

20th Century Australian Science, Changing life on our farmlands

Overview: This program provided 8 sessions as in- and after- class PD for Beulah Primary School in term 2 2013 under the general theme of the “**Sustainability and our Farmlands**” [1]. The sessions provided a locally based project: the nature of environment, landforms and their development, salinity, settlement, and a suite of Australian 20th inventions for homes and farms. Students chose a **20th C farming discovery** (invention or knowledge) developed by an Australian scientist in the last century, and in use for sustainable farming around Beulah today, on which to create a Science-based picture story book for the 2013 Science Talent Search competitions, completed in Semester 2.

Challenge – **Sourcing suitable reference materials for the ‘farming inventions for sustainability’ theme**

This was an extension from the 2012 SPP challenge for materials linking farming with sustainability. In 2013, the materials needed were for how farm machinery inventions worked and contributed to sustainable farming in their time, and still today. These were not really available at primary level for any library, be it the school, visiting bus, regional or on the web – and probably did not exist. The solution was to ask parents to explain machinery that they had at home to the children, to source illustrations of the equipment from adult books and to discuss the machinery with the children as they created their individual books stories. As parental involvement was already needed for some of the environmental background, parents also as businesses became important partners with relevant information for the children’s learning.

Solution: **Children, teachers, parents and businesses (farms) working together for education**

When Minister Dixon said “*We understand the benefits of parental engagement and the important role that parents and families can play in supporting excellence in our schools.*” (Victoria as a Learning Community, 2011, p4), would he have envisaged the contribution **parents** play at a small rural school like Beulah PS, in providing local information?

e1 – The **farming** theme, particularly **engaged** the children in their **home** farms/businesses and with their **parents**. **Parents** responded to an initial query to give a list of discoveries that might be used. Children used science drawings to record what their **home** environment looked like. A **parent** providing aerial photos of the flood helped the children better understand landform. **Parents** responded to further requests for information about changes, salinity and specific machinery throughout this project, and were kept up to date by reports in the *Beulah Blurb* [2].

Initial planning ideas from parents:

What have been the most important Australian scientific discoveries that have improved the sustainability of your farm enterprise? Answers:

1. the change from cultivation to no till
2. GPS navigation
3. calicivirus to control rabbits [nb this is not actually an Australian discovery, but was brought here from Europe]
4. Wimmera Pipeline [also not a ‘discovery’]
- 5 plant breeding, drought and weed resistant crops”

e2 - For the initial **exploration** of the local environment, we visited the Creek. The drawing skills learnt there were then used at home to draw the **home** farm environment. These were then background for drawings for their STS books. Surveys were used to add more detail at the **family farm** level, to the history and geography of the area. The children interviewed **parents** about Science knowledge about the land, farming methods to care for the land and importance of this to get local views on four key sustainability issues: soil health, erosion, salinity and water use. [3] From this, the children also learnt that Science knowledge about farming has been developing over time.

activity	Knowledge		always known	When learnt		in about the....
	done	not done		remember learning this		
improve soil health, (eg add super, nutrients)	10	1	7	2		1950s 1960s
improve water use (eg by channel/ pipeline)	10	1	1	9		1950s, 1980s 1990s 2000s
reduce wind erosion (eg retain stubble)	10	1	1	10		1950s, 1980s/1990s 2000s
reduce salinity (eg plant trees)	10	1	2	9		1950s, 1980s 2000s

[3]

e3 Responses to this survey’s third question (below) gave **explanations** from the **parent/farmers** that together gave a basic concept of sustainability.

Why is knowledge of land important to farmers?

- “The land is the farmers most valuable asset.”
- “To care for our land, we must know what has happened in the past.”
- “We need to keep the land productive for generations for the future.”
- “We need to look after our farms for the future and to give food to our country.”

Although not on the **parent’s ideas** list, understanding how ‘salinity’ came to be here, is a key 20th C discovery for farming sustainability. Modelled in the sandpit, the land’s story was made into a Science story book [4] .

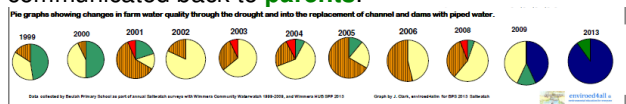


e4 We **elaborated** the issue of **salinity** with the history of its knowledge in Australia. This story demonstrates that acting on this century old Science knowledge could have avoided salinity problems from tree removal. Photos taken from the drama were later formed into a second Science picture reference book on 'salinity'. [5]

This school has had many years involvement with the annual *Saltwatch* program, and participated again in 2013. **Parents** supported children in obtaining water samples, and answering questions about where salinity might be to **elaborate** local knowledge available to the children. The children tested the water and returned reports of the results to the **parents**.



When collated into a group report, the children had captured a wonderful change from the past, thanks to the Pipeline, in farm water salinity - the blue in the pie charts below shows the lowest **salinity**. This important contribution in sustainability in farming in this area was communicated back to **parents**.



For the second half of this project, we **explored** 20th century Australian inventions for **homes and farms**. From these, children chose topics to **elaborate** for their story book. While the history and basic information about the mostly **farm machines** chosen was available on the web, the readability was often not suitable. **Explanations** of how machines worked, and if and how they had been improved since initial discovery were hard to find. For this, the children turned to their **parents**, [6] often finding updated versions of machinery on their own farms.

e5 **Evaluation** is a continuous process and can be done in many ways. For the teacher, each session [1] was an in-class **PD** and a discussion review of it took place afterwards, along with any planning for the next one. Part of the teacher's evaluation was to write a report for *Beulah Blurb*, [2] circulated in the school community.

A variety of evaluation tools were used with the children. In the first session, which was all outdoors, and partly at the Creek, the children responded by **speaking** to something surprising learnt about **Science** today: half named drawing for Science at the Creek.

After the sandpit modelling of our **land formation**, children reflected with **colour card codings** how much of this was new: half of the children said a fair bit, and one said it had sparked a new area of interest.

There were 12 **salinity** facts covered in these sessions. The class was a full school covering F-6 levels. For evaluating the learning of this across all levels at one time, a **model** was used. Each child built a lego block tower with one block representing a spoken salinity fact that the child felt they knew and understood. The towers were nearly all 12 high, - some creatively made.



When the **range of inventions** and a brief introduction to each was introduced, the **colour card ratings** were again used to see how many of these inventions were previously known to the children as Australian. The responses from all to a couple matched age levels.

Parents provided valuable knowledge throughout this project for their children individually and the class group, enabling the children "to tap into expertise, facilities, resources and ideas, and open up pathways*".

Teacher comment on parents on their input

"The parents were willing participants and their extensive discussions, drawing and survey material sent to school provided detailed knowledge for the students to use in their picture story book. They saw the benefit throughout"

Learning Outcomes

This project supports a suite of DEECD programs:

- AusVELS levels F-4 in Science, Humanities, English, Arts, Communication, Personal and Interpersonal Development, and Education for Sustainability [6]
- the **e5 instructional model**
- Principals of Learning and Teaching.
- Literacy as a DEECD Grampians Region Focus,
- Science Talent Search as a priority Science Program in the *Energising Science and Mathematics Education in Victoria Strategy*#
- Actions 14 (needs) and 20 (others) in the Blueprint,
- reforms 3 (innovative ideas) and 4 (from outside the school gate) in 'Victoria as a Learning Community'. * p11
- PD for the teacher especially on local Science, Sustainability, STS, and Saltwatch.

Several materials produced will go on BPS website

Supporting pdf links: [1] = Summary of BPS Wimmera HUB SPP [2] = SPP in Beulah Blurb [3] = Survey report# [4] = Beulah Land Story# [5] = the Story of our Salinity Knowledge# [6] Century of science # [7] = files on AusVELS Science. History. EfS. RSAV.