

At Fadden Primary School we utilise the Academy of Science, **Primary Connections program**. Primary Connections units provide students with opportunities to learn science as a human endeavour, a way to know and as a body of knowledge (MCEETYA, 2006).

The units develop students' skills of working scientifically as they undertake investigations and communicate their understanding about science. Science concepts are described in four conceptual strands

- ✓ **Earth and Beyond (Earth and Space )**
- ✓ **Energy and Change (Energy and Force)**
- ✓ **Life and Living (Living Things), and**
- ✓ **Natural and Processed Materials (Matter).**

### **Primary Connections 5Es teaching and learning model**

The instructional model used in Primary Connections is based on constructivist learning theory. This theory suggests that students learn best when they are allowed to work out explanations for themselves over time through a variety of learning experiences structured by the teacher. Students use their prior knowledge to make sense of these experiences and then make connections between new information and their prior knowledge. To help them make the connections between what they already know and new information, teachers will organise each Primary Connections unit into five phases

#### **Engage, Explore, Explain, Elaborate and Evaluate.**

##### ✓ **Engage**

Each unit begins with a lesson that mentally engages students with an activity or question. It captures their interest, provides an opportunity for them to express what they know about the concept or skill being developed, and helps them to make connections between what they know and the new ideas.

##### ✓ **Explore**

Students carry out hands-on activities in which they can explore the concept or skill. They grapple with the problem or phenomenon and describe it in their own words. This phase allows students to acquire a common set of experiences that they can use to help each other make sense of the new concept or skill.

##### ✓ **Explain**

Only after students have explored the concept or skill does the teacher provide the concepts and terms used by the students to develop explanations for the phenomenon they have experienced. The significant aspect of this phase is that explanation follows experience.

##### ✓ **Elaborate**

This phase provides opportunities for students to apply what they have learned to new situations and so develop a deeper understanding of the concept or greater use of the skill. It is important for students to discuss and compare their ideas with each other during this phase.

##### ✓ **Evaluate**

The final phase provides an opportunity for students to review and reflect on their own learning and new understandings and skills. It is also when students provide evidence for changes to their understandings, beliefs and skills.

Phase	Purpose	Role of teaching and learning activity
Engage	<p>Create interest and stimulate curiosity. Set learning within a meaningful context.</p> <p>Raise questions for inquiry.</p> <p>Reveal students' ideas and beliefs, compare students' ideas.</p>	<p>Activity or multi-modal text used to set context and establish topicality and relevance.</p> <p>Motivating/discrepant experience to create interest and raise questions.</p> <p>Open questions, individual student writing, drawing, acting out understandings, and discussion to reveal students' existing ideas and beliefs so that teachers are aware of current conceptions and can plan to extend and challenge as appropriate – a form of diagnostic assessment.</p>
Explore	<p>Provide experience of the phenomenon or concept.</p> <p>Explore and inquire into students' questions and test their ideas.</p> <p>Investigate and solve problems.</p>	<p>Open investigations to experience the phenomenon, collect evidence through observation and measurement, test ideas and try to answer questions.</p> <p>Investigation of text-based materials (e.g. newspaper articles, web-based articles) with consideration given to aspects of critical literacy, including making judgements about the reliability of the sources or the scientific claims made in the texts.</p>
Explain	<p>Introduce conceptual tools that can be used to interpret the evidence and construct explanations of the phenomenon.</p> <p>Construct multi-modal explanations and justify claims in terms of the evidence gathered.</p> <p>Compare explanations generated by different students/groups.</p>	<p>Student reading or teacher explanation to access concepts and terms that will be useful in interpreting evidence and explaining the phenomenon.</p> <p>Small group discussion to generate explanations, compare ideas and relate evidence to explanations.</p> <p>Individual writing, drawing and mapping to clarify ideas and explanations.</p> <p>Formative assessment to provide feedback to teacher and students about development of investigation skills and conceptual understandings.</p> <p>Small group writing/design to generate a communication product (e.g. poster, oral report, formal written report or PowerPoint presentation, cartoon strip, drama presentation, letter) with attention to form of argumentation, genre form/function and audience, and with integration of different modes for representing science ideas and findings.</p>
Elaborate	<p>Use and apply concepts and explanations in new contexts to test their general applicability.</p> <p>Reconstruct and extend explanations and understandings using and integrating different modes, such as written language, diagrammatic and graphic modes, and mathematics.</p>	<p>Further investigations, exercises, problems or design tasks to provide an opportunity to apply, clarify, extend and consolidate new conceptual understandings and skills.</p> <p>Further reading, individual and group writing may be used to introduce additional concepts and clarify meanings through writing.</p> <p>A communication product may be produced to re-represent ideas using and integrating diverse representational modes and genres consolidating and extending science understandings and literacy practices.</p>
Evaluate	<p>Provide an opportunity for students to review and reflect on their own learning and new understandings and skills.</p> <p>Provide evidence for changes to students' understandings, beliefs and skills.</p>	<p>Discussion of open questions or writing and diagrammatic responses to open questions – may use same/similar questions to those used in Engage phase to generate additional evidence of the extent to which the learning outcomes have been achieved.</p> <p>Reflections on changes to explanations generated in Engage and Evaluation phases to help students be more metacognitively aware of their learning.</p>