St Francis Xavier Primary School
STEM

Rationale
Deeper learning occurs when a cross-disciplinary approach is adopted that exposes students to a range of thinking processes, skills, content, and applications. STEM can provide students with the chance to develop their critical thinking, creativity, communication and self-direction.

Purpose:
STEM education is a term used to refer collectively to the teaching of the disciplines within its teaching umbrella, science, technology, engineering and mathematics, and also to a cross-disciplinary approach to teaching that increases student interest in STEM-related fields and improves students' problem solving and critical analysis skills (Education Council, Australia, 2015).

In the Victorian Curriculum, the Learning Area "Technologies" comprises two strands, "Design and Technologies" and "Digital Technologies". The Engineering component of STEM is taught through the Design and Technologies strand and the Technology component of STEM is taught through the Digital Technologies strand.

The Department of Education and Training (DET) released a document in September, 2016, called "STEM in the Education State" which stated that there is "a greater need for STEM capabilities than ever before. Our employers are increasingly looking for workers who are creative problem solvers, innovative and critical thinkers, and able to use new technologies". The Office of the Chief Scientist has suggested that 75% of the fastest growing occupations require STEM knowledge and yet overall student results in Australia in science and mathematics are declining. At SFX we are seeking to reverse this trend by students participating in weekly STEM classes with a Specialist Teacher.

In addition to the career opportunities that STEM education provides the opportunity to improve student engagement and participation, encourage active learning and address some real world problems and challenges through an innovative and stimulating STEM education program.

Implementation:
At St Francis Xavier Primary School, all students shall participate in STEM education equivalent to 40 minutes per week.

Classes will utilise our STEM centre, gardens and general school grounds for lessons.

The **STEM Process** is an extension of the processes that underpin learning in Science, Design and Technology and Engineering:

Unit ideas will be based on the Inquiry within the classrooms. Running alongside this will be the *'Stephanie Alexander Kitchen Garden program.'* This has been incorporated into the STEM program due to its hands-on approach and real-world approach to scientific and engineering inquiry.

*The **STEM process** uses the following formula:*
Inspiration
Local news items - are there water usage problems, renewable energy projects, town planning proposals or social issues that are of interest to students?

Are there state, national or global issues that your students might be interested in - deforestation, decline in biodiversity, drought, pollution, food security?

What technologies are your students using and do they know how they work - electronic toys, smartphones, computers? (This term will be about engineering with limited resources.)

Process
Identify the needs and constraints
Is a survey necessary?
Define the problem
Prepare a design brief
Do background research

Design Brief
IMAGINE
Generate ideas and brainstorm possible solutions and alternatives individually or in small groups.
PLAN
Think, sketch and label. Choose a solution and prepare materials
CREATE
Construct and develop a prototype
EVALUATE
Test, analyse and troubleshoot and use data and graphs to compare results
IMPROVE
Refine and adjust
COMMUNICATE
Results with students as a presentation to the class or school

The STEM cycle will run over two years, but also consider the Inquiry used in the classroom.
E.g. 2021 Cycle

	Prep	1/2	3/4	5/6
Term 1 Health, Identity and Wellbeing	Living things have a variety of external features and live in different places where their basic needs, including food, water and shelter, are met	Living things grow, change and have offspring similar to themselves	**Kitchen garden** Living things can be grouped on the basis of observable features and can be distinguished from non-living things	Living things have structural features and adaptations that help them to survive in their environment
Term 2 Our Scientific World	Light and sound are produced by a range of sources and can be sensed Exploring different ways to produce sound using familiar objects and actions, for example, striking, blowing, scraping and shaking	**Kitchen Garden** Objects are made of materials that have observable properties	Forces can be exerted by one object on another through direct contact or from a distance	Energy from a variety of sources can be used to generate electricity; electric circuits enable this energy to be transferred to another place and then to be transformed into another form of energy
Term 3 Community, Cultures & Traditions	**Kitchen Garden** Everyday materials can be physically changed or combined with other materials in a variety of ways for particular purposes	Explore the characteristics and properties of materials and components that are used to create designed solutions	Investigate how forces and the properties of materials affect the behaviour of a designed solution	**Kitchen Garden** Changes to materials can be reversible, including melting, freezing, evaporating, or irreversible, including burning and rusting
Term 4 Social Responsibility - For the Common Good	Identify how people create familiar designed solutions and consider sustainability to meet personal and local community needs		**Kitchen Garden** Recognise the role of people in design and technologies occupations and explore factors, including sustainability, that impact on the design of solutions to meet community needs	Investigate how people in design and technologies occupations address competing considerations, including sustainability, in the design of solutions for current and future use

Evaluation:
This policy will be revisited yearly, reviewed as part of the School's Review cycle or as changes are made to the Victorian Curriculum.