St. Elizabeth's Parish School Dandenong North

Science Policy

Rationale

The Science curriculum engages children in hands on activities and involves them in observation, hypothesising, experimenting, discussions and drawing conclusions. It allows children to develop an awareness of science in social and technological changes and encourages them to use investigation to develop curiosity and inquiring minds. It provides children with a range of experiences, including incursions and excursions, to reinforce science concepts. Science develops student's abilities to pose questions and provide answers about the Physical World, Life and Living, Earth and Beyond, Natural and Processed Materials.

Safety is an integral part of student awareness. The children from Prep to Year 6 are made aware of all safe practices when using equipment, solutions and all materials.

Goals

Through learning science students will:

- Acquire scientific skills and conceptual knowledge.
- Acquire and use the skills of scientific investigation, reasoning and analysis to ask questions and seek solutions.
- Develop scientific attributes such as flexibility, curiosity, critical reflection, respect for evidence and ethical considerations.
- Recognise and understand the strengths and limitations of science be able to interpret and communicate scientific ideas effectively appreciate the dynamic role of science in social and technological change.
- Provide a balance of the four following components each of which is important and none of which can be considered separate from the others.
    - scientific concepts
    - processes and skills
    - attitudes and values
    - contexts of current or future interest and use for students.

Hence through the Science Process Skills of observing, inferring, clarifying, predicting, hypothesising, interpreting data and controlling variables the students will be learning about Natural and Processed Materials (Chemistry), The Physical World (Physics), Earth and Beyond (Astronomy) and Life and Living (Biology).

Implementation

Our Science Program at St. Elizabeth's Parish School acknowledges the Victorian Essential Learning Standards as a landmark document, providing us with a framework to help build on and tailor our programs and individual needs of our students.

- Teachers follow the scope and sequence chart for the integrated curriculum, which is based upon the outcomes contained within VELS.
- The scope and sequence chart is developed in topic areas that build upon understandings at each level.
- All teachers use the inquiry model of developing and implementing a unit of study
- Teacher use the proforma provided to document the unit of study.
- The outcomes from Physical and Chemical Science at Levels 3 and 4 are delivered as "stand alone" lessons rather than part of an integrated approach. Chemical science is included at Year 3 and year 6 while the Physical Science strand is covered in year 4 and year 5.

Implementation [continued]

- Teachers engage students by using a variety of teaching and learning strategies that include “hands on” and E-learning opportunities.
- Students’ previous knowledge and individual abilities must be considered when planning units of work, and learning opportunities that promote higher order thinking skills should be provided.
- Teachers need to cater for the identified needs of each student planning for opportunities for them to use their own strengths (MI) in communicating their learning.
- Student progress in Science will be reported in mid and end of year reports to parents.
- Students will be given opportunities to reflect on their learning and receive feedback throughout the learning process.
- The Science program will be resourced by the Librarian and the Learning & Teaching Coordinator.

Safety

The Safety component of all Science lessons is constantly reinforced, so the children become safe and responsible learners.

The students are made aware of the dangers involved in unsafe practices in participating in experiments.

Our Simple Safety Science Rules are:

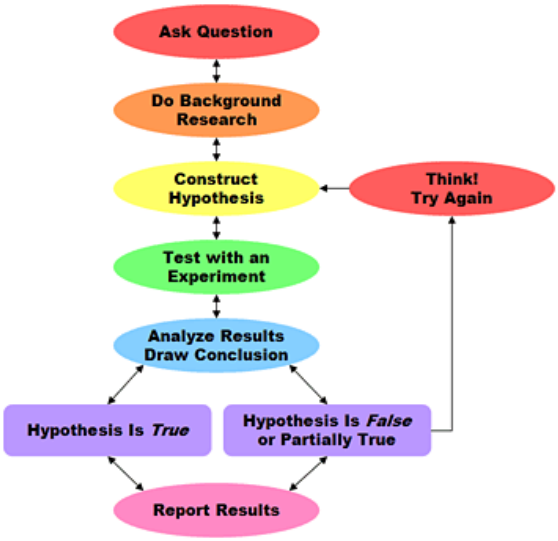
NEVER → Taste
Touch
or
Smell
in Science → unless directed by the teacher in charge

Teaching & Learning

In the Science program the following teaching and learning strategy forms the basis of implementation:

- The learner’s ideas about a concept are used as the starting point for the unit with understandings being shared by the learners.
- Through exploration of the concept a deeper understanding is gained. The concept is tested and predictions made.
- Concepts are refined and ideas challenged through “hands-on experiences”, testing hypothesis and discussing results.
- Concepts are internalised and begin to be used in familiar and unfamiliar situation.

It is within the below framework that the processes for science and technology are implemented.



Implementation [continued]

Other important elements of the teaching and learning situation are:

- Encouragement to take risks and learn through the exploration of ideas, which will result in the experience of failures and successes.
- Teaching strategies need to be many and varied to accommodate the many learning styles of the students.
- All learning should be open-ended and provide the opportunity for on-going refinement and extension of a concept.
- The teaching/learning should bring together theory and practice, reflection and action, life in school and beyond school.
- Teaching and learning in Science should have links to real life situations.

Learning Outcomes

Students' learning outcomes for Science are formulated within a yearly planning process. This process is a review of the previous year's work in the area of Science. Once this evaluation has occurred, staff formulate in accordance with school policies, student needs, Victorian Essential Learning Standards, Course Advice and other resources, sequential learning outcomes. These are documented yearly in the Unit of Work for each year level. These learning outcomes form the basis of what is to be taught throughout the Unit of Work. Staff then work together to plan activities and to work out how best to teach these learning outcomes so that they are achievable for each student.

Program Planning

Each teacher at St. Elizabeth's Parish School is a member of a Professional Learning Team. They work together to devise Units of Work. Each Unit of Work has statements of understandings and learning outcomes that need to be addressed for that particular unit. From the Unit of Work, teachers formulate a Term Planner which shows the scope and sequence of outcomes for the unit. This begins by evaluating previous Units of Work and addressing students' prior knowledge and understandings. Teachers consider the global and local relevance the unit will have on the students and then develop a list of resources that will assist them in the teaching of the unit; (guest speakers, incursion, excursions, videos, equipment, Internet, books, charts,etc…).

Classroom activities are then formulated to assist with the teaching and understanding of each learning outcome. These activities are documented in teacher's Weekly Planners. On-going recording and assessment monitors students' work which is utilized for evaluation purposes. An understanding and a belief we have is that all students will be expected to fully participate within the classroom program. Teachers will provide students with equal access to the program in order for this to be achieved.

Attitude & Skill Development

Level 1 & 2

By the end of Year 2 children should be showing the following:

Attitudes

- An appreciation of their senses to explore their world.
- An awareness of their responsibilities in caring for living things.
- An appreciation of living and non-living things.
- A willingness to participate in the collection of materials and the preparation of work.
- An interest in new thing.
- A willingness to carry out tasks that are within their capacity.
- A willingness to handle living and non-living material.
- An enjoyment in finding out about things for themselves.
- An enjoyment when working with other children.
- Pleasure from exploring the environment.

- An awareness of their need for new words to extend their vocabulary, and for new skills and concepts to carry out activities successfully.
- An interest in detail and finding out about new things.
- A confidence in their ability to work by themselves and try to solve problems they meet.

Skills

- Recognition of patterns, for example in living things.
- An ability to group things by their own or given criteria.
- An ability to record things in a time sequence.
- An ability to symbols such as picture graphs to represent information.
- An ability to discriminate between things.
- An ability to compare using one quality or variable.
- An ability to find answers to simple problems by using trial and error techniques.
- Group things by observable attributes.
- Have increased skill to handle tools and materials and work independently.
- Record information using tables, models, printings, and drawing.
- Use different ways of testing ideas.
- Use measurement to gather information.
- Seek explanations by asking questions or by actions.

Level 3

By the end of Year Four children could be exhibiting the following:

Attitudes

- An enjoyment of science activities, as shown by their readiness to try out new activities, to do work at home, to write and talk about what they have observed and found out, and to read books on science.
- An active part in making suggestions for investigation and will supply possible explanations when faced with new problems.
- A readiness to adjust or reject their explanations when they are at variance with observations; they form conclusions which are in accordance with the evidence available.
- Confidence in their ability to solve appropriate problems.

Skills

- An ability to classify objects, taking into account two or more properties, for example classifying substances by density.
- An ability to use models of a material kind to explain more complex things, for example the making of “rock” using gravel, sand, and cement.
- An ability to use instruments including those that they make will be used to extend the range of the senses, for example a rubber band as a weighing instrument or a telescope from two simple lenses.
- Make observations using all the senses.
- An ability to demonstrate an understanding that observations of position and motion depend on the position and motion of the observer.
- Use of mathematics in the organisation of observations, i.e. the making of quantitative observations, the setting out of recordings in tabulated form and the use of column graphs.

Level 4

By the end of Year 6 children should demonstrate the following:

Attitudes

- A keen interest in their physical surroundings and in investigating plants, animals, rocks, machines, physical processes, and the like. This will be shown in spontaneous remarks, eagerness in tackling problems, concentration in work on a problem, 'self-starting' in activities, and the use of library references.
- A spirit of inquiry and imagination, as indicated by questions asked, and hypotheses suggested when faced with new problems.
- A satisfaction in achieving solutions to problems.
- A preference for concise solutions which are clearly expressed.
- A value of the importance of basing their opinions on evidence and reject superstitions, prejudices, and mythical 'explanations'.
- A value of scientific knowledge and methods of thinking as a basis for activity, for example they avoid smoking not because of rules but because of evidence against the habit

Skills

- The capacity to describe and explain observations and activities in clear and precise English.
- The use of mathematics to organize information - including line, circle, and column graphs, flow charts, sampling techniques, and tabular setting out of data; and the capacity to get information from charts of these types.
- The capacity to distinguish relevant and irrelevant information in solving a problem.
- The capacity to decide whether there is enough information available to answer a question or solve a problem, i.e. children is cautious in making statement for which insufficient evidence is available.
- The capacity to decide the type of information still needed to answer a question or solve a problem.
- The capacity to decide the best ways to obtain the information that is needed. What experiment is needed? What observations are needed? What reference books are needed?
- The capacity to design and carry out experiments.
- The capacity to use and design instruments and to decide which instruments are necessary.
- The capacity to organize the various skills learnt in the previous years into a generalized problem solving approach.