b></p> <p>Critically examine their own and others' thinking processes and discuss the factors that influence thinking, including cognitive biases <b>(VCCCTM051)</b></p> <p>Setting A Purpose Inferring</p>	<p><b>Science Understanding</b></p> <p><b>VCSSU121)</b> - Ecosystems consist of communities of interdependent organisms and abiotic components of the environment; matter and energy flow through these systems.</p> <p><b>VCSSU117)</b> - Multicellular organisms rely on coordinated and interdependent internal systems to respond to changes to their environment.</p> <p><b>Meta- Cognition</b></p> <p>Suspend judgements to allow new possibilities to emerge and investigate how this can broaden ideas and solutions <b>(VCCCTQ044)</b></p> <p>Metacognition Text Structure</p>	<p><b>Science Understanding</b></p> <p><b>VCSSU132)</b> - Energy flow in Earth's atmosphere can be explained by the processes of heat transfer.</p> <p><b>VCSSU130)</b> - 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.</p> <p><b>Meta-cognition</b></p> <p>Investigate the kind of criteria that can be used to rationally evaluate the quality of ideas and proposals, including the qualities of viability and workability <b>(VCCCTM053)</b></p> <p>Predicting Monitoring Comprehension</p>	<p><b>Science Understanding</b></p> <p><b>VCSSU129)</b> - The Universe contains features including galaxies, stars and solar systems; the Big Bang theory can be used to explain the origin of the Universe.</p> <p><b>VCSSU127)</b> -The theory of plate tectonics explains global patterns of geological activity and continental movement.</p> <p><b>Meta – cognition</b></p> <p>Investigate the kind of criteria that can be used to rationally evaluate the quality of ideas and proposals, including the qualities of viability and workability <b>(VCCCTM053)</b></p> <p>Visualising Questioning</p>
	<b>Digital Technologies</b>		<b>Digital Technologies</b>	
	<p>Define and decompose real-world problems precisely, taking into account functional and non-functional requirements and including interviewing stakeholders to identify needs <b>(VCDTCD050)</b></p> <p>Manage and collaboratively create interactive solutions for sharing ideas and information online, taking into account social contexts and legal responsibilities <b>(VCDTDI049)</b></p>		<p>Define and decompose real-world problems precisely, taking into account functional and non-functional requirements and including interviewing stakeholders to identify needs <b>(VCDTCD050)</b></p> <p>Manage and collaboratively create interactive solutions for sharing ideas and information online, taking into account social contexts and legal responsibilities <b>(VCDTDI049)</b></p>	
	<b>Design and Technologies</b>		<b>Design and Technologies</b>	
<p>Explain how designed solutions evolve with consideration of preferred futures and the impact of emerging technologies on design decisions <b>(VCDSTS055)</b></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 <b>(VCDSTC058)</b></p> <p><b>Investigating</b></p> <p>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 <b>(VCDSCD060)</b></p> <p><b>Generating</b></p> <p>Apply design thinking, creativity, innovation and enterprise skills to develop, modify and communicate design ideas of increasing sophistication <b>(VCDSCD061)</b></p> <p><b>Producing</b></p> <p>Work flexibly to safely test, select, justify and use appropriate technologies and processes to make designed solutions <b>(VCDSCD062)</b></p> <p><b>Evaluating</b></p> <p>Evaluate design ideas, processes and solutions against comprehensive criteria for success recognising the need for sustainability <b>(VCDSCD063)</b></p>		<p>Explain how designed solutions evolve with consideration of preferred futures and the impact of emerging technologies on design decisions <b>(VCDSTS055)</b></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 <b>(VCDSTC058)</b></p> <p><b>Investigating</b></p> <p>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 <b>(VCDSCD060)</b></p> <p><b>Generating</b></p> <p>Apply design thinking, creativity, innovation and enterprise skills to develop, modify and communicate design ideas of increasing sophistication <b>(VCDSCD061)</b></p> <p><b>Producing</b></p> <p>Work flexibly to safely test, select, justify and use appropriate technologies and processes to make designed solutions <b>(VCDSCD062)</b></p> <p><b>Evaluating</b></p> <p>Evaluate design ideas, processes and solutions against comprehensive criteria for success recognising the need for sustainability <b>(VCDSCD063)</b></p>		