St John’s Science Curriculum Statement

Science Curriculum

Updated 5.10.11.
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1. COMMUNITY PROFILE

The purpose of this document is to inform curriculum planning and implementation at St. John’s by providing a framework for teachers to achieve a consistent approach to Science curriculum delivery, assessment and reporting. This meets the requirements of Catholic Education in the Cairns Diocese.

Professional development in Science has been undertaken during 2009 by St. John’s staff at staff meetings and during professional development opportunities provided by the Cairns Curriculum Team to all teachers in the Southern Cluster and to the Curriculum Support Teacher at cluster meetings.

St. John’s Science Curriculum Statement was finalised in 2009 and will be reviewed in 2012 after the introduction of the National Curriculum in Science.

Our small rural school of St. John’s at Silkwood prides itself on being both Christ and child-centred, providing excellent teaching delivery to the students it serves. The school is located in the heart of the Southern Deanery in the Johnstone Shire. Geographically placed in between the larger towns of Tully and Innisfail, the school draws many of its students not only from Silkwood but also the surrounding communities of Kurrimine Beach, Mission Beach and El Arish.

St. John’s School comprises of children from the Silkwood area who are mainly of Italian descent and whose parents work in the sugar cane, banana and fishery industries. Our dedicated staff continues the proud tradition of quality Catholic Education to many of the children and grandchildren of the first students of St. John’s.

St. John’s is blessed to have the Three Saints Organisation actively involved with the school. The feast of the Three Saints is held annually on the first weekend of May in the school grounds. The current St. John’s community is respectful of the past and excited about the future, as it plays its part in inspiring St. John’s students to live the school motto of "Always Reaching For New Heights." In compiling this Science Curriculum Framework all members of the St. John’s community have been consulted.
2. LEARNING AREA RATIONALE

Science provides an empirical way of answering interesting and important questions about the biological, physical and technological world. The knowledge it produces has proved to be a reliable basis for action in our personal, social and economic lives. Science is a dynamic, collaborative and creative human endeavour arising from our desire to make sense of our world through exploring the unknown, investigating universal mysteries, making predictions and solving problems. Science aims to understand a large number of observations in terms of a much smaller number of broad principles. Science knowledge is contestable and is revised, refined and extended as new evidence arises.

The Australian Curriculum: Science provides opportunities for students to develop an understanding of important science concepts and processes, the practices used to develop scientific knowledge, of science’s contribution to our culture and society, and its applications in our lives. The curriculum supports students to develop the scientific knowledge, understandings and skills to make informed decisions about local, national and global issues and to participate, if they so wish, in science-related careers.

In addition to its practical applications, learning science is a valuable pursuit in its own right. Students can experience the joy of scientific discovery and nurture their natural curiosity about the world around them. In doing this, they develop critical and creative thinking skills and challenge themselves to identify questions and draw evidence-based conclusions using scientific methods. The wider benefits of this “scientific literacy” are well established, including giving students the capability to investigate the natural world and changes made to it through human activity.

The science curriculum promotes six overarching ideas that highlight certain common approaches to a scientific view of the world and which can be applied to many of the areas of science understanding. These overarching ideas are patterns, order and organisation; form and function; stability and change; systems; scale and measurement; and matter and energy.

The Diocesan Learning framework is reflected in how we teach science in the following ways;

At St. John’s School we believe that science is a way of answering questions about the natural world with a Catholic perspective. Children are encouraged to be inquiring and reflective learners in accordance with the philosophy and values outlined in the Diocesan Learning Framework 2007.

Education in science at St. John’s contributes to students being able to choose a career in a scientific field and act as Community Contributors through being able to make informed personal and societal decisions about the local environment and their own health and well being. At St.
John’s the development of scientific knowledge includes the use of technology as an important component of science and it is seen as important that the application of science and technology should be made authentic and link to the real world.

The science curriculum at St. John’s provides the basis for learning that will engage students as Active Investigators in meaningful ways. With the support of teachers, students will have opportunities to develop their science understanding so that they can function effectively in a scientifically and technologically advanced society.

Students are engaged in inquiry learning practices of the world around them, including their local environment such as King Reef and local rainforests. In order to sustain God’s Kingdom, science teaching at St. John’s incorporates stewardship of the environment.

The science curriculum is flexible, promoting local science learning opportunities such as the sugar cane and banana industries, the Great Barrier Reef, local rainforest, inland waterways, the recycling centres and other primary industries.

Teaching science at St. John’s School begins in Prep and continues throughout schooling. St. John’s School is currently using ‘Primary Connections - linking science with literacy’ published by the Australian Academy of Science as a major resource. This is an innovative approach to teaching and learning which enhances our science program. Students learn to be Leaders and Collaborators through teamwork and cooperative learning during scientific investigations. Students are taught to be Effective Communicators of Science, to be sceptical and questioning of the claims of others, and to be able to identify and investigate questions and draw evidence-based conclusions.

Primary Connections is an inquiry based program which contributes to conceptual development and growth in scientific literacy by using the 5Es teaching and learning model;

- engages and challenges student pre-conceptions
- includes opportunities for students to explore conceptions
- Supports students as Designers and Creators, to develop accurate science explanations for their explorations
- Extends students' learning through elaboration in new contexts via student investigations, and
- Provides opportunities for students as Quality Producers, to reflect on and evaluate their learning.

Ref: Diocese of Cairns Learning Framework (2007)

3. BROAD SUBJECT AIDS:

The Australian Curriculum: Science aims to ensure that students develop:

- an interest in science as a means of expanding their curiosity and willingness to explore, ask questions about and speculate on the changing world in which they live
• an understanding of the vision that science provides of the nature of living things, of the Earth and its place in the cosmos, and of the physical and chemical processes that explain the behaviour of all material things
• an understanding of the nature of scientific inquiry and the ability to use a range of scientific inquiry methods, including questioning; planning and conducting experiments and investigations based on ethical principles; collecting and analyzing data; evaluating results; and drawing critical, evidence-based conclusions
• an ability to communicate scientific understanding and findings to a range of audiences, to justify ideas on the basis of evidence, and to evaluate and debate scientific arguments and claims
• an ability to solve problems and make informed, evidence-based decisions about current and future applications of science while taking into account ethical and social implications of decisions
• an understanding of historical and cultural contributions to science as well as contemporary science issues and activities and an understanding of the diversity of careers related to science
• a solid foundation of knowledge of the biological, chemical, physical, Earth and space sciences, including being able to select and integrate the scientific knowledge and methods needed to explain and predict phenomena, to apply that understanding to new situations and events, and to appreciate the dynamic nature of science knowledge

YEARS K – 2 (TYPICALLY FROM 5 TO 8 YEARS OF AGE)

Curriculum focus: awareness of self and the local world

Young children have an intrinsic curiosity about their immediate world and a desire to explore and investigate things around them. Asking questions leads to speculation and the testing of ideas. Exploratory, purposeful play is a central feature of their investigations. Observation, using the senses in dynamic ways, is an important skill to be developed in these years. Observation leads into the idea of order that involves describing, comparing and sorting.

| Science understanding | • comparing sorting and classifying objects and materials  
|                        | • pushes, pulls, position and motion of objects  
|                        | • living and non-living things  
|                        | • needs, structures and growth of organisms  
|                        | • objects in the sky  
|                        | • changes on earth and the effects of living things. |
| Science inquiry skills  | • explore, be curious and wonder  
|                        | • ask questions and begin to investigate  
|                        | • describe what has happened  
|                        | • make and share observations  
|                        | • use evidence to support ideas. |
Science as a human endeavour
- recognize aspects of science in everyday life
- identify work associated with science in the community
- care for the environment.

Unifying ideas for students in this age range are:

- **Exploration**: Investigation of objects and things around them as a precursor to more directed inquiry in later years.
- **Observation**: Using the senses to observe and gather information about the environment, looking for what is the same and what is different.
- **Order**: Observing similarities and differences and comparing, sorting and classifying to create an order that is more meaningful.
- **Change**: There are many changes that occur in the world. Changes occur in materials, the position of objects, and the growth cycles of plants and animals. Some of these changes are reversible, but many are not. These changes vary in their rate and their scale.
- **Questioning and speculating**: Questions and ideas about the world become increasingly purposeful; explanatory ideas are developed and tested through further exploration.

**YEARS 3 – 6 (TYPICALLY FROM 8 TO 12 YEARS OF AGE)**

*Curriculum focus: recognising questions that can be investigated scientifically and investigating them*

During these years students will have the opportunity to develop ideas about science that relate to their life and living. A broad range of science concepts will be explored. Within these, the unifying ideas of patterns, systems, cause and effect, and evidence and explanation will be developed.

In the early years of primary school, students will tend to use a trial-and-error approach to their science investigations. As they progress through these years, the expectation is that they will begin to work in a more systematic way. The notion of a ‘fair test’ and the idea of variables will be developed, as well as other forms of science inquiry. Understanding the importance of measurement will also be fostered.

| Science understanding | • properties and uses of materials  
|                       | • forces and motion  
|                       | • forms, use and transfer of energy  
|                       | • structures and functions of living things  
|                       | • life cycles of organisms  
|                       | • living things and the environment  
|                       | • changes on earth and in space  
|                       | • relationship between earth, moon and sun  
|                       | • earth’s resources and their uses.  

St John’s Science Curriculum Document, updated 5th October 2011
### Science inquiry skills
- identify questions and predictions for testing
- plan and conduct simple investigations
- observe, describe and measure
- collect, record and present data as tables, diagrams or descriptions
- analyse data, describe and explain relationships
- discuss and compare results with predictions
- draw conclusions and communicate ideas and understandings.

### Science as a human endeavour
- consider how science is used in work and leisure
- become aware of science related careers
- recognize the effect of science and technology on our environment
- be aware of the historical nature of science ideas.

Building on the unifying ideas of exploration, observation, order, change, questioning and speculating, the unifying ideas of this age range are:

- **Patterns:** Through observation one can detect similarities among objects, living things and events. These similarities form patterns that underlie the idea of regular repetition. By identifying these patterns in nature, explanations can be developed about the reasons for them.
- **Systems:** The world is complex but can be understood by focusing on its smaller components. Understanding develops by examining these smaller components, or parts, and how they are related. Groups of parts that work together as a whole are commonly described as systems. There are also systems within systems, or subsystems. For example, an animal can be regarded as a system and within the animal there can be subsystems, such as the nervous system. There are many types of systems. Some examples are: a pond, a network, a particular machine, a school, the solar system.
- **Cause and effect:** An important aspect of science investigation is the study of relationships between different factors or variables. Cause and effect is an important kind of relationship. Examples of cause and effect questions are: If a plant dies, what are the factors that caused its death? If a person develops a skin rash, what has caused that rash?
- **Evidence and explanations:** Evidence is the driving force of science knowledge. From the data derived from observation, explanations about phenomena can be developed and tested. With new evidence, explanations may be refined or may change.

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**YEARS 7 – 10 (TYPICALLY FROM 12 TO 15 YEARS OF AGE)**

**Curriculum focus:** explaining phenomena involving science and its applications.

During these years, students study science concepts associated with each of the disciplines: biology, physics, chemistry and earth science. It is important to include contemporary contexts in which science can be learned and issues and recent research to enhance understanding of science in the world. It is current research and its human uses and implications that motivates and excites students.
In determining what concepts students should learn, it is important to exercise restraint and avoid overcrowding the curriculum, and so provide time to build the knowledge base that underlies science understanding. The unifying ideas of energy, sustainability of systems, equilibrium and interdependence lead to the ideas of form and function that result in a deeper appreciation of evidence, models, explanations and theories.

<table>
<thead>
<tr>
<th>Science understanding</th>
<th>Physics and chemistry</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• nature of matter, including particle theory</td>
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<tr>
<td></td>
<td>• forms of energy, energy transfer and storage</td>
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<td></td>
<td>• forces and motion</td>
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<td></td>
<td>• acids and bases</td>
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<tr>
<td></td>
<td>• metals and non-metals</td>
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<tr>
<td></td>
<td>• elements, compounds and chemical reactions.</td>
</tr>
<tr>
<td>Biology</td>
<td>• cells and living things</td>
</tr>
<tr>
<td></td>
<td>• the human body</td>
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<tr>
<td></td>
<td>• ecosystems</td>
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<tr>
<td></td>
<td>• theory of evolution and the diversity of living things.</td>
</tr>
<tr>
<td>Earth science</td>
<td>• structure of the earth and geological history</td>
</tr>
<tr>
<td></td>
<td>• plate tectonics and geological phenomena</td>
</tr>
<tr>
<td></td>
<td>• stars, galaxies and the universe</td>
</tr>
</tbody>
</table>

| Science inquiry skills                    | • formulate scientific questions or hypotheses for testing                            |
|                                           | • design and conduct science investigations involving measurement and repeated trials|
|                                           | • gather and organise data from a variety of sources                                  |
|                                           | • analyse and test models and theories based on the evidence available                |
|                                           | • explain and summarise patterns in data using science concepts.                      |
Science as a human endeavour

- be aware of contemporary issues such as water and its management, climate change, stem cell research, nanotechnology, gene technology
- apply scientific understandings to make responsible, ethical and informed decisions about issues
- be aware of the nature of science and research of Australian scientists
- appreciate that science provides rewarding careers
- appreciate the diversity of people who have contributed to, and shaped the development of, science.

Building on the unifying ideas of exploration, observation, order, change, questioning and speculating, patterns, systems, cause and effect, evidence and explanations, the unifying ideas of this age range are:

- **Energy**: Energy is the basis of all activity. There are different forms of energy and energy is transferred between these forms. A guiding principle is that energy is always conserved. A challenge for humans is to use energy wisely.
- **Sustainability**: The idea of sustainability is central to the nature of dynamic systems. A system has inputs, outputs and a variety of internal functions. The interaction of these inputs, functions and outputs determines the degree to which any system can sustain itself. The inputs include resources that may be renewable or non-renewable.
- **Equilibrium and interdependence**: In a system there are forces and changes that act in opposing directions. For a system to be stable, these factors need to be in a state of balance or equilibrium. This equilibrium is based on the interdependence of all the components within the system. A change in one of the components can affect all components of the system because of the interrelationships between the parts.
- **Form and function**: For objects and organisms, form and function are complementary. Form describes the nature or make-up of an aspect of an object or organism, while function represents the use of that aspect. For example, the form of a particular bone in the human body is specifically suited to its use.
- **Evidence, models, explanations and theories**: Just as evidence provides the basis of explanations, explanations are used and refined to form models and theories. Models and theories are more complex; abstract schemes or structures that provide a more detailed but tentative basis for understanding a range of evidence.

Ref: *Shape of the Australian Curriculum: Science*
Commonwealth of Australia 2009
4. CROSS CURRICULUM PRIORITIES

Cross Curriculum Priorities equip young Australians with the skills, knowledge and understanding that will enable them to engage effectively with and prosper in a globalised world. Students will gain personal and social benefits, be better equipped to make sense of the world in which they live and make an important contribution to building the social, intellectual and creative capital of our nation.

Science provides considerable opportunity for students to explore, understand and appreciate the wider world through the integration of across curriculum perspectives. The following statements about cross curriculum content indicate ways in which the following areas are embedded whilst ensuring that subject integrity is maintained.

CATHOLIC ETHOS

The overarching purpose of Catholic schools of the past, as well as the future, is to bring the Good News of Jesus to all who hear it. In the midst of a world of educational, social and economic change the focus on the holistic growth of the individual remains the surest way catholic school can prepare students for the uncertainties of the future.

Defining Features, Diocese of Cairns

The curriculum provides opportunities for young people to connect their curriculum experiences to a living Christian faith.

St. John’s is a Christian and specifically Catholic school. We value authentic evangelisation in our formal science curriculum. Through our science teaching program we plant the seeds of religious values and understandings in our student’s lives as individuals and as members of society. Through these values and understandings the student’s growth is nurtured to foster knowledge, skills, and attitudes that enable them to become a positive influence in the community. Staff, students and members of the community celebrate student achievement so that the students may achieve their personal best in a united, challenging, Christ-centred environment, promoting justice for all.

We actively nurture the belief that decisions which individuals make are founded not just on the knowledge they have gained, but also on the values they hold to be important thus developing holistic growth of the individual. At St. John’s, values that are commonly held by the Christian Catholic faith community in Australia are promoted. The St. John’s vision statement influences all teaching and learning:

Plant the Seed
Nurture the Growth
Celebrate the Harvest

Through this focus students are helped to develop a comprehensive understanding of the relationship between God, their Catholic faith and their personal development and wellbeing as well as fostering their role as stewards over the world, which God’s love continues to entrust us. Social justice issues are presented to the students in a way so as to promote the fundamental Christian Catholic gospel value that ‘all humankind are made in the image and likeness of God’ and as such deserve to be treated fairly and justly. The St. John’s community, through genuine positive relationships, shared beliefs, Gospel values and common goals, participates in the evangelical mission of the church.

ABORIGINAL AND TORRES STRAIT ISLANDER HISTORIES AND CULTURES

Active engagement of inclusive curriculum practices which reflect Aboriginal and Torres Strait Islander perspectives, knowledge, histories, cultures and spirituality. A genuine commitment to
Reconciliation, guided by principles of personal dignity, social justice and equity reflects the Gospel message and the mission of the Church.

The curriculum provides opportunities to value and respect:

1. traditional knowledge and practices
2. culture and natural heritage
3. spirituality

and to critically examine and/or challenge:

1. social constructs
2. prejudice and racism

Through the teaching of science students will experience opportunities to learn that Aboriginal and Torres Strait Islander Peoples have developed knowledge about the world through observation, using all the senses; through prediction and hypothesis; through testing (trial and error); and through making generalisations within specific contexts. These scientific methods have been practised and transmitted from one generation to the next. Students will develop an understanding that Aboriginal and Torres Strait Islander Peoples have particular ways of knowing the world and continue to be innovative in providing significant contributions to development in science. They will investigate examples of Aboriginal and Torres Strait Islander science and the ways traditional knowledge and western scientific knowledge can be complementary.

Asia and Australia’s engagement with Asia

This perspective requires students to develop skills, knowledge and understandings related to Asia and Australia’s engagement with Asia.

The curriculum provides opportunities to know, understand and be able to:

1. Understand ‘Asia’
2. Develop informed attitudes and values
3. Know about contemporary and traditional Asia
4. Connect Australia and Asia
5. Communicate effectively with people of the Asian region both within and outside Australia confidently

Through the teaching of science students will experience opportunities to appreciate that the Asia region plays an important leadership role in addressing significant contemporary global challenges related to climate change, biodiversity and genetic engineering. Students recognise that people from the Asia region have made and continue to make significant contributions to the application of technology in industry and everyday life.

This learning area allows students to understand that the Asia region includes diverse environments and to appreciate that interaction between human activity and these environments continues to influence the region, including Australia, and has significance for the rest of the world.
SUSTAINABILITY

Education for sustainability develops the knowledge, skills and values necessary for people to act in ways that contribute to more sustainable patterns of living. It is futures-oriented, focusing on protecting environments and creating a more ecologically and socially just world through action that recognises the relevance and interdependence of environmental, social, cultural and economic considerations. The curriculum provides opportunities to reflect upon:

1. the gift of creation
2. an attitude of responsible stewardship

and to critically examine and/or challenge:

1. the impact of human interaction with the natural, built and social environment
2. current environmental issues

Through the teaching of science students will experience opportunities to appreciate how people forecast change and plan the actions necessary to shape more sustainable futures, including the design, construction and/or management of the physical and social environment. By providing a focus on change in systems, its causes and consequences, the sustainability priority assists students to relate learning across the strands of science.

At St. John’s science is valued as a curriculum area in which students are able to develop their understandings of the environment. The St. John’s science curriculum seeks to foster a positive attitude in students towards the earth and the life it supports. Students are encouraged to discuss ways that ecological sustainability can be promoted. Through the delivery of the science curriculum students are provided with access to current information about environmental issues of a personal, local, national and global nature. Students have opportunities to discuss, reflect upon and develop responsive attitudes towards stewardship of the gifts of creation.

SOCIAL EMOTIONAL LEARNING

Social and emotional competencies are integral to academic and work success and are the basis of resilience, relational quality and social capital.

The curriculum provides opportunities to develop:

1. Self Awareness
2. Social Awareness
3. Responsible Decision Making
4. Self-Management
5. Relationship Management

Through the teaching of science students will experience opportunities to
• Recognise and manage emotions
• Develop caring and concern for others
• Make responsible decisions
• Establish positive relationships, and handle challenging situations effectively

SEL is fundamental to children’s social and emotional development, their health, ethical development, citizenship, academic learning, and motivation to achieve success in sustainable science.

Teachers incorporate the social, emotional and personal learning values, goals and standards in the planning phase of science units. The five keys to help students develop social emotional skills in science are:

1. Emotional Resilience
2. Getting Along
3. Organisation
4. Persistence
5. Confidence

INCLUSIVE EDUCATION

It is by the quality of interactions and relationships that all students learn to understand and appreciate difference, to value diversity and learn to respond with dignity and respect to all through mutually enriching interactions.

The curriculum provides equitable access for and/or positive interactions with students from different backgrounds and with diverse needs and abilities.

At St. John’s School all students are provided with equal opportunity to engage learning in the learning area of science. This includes students with physical or intellectual disabilities; those with learning difficulties; students who experience poverty, abuse, neglect or isolation; those who have emotional or behavioural difficulties as well as students with particular gifts and talents. Teachers are required to make modifications to lessons to support these particular students and enable them to reach their full potential in science education.

5. GENERAL CAPABILITIES

General capabilities encompass skills, behaviours and dispositions that students develop and apply to content knowledge and that support them in becoming successful learners, confident and creative individuals and active and informed citizens.

Throughout their schooling students develop and use these capabilities in their learning across the curriculum, in co-curricular programs and in their lives outside school.
**LITERACY**

Students become literate as they develop the skills to learn and communicate confidently at school and to become effective individuals, community members, workers and citizens. These skills include listening, reading, viewing, writing, speaking and creating print, visual and digital materials accurately and purposefully within and across all learning areas.

Literacy involves students engaging with the language and literacy demands of each learning area.

As they become literate students learn to:

- interpret, analyse, evaluate, respond to and construct increasingly complex texts (Comprehension and composition)
- understand, use, write and produce different types of text (Texts)
- manage and produce grammatical patterns and structures in texts (Grammar)
- make appropriate word selections and decode and comprehend new (basic, specialised and technical) vocabulary (Vocabulary)
- use and produce a range of visual materials to learn and demonstrate learning (Visual information)

**NUMERACY**

Students become numerate as they develop the capacity to recognise and understand the role of mathematics in the world around them and the confidence, willingness and ability to apply mathematics to their lives in ways that are constructive and meaningful.

As they become numerate, students develop and use mathematical skills related to:

- Calculation and number
- Patterns and relationships
- Proportional reasoning
- Spatial reasoning
- Statistical literacy
- Measurement

**INFORMATION AND COMMUNICATION TECHNOLOGY**

Students develop ICT competence when they learn to:

- Investigate with ICT: using ICT to plan and refine information searches; to locate and access different types of data and information and to verify the integrity of data when investigating questions, topics or problems
• Create with ICT: using ICT to generate ideas, plans, processes and products to create solutions to challenges or learning area tasks
• Communicate with ICT: using ICT to communicate ideas and information with others adhering to social protocols appropriate to the communicative context (purpose, audience and technology)
• Operate ICT: applying technical knowledge and skills to use ICT efficiently and to manage data and information when and as needed
• Apply appropriate social and ethical protocols and practices to operate and manage ICT.

**CRITICAL AND CREATIVE THINKING**

Students develop critical and creative thinking as they learn to generate and evaluate knowledge, ideas and possibilities, and use them when seeking new pathways or solutions. In learning to think broadly and deeply students learn to use reason and imagination to direct their thinking for different purposes. In the context of schooling, critical and creative thinking are integral to activities that require reason, logic, imagination and innovation.

As they develop critical and creative thinking students learn to:

• pose insightful and purposeful questions
• apply logic and strategies to uncover meaning and make reasoned judgments
• think beyond the immediate situation to consider the ‘big picture’ before focusing on the detail
• suspend judgment about a situation to consider alternative pathways
• reflect on thinking, actions and processes
• generate and develop ideas and possibilities
• analyse information logically and make reasoned judgments
• evaluate ideas and create solutions and draw conclusions
• assess the feasibility, possible risks and benefits in the implementation of their ideas
• transfer their knowledge to new situations

**ETHICAL BEHAVIOUR**

Students develop ethical behaviour as they learn to understand and act in accordance with ethical principles. This includes understanding the role of ethical principles, values and virtues in human life; acting with moral integrity; acting with regard for others; and having a desire and capacity to work for the common good.

As they develop ethical behaviour students learn to:

• recognise that everyday life involves consideration of competing values, rights, interests and social norms
- identify and investigate moral dimensions in issues
- develop an increasingly complex understanding of ethical concepts, the status of moral knowledge and accepted values and ethical principles
- explore questions such as:
  - What is the meaning of right and wrong and can I be sure that I am right?
  - Why should I act morally?
  - Is it ever morally justifiable to lie?
  - What role should intuition, reason, emotion, duty or self-interest have in ethical decision making?

### PERSONAL AND SOCIAL COMPETENCE

Students develop personal and social competence as they learn to understand and manage themselves, their relationships, lives, work and learning more effectively. This involves recognising and regulating their emotions, developing concern for and understanding of others, establishing positive relationships, making responsible decisions, working effectively in teams and handling challenging situations constructively.

As they develop personal and social competence students learn to:

- recognise and understand their own emotions, values and strengths, have a realistic assessment of their own abilities and a well-grounded sense of self-esteem and self-confidence (Self-awareness)
- manage their emotions and behaviour, persevere in overcoming obstacles, set personal and academic goals, develop self-discipline, resilience, adaptability and initiative (Self-management)
- perceive and understand other people’s emotions and viewpoints, show understanding and empathy for others, identify the strengths of team members, define and accept individual and group roles and responsibilities, be of service to others (Social awareness)
- form positive relationships, manage and influence the emotions and moods of others, cooperate and communicate effectively with others, work in teams, build leadership skills, make decisions, resolve conflict and resist inappropriate social pressure (Social management).

### INTERCULTURAL UNDERSTANDING

Students develop intercultural understanding as they learn to understand themselves in relation to others. This involves students valuing their own cultures and beliefs and those of others, and engaging with people of diverse cultures in ways that recognise commonalities and differences, create connections and cultivate respect between people.

As they develop intercultural understanding students learn to:
• identify increasingly sophisticated characteristics of their own cultures and the cultures of others
• recognise that their own and others’ behaviours, attitudes and values are influenced by their languages and cultures
• consider what it might be like to ‘walk in another’s shoes’
• compare the experiences of others with their own, looking for commonalities and differences between their lives and seeking to understand these
• reflect on how intercultural encounters have affected their thoughts, feelings and actions
• accept that there are different ways of seeing the world and live with that diversity
• stand between cultures to facilitate understanding
• take responsibility for developing and improving relationships between people from different cultures in Australia and in the wider world
• contribute to and benefit from reconciliation between Indigenous and non-Indigenous Australians.
6. SEQUENCE AND SCOPE

For a copy of the Australian Curriculum – Science Scope and Sequences see Appendix 1 of this document. Scope and sequence for Science can also be downloaded from:

http://www.australiancurriculum.edu.au/Science/Curriculum/F-10

Whole School Science Primary Connections Unit Overview

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<th>Year</th>
<th>Biological science</th>
<th>Chemical science</th>
<th>Earth and space science</th>
<th>Physical science</th>
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</thead>
<tbody>
<tr>
<td>Prep</td>
<td>Staying alive</td>
<td>What’s it made of?</td>
<td>Weather in my world</td>
<td>On the move</td>
</tr>
<tr>
<td>1</td>
<td>Schoolyard safari</td>
<td>Spot the difference</td>
<td>Up, down and all around</td>
<td>Sounds sensational</td>
</tr>
<tr>
<td>2</td>
<td>Watch it grow</td>
<td>All mixed up</td>
<td>Water works</td>
<td>Push pull</td>
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<tr>
<td>3</td>
<td>Feathers, fur or scales</td>
<td>Melting moments</td>
<td>Spinning in space</td>
<td>Heat</td>
</tr>
<tr>
<td>4</td>
<td>Plants in action</td>
<td>Material world/Package it better</td>
<td>Beneath our feet</td>
<td>Smooth moves</td>
</tr>
<tr>
<td>5</td>
<td>Adaptations</td>
<td>Solids, liquids and gases</td>
<td>Earth’s place in space</td>
<td>Light fantastic</td>
</tr>
<tr>
<td>6</td>
<td>Marvellous micro-organisms</td>
<td>Change detectives</td>
<td>Earthquake explorers</td>
<td>Essential energy/It’s electrifying</td>
</tr>
<tr>
<td>7</td>
<td>Teachers of grade 7 will be required to create units for each strand that satisfy the requirements of the National Curriculum for Science (refer to scope and sequence). These units should follow the SE’s inquiry model.</td>
<td></td>
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</tr>
</tbody>
</table>
STATEMENT OF AGREED PRACTICE FOR LEARNING AND TEACHING EXPERIENCES

Our school vision is:

PLANT THE SEED,

NUTURE THE GROWTH,

CELEBRATE THE HARVEST

Our pedagogical principle is:

ALWAYS REACHING FOR NEW HEIGHTS

Science at St. John’s School is taught for 1 hour each week in prep/1/2, 1.5 hours in classes 3 to year 6 and for 2.5 hours in grade 7.

Teachers at St John’s teach science through the 5 E’s process which is embedded in Primary Connections Units of work. If these units are not being used teachers are still expected to develop units using this process.

Teachers plan units of work in science using the school based planning proformas that meet the requirements stipulated in the diocesan ‘A Way Forward’ document and align with the Diocesan Learning and Teaching Policy

When planning mathematics, teachers are required to complete the following components:

1. A unit overview
2. Weekly Planning
3. Assessment task sheet
4. Criteria sheet

A unit planning document proforma can be found in appendix 2.

This planning document is required to be submitted to the Curriculum Support teacher by week 3 of each term and again at the end of term. Planning will be digitally stored on the school server (Teachers drive – Teaching Programs) and it is the responsibility of the teacher to upload their planning with evaluations added.

Evidence of the St. John’s learning and teaching philosophy will be found not only in planning but also in classroom displays, student portfolios, work samples and student contribution to assemblies.
The teachers and students will have an opportunity to experience the following throughout the learning and teaching process at St. John’s. In this way we are able to see that science is assisting us in meeting our vision for our students.

<table>
<thead>
<tr>
<th>Plant the Seed</th>
<th>Nurture the Growth</th>
<th>Celebrate the Harvest</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Goal setting</td>
<td>• Developing patience</td>
<td>• Portfolios</td>
</tr>
<tr>
<td>• Caring about my work</td>
<td>• Developing persistence</td>
<td>• Caring about my work</td>
</tr>
<tr>
<td>• Individual education programs</td>
<td>• Developing resistance</td>
<td>• Varied assessment tasks</td>
</tr>
<tr>
<td>• Expectation of best work</td>
<td>• Developing attitude of tolerance and patience</td>
<td>• Rubrics</td>
</tr>
<tr>
<td>• Differentiated curriculum</td>
<td>• Acknowledging individually</td>
<td>• Presentation night celebration</td>
</tr>
<tr>
<td>• Working and planning in Southern Cluster</td>
<td>• Differentiated curriculum</td>
<td>• Assemblies</td>
</tr>
<tr>
<td>• Integrated curriculum</td>
<td>• Student Directed Learning</td>
<td>• Meaningful P&amp;F and staff meetings</td>
</tr>
<tr>
<td>• Professional development</td>
<td>• Online learning</td>
<td>• Celebrate successes and growth</td>
</tr>
<tr>
<td>• Interschool visits</td>
<td>• Blooms taxonomy</td>
<td>• My classes</td>
</tr>
<tr>
<td>• Effective communication with parents, students and the wider community</td>
<td>• David Langford tools</td>
<td>• Authentic assessment</td>
</tr>
<tr>
<td>• Positive teacher-student-parent relationships</td>
<td>• Independent thinking</td>
<td>• Positive teacher-student-parent relationships</td>
</tr>
<tr>
<td>• A culture of understanding</td>
<td>• Team spirit</td>
<td>• Higher level thinking – productive pedagogies</td>
</tr>
<tr>
<td></td>
<td>• Co-operative learning strategies</td>
<td>• Multiple intelligences</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Homework</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Consistent expectations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Inclusive teaching and learning practices</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Parents assisting in the classroom</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• CSIRO Visiting workshop</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• My classes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Positive teacher-student-parent relationships</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Strong work ethic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Self-motivated learners</td>
</tr>
</tbody>
</table>

**SAFETY**

At St. John’s safe practices and a positive attitude to safety are paramount in science teaching and learning. Teachers are required to address safety issues in science lessons for example pre-trialling experiments involving unfamiliar equipment and materials and wearing plastic gloves if
handling soil. Students are encouraged to follow a set of safe practice guidelines in each classroom developed in collaboration with the class teacher.

8. RESOURCES

A list of St John’s Science Resources can be found in appendix 3

9. ASSESSMENT AND REPORTING

ASSESSMENT

At St. John’s Assessment and Reporting represents our commitment to the dignity of the individual. Our Vision Statement lies at the centre of all our assessment decisions, we:

**Plant the Seed, Nurture the Growth, and Celebrate the Harvest.**

Assessment is the process by which pupil achievement is measured. It involves identifying, gathering and interpreting information, and making judgements about how satisfactorily students have mastered a skill and achieved National Curriculum Standards. Assessment and reporting should be part of the total learning experience of the individual and should be consistent with the School’s Mission Statement.

Thus, assessment and reporting should:

- Inform teaching practice
- Assist each child to develop his/her full potential
- Acknowledge and develop the dignity and worth of each individual learner
- Be relevant, flexible and challenging leading to the development of self-esteem
- Be consistent with Gospel values of equality and justice
- Be honest and accurate
- Be stated in positive language
- Be easily understood and presented
- Be concise
- Demonstrate consistent presentation across the school

PURPOSE OF ASSESSMENT

The purpose of assessment at St. John’s is to reflect consistency with the school goals, general policies and to reflect current National Curriculum Standards and content by:

Appraising the achievement of individual students, in order to develop:

- Student potential e.g. reasoning powers
• A plan for future activities and student development
• An incentive for learning
• A positive attitude and self-esteem.
• Diagnosing learning difficulties and gifts and talents of individual students.
• Gauging the effectiveness of:
• Student learning and teaching programs
• The program of work presented through teacher self-evaluation.
• Providing information to students, parents/guardians and significant others.

WHAT DO WE ASSESS?

Teachers need to assess student learning across all interrelating strands of the Australian Curriculum – Science

• Science Understanding
  Substrands: Biological, Chemical, Earth and Space, Physical Sciences
• Science Inquiry skills
• Science as a Human Endeavour

Understanding the Australian Curriculum standards is paramount in developing an overall understanding of assessment. Student achievement is assessed against the achievement standards which describe the standard expected at the end of each year of learning.

TYPES OF ASSESSMENT

Assessment is an integral part of the learning process and should include:

• Assessment for Learning
• Assessment of Learning
• Assessment as Learning

Assessment FOR learning

This type of assessment occurs when teachers use inferences about student progress to inform their teaching. It is frequent, formal or informal (e.g. quality questioning, anecdotal notes, written comments), embedded in teaching and provides clear and timely feedback that helps students in their learning progression.

It has a formative use providing evidence that informs, or shapes, short term planning for learning. The key assessor is the teacher.

Assessment AS learning
This type of assessment occurs when students reflect on and monitor their progress to inform their future learning goals. It is regularly occurring, formal or informal (e.g. peer feedback buddies, formal self assessment) and helps students take responsibility for their own past and future learning.

It builds meta-cognition as it involves students in understanding the standards expected of them, in setting and monitoring their own learning goals, and in developing strategies for working towards achieving them.

The key assessor is the learner.

**Assessment OF learning**

This type of assessment occurs when teachers use evidence of student learning to make judgements on student achievement against goals and standards.

It is usually formal, frequently occurring at the end of units of work where it sums up student achievement at a particular point in time (i.e. is summative).

It is often organised around themes or major projects and judgements may be based on student performance on multi-domain assessment tasks.

It shows how students are progressing against the Standards and provides evidence to inform long term planning. The key assessor is the teacher or system.

**QUALITY ASSESSMENT**

At St. John’s teachers use the following principles of quality assessment to plan their assessment.

Quality Assessment:

*Emphasises the interactions between learning and manageable assessment strategies that promote learning*

- In practice, this means:
- Teachers reflect on the purposes of assessment and on their assessment strategies.
- Assessment activities allow for demonstration of learning outcomes.
- Assessment is embedded in learning activities and informs the planning of future learning activities.
- Teachers use assessment to identify what a student can already do.

*Clearly expresses for the student and teacher the goals of the learning activity*

In practice, this means:
• Students understand the learning goals and the criteria that will be applied to judge the quality of their achievement.
• Students receive feedback that helps them make further progress.

_Reflects a view of learning in which assessment helps students learn better, rather than just achieve a better mark_

In practice, this means:

• Teachers use tasks that assess, and therefore encourage, deeper learning.
• Feedback is provided in a way that motivates the learner and helps students to understand that mistakes are a part of learning and can lead to improvement.
• Assessment is an integral component of the teaching-learning process rather than being a separate activity.

_Provides ways for students to use feedback from assessment_

In practice, this means:

• Feedback is directed to the achievement of standards and away from comparisons with peers.
• Feedback is clear and constructive about strengths and weaknesses.
• Feedback is individualised and linked to opportunities for improvement.

_Helps students take responsibility for their own learning_

In practice, this means:

• Assessment includes strategies for self-assessment and peer assessment emphasising the next steps needed for further learning.

_Is inclusive of all learners_

In practice, this means:

• Assessment against standards provides opportunities for all learners to achieve their best.
• Assessment activities are free of bias.
ASSESSMENT STRATEGIES

At St. John’s teachers have agreed to use a range of Quality Assessment Strategies to inform their teaching and learning practices. The following table is a selection of assessment strategies used at St John’s.

<table>
<thead>
<tr>
<th>• Prediction</th>
<th>• Samples of students’ work</th>
<th>• Explanation and demonstration to others</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Verbal responses</td>
<td>• Practical tasks such as measurement activities</td>
<td>• Investigations and/or projects</td>
</tr>
<tr>
<td>• Retelling</td>
<td>• Short quizzes</td>
<td>• Pen-and-paper tests</td>
</tr>
<tr>
<td>• Cloze</td>
<td>• Observation of students’ participation in a group activity</td>
<td>• Teacher/student discussion or interviews</td>
</tr>
<tr>
<td>• Checklists</td>
<td>• Students’ journals and comments on the process of their solutions</td>
<td>• Graphing</td>
</tr>
<tr>
<td>• Teacher-made tests</td>
<td>• Matching questions with answers</td>
<td>• Developing concept maps</td>
</tr>
<tr>
<td>• Standardised tests</td>
<td>• Labelling a diagram or model</td>
<td>• Completing timelines</td>
</tr>
<tr>
<td>• Response logs</td>
<td>• Data collection</td>
<td>• Problem-solving</td>
</tr>
<tr>
<td>• Writing logs</td>
<td>• Research projects</td>
<td>• Critical dialogue</td>
</tr>
<tr>
<td>• Conferences</td>
<td>• Debating</td>
<td>• Creating posters</td>
</tr>
<tr>
<td>• Running records</td>
<td>• Performances</td>
<td>• Letter-writing</td>
</tr>
<tr>
<td>• Story maps</td>
<td>• Multimedia presentations</td>
<td>• Skills checklists</td>
</tr>
<tr>
<td>• Discussion</td>
<td>• Role plays</td>
<td>• Activity journals</td>
</tr>
<tr>
<td>• Miscue analysis</td>
<td>• Peer assessment</td>
<td>• Action plans</td>
</tr>
<tr>
<td>• Questions posed by students</td>
<td>• Self assessment</td>
<td>• Students’ oral and written reports</td>
</tr>
<tr>
<td>• Comprehension and interpretation exercises</td>
<td>• Observation of students during learning activities, including listening to students’ use of language</td>
<td>• Students’ plans for and records of their solutions of problems</td>
</tr>
</tbody>
</table>

Assessment Timeline

Teachers design their Assessment Overviews and Plans in Weeks 1-3 of each term. This plan outlines the assessment for and of learning to be conducted within each teaching program. It should reflect a range of assessment strategies including formal and informal, self and peer evaluations.

The Principal/Curriculum Support Teacher in Week 4 of each term reviews these Assessment Plans alongside the teacher’s unit plans.
Teachers are also provided with a continuous assessment checklist book each year to record assessment data and this is submitted at the end of each year for checking by the Principal/Curriculum Support Teacher and archived.

These Assessment Records are used to assist teachers to make an informed, on-balance judgement about how well each student has achieved against the National Curriculum standards for each Learning Area. This on-balanced judgment is expressed using an A-E Scale.

This judgement is used for the ongoing reporting to parents, including formal school reports at the end of Semester 1 and 2.

**WRITTEN AND ORAL REPORTING**

On-Track reporting software is utilised by St. John’s to formally report on student achievement in terms 2 and 4. In addition 3-way conferences are used to provide feedback to parents and students in terms 1 and 3. These processes are supplemented by informal feedback to parents on an as needs basis.

Teachers maintain an assessment schedule in their term program to highlight the timing of significant assessment tasks. Assessment task sheets provide a detailed summary of the assessment task criteria. Criteria sheets/rubrics are an integral component of major assessment tasks at St. John’s. It is preferred that criteria sheets utilise A-E standard descriptors. Student achievement in assessment tasks is maintained in teacher programs as assessment results. A hard copy of student reports is archived on the school premises until the student reaches the age of 25 years. Additional student samples are also archived into student archive folders annually. A copy of the student archive folder recording sheet can be found in appendix 4.

Student portfolios further supplement the reporting process at St. John’s. Student portfolios typically contain samples of student work and major assessment tasks selected from semester 1 and semester 2 in all KLA’s. Student portfolios are representative of student achievement throughout the school year. The portfolio is presented to parents during semester 2.

The presentation evening at the end of the school year acknowledges student achievement in the following categories:

- Spirituality
- SEL awards
- Sporting awards
• Academic achievement awards
• Academic improvement awards

Students with a disability who are unable to access any of the learning areas with their same age-cohort peers will receive a modified report that shows achievement ratings against learning areas indicated in their individual goals.

Parents of students who are engaged in individualised education programs receive regular feedback and support from the classroom and learning support teachers.

St John’s participates in Consistency of Teacher Judgement professional development every year. This provides a forum for St. John’s teachers to compare student work samples with teachers from other schools in the Southern Cluster in order to achieve consistency in grading student work samples.

The national assessment program is used as a supplementary measure of student performance of a broad range of educational outcomes to inform the teaching and learning process at St. John’s. The national testing program provides student performance information to students, teachers, parents and the St John’s community about how our students are performing against the national benchmarks for literacy and numeracy. The NAPLAN results provide a measure of how St. John’s students are performing in the areas of reading, writing, spelling and numeracy. Specifically the NAPLAN report is used at St. John’s for:

• Individual student reporting to parents
• St John’s reporting to the community
• Aggregate reporting against national standards.

Queensland Comparable Assessment Tasks (QCATs) are also utilised to inform teacher judgement of student achievement in years 4 and 6 in English, Science, and Mathematics. QCATs are authentic performance based assessment tasks. St John’s students in years 4 and 6 participate in the QCATs on an annual negotiated basis. Parents receive a formal QCAT report of their child’s achievement on these tasks.
Year 2 students who have not achieved phase C of the developmental continua also participate in the Year 2 Diagnostic Net. Children who do not pass the Year 2 net receive additional funded support.

10. EVALUATION

Evaluation occurs in three ways:

- Evaluation of planning by the teacher/learning area coordinator
- Evaluation of learning and teaching strategies/resources etc
- Evaluation of the school curriculum document to ensure it reflects current understandings and practices.

Evaluation is the process of making judgements about the effectiveness of curriculum documents, teaching programs, procedures and resources. Evaluation is an inherent part of our professional lives as teachers and as a school. Evaluation occurs in three ways:

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- Evaluation of learning and teaching strategies/resources etc
- Evaluation of the school curriculum document to ensure it reflects current understandings and practices.

Evaluation is the process of making judgements about the effectiveness of curriculum documents, teaching programs, procedures and resources. Evaluation is an inherent part of our professional lives as teachers and as a school.

EVALUATION OF PLANNING BY THE TEACHER/LEARNING AREA COORDINATOR

The Curriculum Support Teacher/Principal evaluates the teachers’ planning at the beginning of each term. The Curriculum Support Teacher/Principal provides feedback to the teachers using the Teacher Program Supervision proforma located in appendix section 5.

EVALUATION OF LEARNING AND TEACHING STRATEGIES/RESOURCES ETC

The Curriculum Support Teacher/Principal evaluates the teachers’ planning at the beginning of each term. The Curriculum Support Teacher/Principal provides feedback to the teachers using the Teacher Program Supervision proforma located in appendix section 5.

Teachers are also provided with a continuous assessment checklist book each year to record assessment data and this is submitted at the end of each year for checking by the Principal/Curriculum Support Teacher and archived. These Assessment Records are used to assist teachers to make an informed, on-balance judgment about how well each student has achieved...
against the National Curriculum standards for each Learning Area. This on-balanced judgment is expressed using an A-E Scale. This judgment is used for the ongoing reporting to parents, including formal school reports at the end of Semester 1 and 2.

Teachers reflect on and evaluate their unit plans at the end of each unit. Recommended modifications are made to improve each unit and digital copies of each unit are amended with suggestions accordingly. Paper copies are archived and digital copies are stored on the server and ‘myclasses St John’s curriculum page’.

Resources will be added to the schools mathematics resources stock as each term progresses and teachers make recommendations regarding the purchasing of appropriate equipment and books.

**EVALUATION OF THE SCHOOL CURRICULUM DOCUMENT TO ENSURE IT REFLECTS CURRENT UNDERSTANDINGS AND PRACTICES**

This Science curriculum document has been evaluated and updated throughout 2011. As the school implements the National Curriculum – Science in 2012, this document will undergo further evaluation.