

In accordance with the St Mary's School Vision and Mission Statement, our Science and Technology policy recognizes that:

- The study of Science and Technology involves the students experiencing and using the processes of investigating, designing, making and using technology. Science is approached through observing, measuring, classifying, questioning, experimenting, predicting, planning, recording, communicating and formulating conclusions. Skill development is based on practical, hands on experiences and directed at the child's level of development. (Primary Connections, 2008).
- We the teachers of St Mary's Primary School, recognize the nature of the learner and the needs of the diverse learning group. We aim to foster in our school community, justice, peace and the development of self and others.
- We aim to create in our students an awareness of being called to improve society, just as Jesus did, by helping students to operate flexibly, autonomously and responsibly.
- We seek to develop within students positive feelings towards themselves, other
- People and the environment, by inspiring an awe of God's creation and an understanding of themselves as unique persons, with a responsibility to protect and nurture the environment.

The Science program at St Mary's is based on Primary Connections units. The science program incorporates the Quality Teaching Framework (QTF). The QTF provides a consistent pedagogical framework within which all NSW teachers and schools can operate.

EXIT OUTCOMES

As a result of seven years of primary schooling at St Mary's the students should have:

Knowledge and understanding of:

- Biological science (PC)
- Chemical science (PC)
- Earth and space science (PC)
- Physical science (PC)
- An inquiry approach to learning. Students' questions become the focus for student-planned investigations and the basis for developing scientific explanations. (Primary Connections, 2008).
- Questioning and predicting: Identifying and constructing questions, proposing hypotheses and suggesting possible outcomes.
- Planning and conducting: Making decisions regarding how to investigate or solve a problem and carrying out an investigation, including the collection of data.
- Processing and analysing data and information: Representing data in meaningful and useful ways; identifying trends, patterns and relationships in data, and using this evidence to justify conclusions.
- Evaluating: Considering the quality of available evidence and the merit or significance of a claim, proposition or conclusion with reference to that evidence.

- Communicating: Conveying information or ideas to others through appropriate representations, text types and modes. (ACARA Australian Curriculum, Assessment and Reporting Authority.)
- Skills/Science Inquiry Skills to:
 - Consider different points of view and develop solutions to problems.
 - Share knowledge, ideas and experience.
 - Develop social skills of sharing, leading, communicating, building trust and managing conflict.
 - Place in context “a range of contemporary and sensitive issues from a Catholic perspective”. (Treasures New and Old Core Document 926).
 - Develop an understanding of the subject-specific vocabulary and design features of genres of science.
- Values and attitudes:
 - Towards themselves so that the children will grow in self-worth and integrity
 - Towards others with a tolerance and understanding of other cultures
 - Towards science and technology where they understand, appreciate and preserve our environment.
 - Towards the connection of science to students’ everyday lives and local communities.

Through the interaction with the above content strands and values students will have had the opportunity to engage in the learning processes of Science and Technology. “They will be provided with opportunities to develop a moral sensitivity and a heightened capacity to distinguish between what is life giving and what is dehumanising.” (Treasures New and Old Core Document.p24).

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. (ACARA Australian Curriculum, Assessment and Reporting Authority.)

At St Mary’s students will be encouraged to address community values and be responsive to local community concerns. We at St Mary’s accept that Science is not just a body of knowledge but is also a process of investigation. “Science seeks to be objective none the less, as a human endeavour it is affected by human values”. (P1 Science and Technology Syllabus and Support Document.)

The students will be encouraged to interact with the world around them through developing knowledge, concepts and skills which incorporate observation, systematic analysis and careful recording of information gathered.

Primary Connections is based on an inquiry-orientated teaching and learning model where students have the opportunity to represent and re-represent their developing understanding. (Primary Connections, 2008).

Teaching and learning progresses through (5 E's) five phases: Engage, Explore, Explain, Elaborate and Evaluate.

- Engage: Engage students and elicit prior knowledge.
- Explore; Provide hands-on experience of the phenomenon.
- Explain: Develop scientific explanations for observations and represent developing conceptual understanding.
- Elaborate: Extend understanding to a new context or make connections to additional concepts.
- Evaluate: Students re-represent their understandings and reflect on their learning journey

As students move through the process of inquiry, they can draw on several ways of investigating and expressing their growing understandings – integrating skills and content from multiple disciplines or learning areas.

Inquiry learning emphasises process as well as product, moving away from the acquisition of facts to the development of understandings about concepts and generalisations. Inquiry learning develops students' investigative and thinking skills and contributes to their ability to participate effectively in society. It can also contribute to enhancing self-esteem by encouraging students to take responsibility for their own learning.

AIMS

The aim of Science & Technology at St. Mary's is to develop students' competence, confidence, social skills and responsibility in their interactions in this K.L.A. leading to:

- An enriched view of themselves, society, the environment and the future
- An enthusiasm for further learning of Science and Technology
- Providing opportunities for them to develop independent rational thought and responsible actions.
- Engage in learning experiences that will enable them to develop positive and informed values and attitudes.
- Provide students with opportunities to explore the way science is used in the real world and develop students' scientific literacy as they come to understand and appreciate the way science influences society. (Primary Connections, 2008).

OUTCOMES

St. Mary's Science and Technology Policy and Programs are directly linked to Primary Connections.

Primary Connections and the Australian Curriculum

The science content includes the three strands of Science Understanding, Science Inquiry

Skills and Science as a Human Endeavour. The three strands of the curriculum are interrelated and their content is taught in an integrated way.

Science Understanding

Biological sciences

- Living things have basic needs, including food and water
- Chemical sciences
- Objects are made of materials that have observable properties
- Earth and space sciences
- Daily and seasonal changes in our environment, including the weather, affect everyday life
- Physical sciences
- The way objects move depends on a variety of factors, including their size and shape

Science as a Human Endeavour

Nature and development of science

- Science involves exploring and observing the world using the senses

Use and influence of science (Years 1 to 6)

Scientific understandings, discoveries and inventions are used to solve problems that directly affect peoples' lives

Scientific knowledge is used to inform personal and community decisions

Science Inquiry Skills

Questioning and predicting

- Respond to questions about familiar objects and events

Planning and conducting

- Explore and make observations by using the senses

Processing and analysing data and information

- Engage in discussions about observations and use methods such as drawing to represent ideas

Communicating

- Share observations and ideas.

COURSE DESCRIPTION

At St Mary's Primary Connections units are used for teaching and learning in Science and Technology. The Primary Connections units are aligned with the rationale and aims of the Australian Curriculum for Science. It will support its national implementation by continuing to provide an innovative, inquiry-based program linking the teaching of science with literacy. The new NSW Board of Studies Science Syllabus which is to be released in 2013 will be guided by the Australian Curriculum requirements.

All teachers then plan and program units of work using the outcomes and indicators directly from the Primary Connections Units.

TIME ALLOCATION

It is expected at St Mary's Primary School, that Science and Technology be taught for approximately:

Early Stage 1- 40 minutes- 60 minutes – per week.

Stage 1- 40 minutes- 60 minutes – per week.

Stage 2- 60 minutes – per week.

Stage 3 – 60 minutes – per week.

In addition to this time each Class has an allocated time to go to the Computer Lab each week where they have access to all Computer Resources.

Early Stage One – _approx.. 30 – 40 minutes per week

Stage One – _approx.. 45 – 50 minutes per week

Stage Two and Three – _approx.. 45 – 60 minutes per week

Teachers and students also utilize the laptops and other computers within their classroom.

SCOPE AND SEQUENCE

- In addition to the Content Focus Teachers will choose appropriate Learning Processes and Primary Connections units and their current state of alignment with the Australian Curriculum.

	Term 1	Term 2	Term 3	Term 4
Kinder				
Year 1	What's it made of?	Weather in my World	Staying Alive!	On the Move
Year 2	Push-pull	Water works	Watch it grow	All mixed up
Year 3	Feathers, fur or leaves?	Melting moments	Heating Up	Night and day
Year 4	Friends of foes?	Plants in action	Smooth moves	Package it Better
Year 5	Desert survivors	What's the matter	Earth's place in space	Light shows
Year 6	Earthquake explorers	Electricity	Change detectives	Micro-organisms

- In addition to the content focus teachers will choose appropriate learning processes and Value Outcomes for each individual unit that is programmed.

AGREED PRACTICE FOR TEACHING AND LEARNING

Our aim at St. Mary's is to plan units of work in Science and Technology which follow sequentially across the stages and integrate with other key learning areas, where possible. Teachers at St Mary's, programme teaching and learning outcomes and indicators from the NSW Board of Studies Syllabus of Science and Technology.

We at St. Mary's agree that in our teaching and learning we will engage students in:

- Developing their knowledge and understanding of appropriate Content strand areas
- Developing investigating, designing and making, reporting and recording and using technology skills.
- Encourage 'Hands-on' experiences to compliment other teaching and learning strategies.
- Promote participation in Environmental activities – For example: Clean up Australia, Tidy Towns, class clean up areas.

St. Mary's offers the students the opportunity to participate in:

- University of NSW Science and Technology Competition (Years 3 – 6)
- University of NSW Computer Skills Competition (Years 3 – 6)
- School Excursions
- Regular access to Computers, including software programs and the internet (Allocated class time and lunch time).

An invaluable resource regarding Teaching and Learning Strategies is the Archdiocese of Canberra and Goulburn Treasures New and Old Religious Education Curriculum Teaching Strategies Resource Book. A variety of strategies are detailed in this book, which are well suited or can be adapted to Science and Technology.

Again, additional information can be found in the statements about Teaching and Learning of all individual Key Learning Areas, located in St. Mary's Policy and Procedure Manual.

ASSESSMENT

Assessing is the process of collecting, analysing, and recording information about student progress towards achievement of Outcomes and Indicators. Assessment is carried out in order to determine the effectiveness of teaching and learning. Assessment is embedded and ongoing to enhance learning. Assessment data is collected through diagnostic, formative and summative assessment strategies.

At St Mary's we believe that assessment:

- Should be related to the syllabus content and be based on the syllabus outcomes and indicators, which specify what students know, understand and are able to do in Science and Technology.
- Procedures should relate to the knowledge and skills that are taught within the Science and Technology programme.
- Should accurately reflect the students' capabilities.
- The attitudes and values being demonstrated.
- Should recognise and value the diverse backgrounds and experiences of the students.
- We also believe that:
 - All teaching and learning activities provide opportunities for assessment of student knowledge and understanding, skills, attitudes and values
 - Assessment activities should be constructive; focus on what the children can do, look for strengths and encourage further learning.

- Assessment will require systematic observation of student's work, questioning and appraisal of the products of children's work.
- Assessment will focus on proficiency in using the required skills of Science and Technology over a period of time
- Teacher's observations will focus on positive achievements
- Teachers will use a range of Assessment strategies to ensure information is gathered and focuses on proficiency in using the required skills pertinent to this key learning area. They include strategies such as:

- observation

- listening

- student - teacher discussions

- student demonstrations and explanations

- anecdotal records of student's performance

- analysing samples of students work

- photographs and videos of activities.

- The Units of work selected across the K-6 classes are sequential and cover the content areas of the curriculum. They have been chosen so as to allow for identifying a student's current achievement and in planning future learning experiences.
- Integration with other KLA's is seen as an appropriate strategy.

Further information related to assessment strategies in Science and Technology is outlined on p.28 & 29 of Science and Technology K-6 – Syllabus and Support Document.

Additional information about Assessment at St. Mary's is located in the Assessment Policy (St. Mary's Policy and Procedure Manual – Programming, Assessment and Reporting Policy).

REPORTING

As a result of ongoing assessment, the progress of a student will be communicated to their parent/guardian in both written and verbal form over the course of the year. At St. Mary's we inform parents/guardians of student's progress in the following ways:

- Celebrations of Learning– During Term 1 and Term 3
- Written Formal Report - At the end of Term 2 and Term 4.
- An interview between parents/guardians and the teacher can be made at a mutually convenient time at any time throughout the year.

Reporting at St. Mary's reflects the spirit of the school's mission statement. As such, it should be undertaken in the ways that:

- Acknowledge parent's rights to be adequately informed of their child's progress.
- are meaningful, appropriate and understandable to the audience;

- are appropriate to the stage of student development;
- seek to build on achievements;
- demonstrate links to stage outcomes;
- Foster productive school/home understanding and interaction.

Written Reports are completed at the end of Term 2 and Term 4. Written reports are designed to provide an overview of the child's achievement and efforts across all curriculum areas. The written report form is regularly evaluated to ensure that it is relevant to curriculum development, taking particular note of outcomes and portfolios of student progress.

EVALUATION

Evaluation is a process used to enhance student learning, teacher effectiveness and improve courses and programs. A continual improvement cycle underpins good practice in learning and teaching, and evaluation is a key step in that cycle. We continually gather information about the quality of student learning that is taking place in our classrooms. We then make judgments based on that information to ensure the content we are providing is current, relevant and appropriate to the learners' needs.

Teachers need to gather, organise and interpret information in order to make judgments about the effectiveness and appropriateness of:

- plans for the teaching of specific units
- teaching programmes
- teaching strategies and practices
- assessment strategies
- resources
- Staff development

RESOURCES

Science and Technology K-6 Outcomes and Indicators (NSW Board of Studies)

Science and Technology Syllabus Document (NSW Board of Studies)

New Science and Technology Today K-6. (Tess and Tony Boyle)

Archdiocese of Canberra and Goulburn Treasures New and Old Religious Education Curriculum Teaching Strategies Resource Book.

Primary Connections. (Academy of Science. 2007).

Australian Curriculum, Assessment and Reporting Authority. (ACARA, 2011).

Other suggested resources:

- Guest speakers
- Field trips or excursions
- Internet
- Computer programmes – Web Quests

- Commercially produced teaching kits
- Library – School and Local

Additional teacher resource material is available in the Science and Technology teacher reference section of the staff room. Specific resources are located in the science cupboard in the resource room and computer software and programmes are located within the computer lab.