Year 10 core Maths

The damage to agricultural infrastructure caused by the Queensland floods inspired the development of this unit, which was designed to extend students’ understanding of the maths of measurement: scale, perimeter, area, volume and surface area, using Pythagoras’ Theorem and trigonometry.

The students are presented with a scenario in which a farmer’s tomato crop in his lower paddock is worthless after flooding. The fences have been destroyed, and a large hayshed and an irrigation pump house by the creek have had to be demolished due to erosion of the foundations. The hay was washed away, and the fixed irrigation system needs replacing and redesigning after major damage. The farmer also needs to calculate his losses, and the cost of borrowing to meet the shortfall after compensation.

What else is happening?

Year 6 teachers are working with the project coordinator and a local duck producing business is to develop a unit supporting curriculum in a range of areas. The students will be investigating the business and lifestyle reasons behind the establishment of the business, and visiting to check out the reality of it; meeting with one of the producers, who is also a writer, to explore the way he uses blogging to promote the product and his business, and developing their own blogs or other written work as part of the project; researching duck breeds, housing, feeding, costs etc; and taking responsibility for the incubation of a clutch of eggs.

Meanwhile, Year 5 students will be doing something similar with rare breed chooks, but their focus will be on the physical preparation for and care of the chooks and the production and sale of eggs. The students’ work in designing and constructing housing for the chooks will be supported by the VCAL teacher and students.

Professional development and industry orientation for teachers is ongoing: in 2013 the Maths teachers had a day in the industry to make the connections between curriculum requirements and what happens in agriculture. In May 2013, Year 3 & 4 teachers will undertake a similar activity. One Year 5 or 6 teacher each year attends “A Day on the Farm”, a professional development day delivered by the local dairy industry. A TAP Professional Learning Team is dedicated to identifying the curriculum links with local agricultural activity, and how best to capitalise on those links to the benefit of students across all year levels.

What next?

In the longer term, the project horizon for Timboon P-12 students will develop beyond local and regional communities. National and potentially international study tours will be considered as part of the curriculum in Years 11 and 12. The prospect of studying within a global context will be an attractive and exciting goal for senior students as they broaden their understanding of agriculture. This will provide them with insights that extend well beyond the current exposure of students in most Victorian schools.

As the TAP heads into its second year, the focus will be not just on developing more of the new ideas and opportunities generated, but on embedding the proven initiatives into the core functioning of the school, and on nurturing the community and industry relationships that are so integral to the project’s capacity to deliver “learning by doing” to the school’s students.

VET Agriculture

Despite being surrounded by farms and sourcing more than half of its student population from farming families, the school had not been able to offer vocational training in Agriculture to its students, except by distance education. The National Centre for Dairy Education Australia now delivers skill sets from Certificates II and III in Agriculture in the new Agriculture classroom, using activities on the Ag precinct as well as on local farms and businesses for applied learning opportunities. This training is delivered to students from Timboon and nearby schools as part of school-based traineeships, and will also be available at the school to adult learners from local farms and businesses.

Year 11 student Georgia is undertaking a school-based apprenticeship with a local genetics company, and is keen to pursue a career related to animal reproduction and genetic science. The vocational studies in Agriculture will support her academic studies in science to broaden her career and educational pathways, post-VCET.

What is the TAP?

The TAP is a partnership between Timboon P-12 School and WestVic Dairy, Dairy Australia’s regional development program for western Victoria. In its developmental stage, the project has received funding from the Gardiner Foundation, and from a Commonwealth Government Empowering Local Schools grant.

The purpose of the TAP is to integrate agriculture into the curriculum delivered at all levels of the school to

✦ support student learning, particularly in maths and science, and to increase applied learning opportunities,
✦ increase student awareness of preparation for and interest in agricultural educational pathways and careers,
✦ increase the school’s engagement with the local community, and
✦ improve retention levels of students at secondary level, and increase the attraction for school leavers to remain in or return to the district.

Why Agriculture?

The production of food – from paddock to plate – requires the application of knowledge and skills that cuts across key learning areas of the modern education curriculum. By tapping into this community of knowledge, the Timboon Agriculture Project supports student learning outcomes across the curriculum, from Prep to Year 12, in both VCE and VCAL.

Australia has a well-recognised skills shortage in agriculturalists. The farming community welcomes the interest of its young people in agriculture as it enhances the likelihood of them returning to the community to pursue their careers. The local community has a vested interest in maintaining a healthy school and a project such as TAP supports this.

Who’s involved?

As a partnership between school and industry, the Timboon Agriculture Project has a steering committee drawn from a cross-section of the local agricultural industry. Through the networks of steering committee members, and the school’s parent body, the project can facilitate access for students and teaching staff to a breadth of expertise in agriculture, agricultural service and support, and food processing. In addition to the school leadership, a student rep and staff representatives as required, the steering committee comprises dairy farmers, a beef farmer, a large animal vet and farm consultant, a milk processing company farm advisor, a seed company agronomist, a dairy farm trainee, a heifer rearing property owner and a landscape facilitator.
**What happens in the classroom?**

The classroom has been extended.

The project launched in 2012 with a day of hands-on activities for students from Prep to Year 10, delivered by industry specialists in animal husbandry, animal health, genetics, soil science, growing grass, milking technology, land management, farm safety, and local agricultural history.

Student excursions in support of curriculum delivery in the first 18 months of the project include:
- 6 dairy farms (Year 5 farm safety, Year 7/8 Science, Year 9 Maths, Year 10 Math, Year 10 Science)
- a boutique cheese manufacturer (Yr 8 Science)
- a duck farm (Yr 6 science; Yr 8 Science)
- a chocolate manufacturer (Yr 8 Science)
- Sungold Field Days, a lavender farm, local small businesses (Yr 9 Commerce)

Industry presenters supporting curriculum delivery have included:
- a butcher, (Yr 7/8 Food & Agriculture)
- large animal vets (Yr 5 farm safety; Yr 7/8 Science: animal welfare/systems; Yr 10 Science: genetics)
- dairy farmers: (Yr 5 farm safety; Yr 7/8 Science: animal nutrition, calf rearing; VICAL Maths: irrigation;)
- local community health service, Worksafe and milk processing company field officer (Yr 5 farm safety)
- Heytesbury District original settlers (Yr 9)

The development of the Agricultural precinct, including the preparation for and planting of the first crop, has involved students from years 8-10, and been supported by seed company agronomists, local farmers and farm contractors.

**How does it work?**

The project is overseen by a school/industry steering committee. The key to its successful implementation was made possible by funding from the Gardiner Foundation, which enabled WestVic Dairy to appoint a project coordinator to work with the school for the first 12 months. This role has developed into that of a “learning broker”: liaising between teaching staff and industry specialists (in dairy and beyond) to facilitate the development and trial of new curricula; sourcing and filtering industry and education resources to support that; and providing logistical support for the organisation of excursions and in-school activities.

Focused professional development activities have been developed and delivered to teachers, equipping them to develop engaging, hands-on curriculum in partnership with local farms and other businesses.

**TAP is curriculum driven – its primary aim is to support student learning outcomes. These examples are just a taste of the work that is underway.**

**Year 3-4 Summer Crop Scientists**

What makes plants grow? How do they reproduce? How does one plant differ from another?

Older questions brought to new life with students able to grow their own seeds in classroom activities, while monitoring the soil preparation, planting and growth of identical plants in cropping rows on the agriculture precinct.

Year 8, 9 and 10 students engaged with the farmers, agronomist and farm contractors involved in the preparation of the plot and the planting of the first summer crop (a variety of pasture and forage crops typically found on livestock farms). Year 3-4 students are able to draw on the same resource for first-hand experiential learning.

**Year 5 Farm Safety**

In the classroom, students use Lego construction to explore farm safety issues under the guidance of their teacher and a WorkSafe education officer. This is followed up by a visit to a local dairy farm, where the students rotate through five workstations, engaging with the farmer, a large animal vet, a WorkSafe inspector, a milk processing company field officer and a community health nurse.

By the end of the visit, students have explored safety issues in relation to the dairy, including the shed itself, vats and equipment; animals, pens, crushes and yards; silos and chemicals; motorbikes, quad bikes, tractors and other vehicles; and learned the basics of emergency first aid for common injuries on farm.

**Year 7-8 Science**

Dairy Australia programs Cows Create Careers and Camembert in the Classroom are integrated into a broader science program for Year 7 and 8 students.

A first term elective unit, TAP Into Dairy, is delivered as a prequel to Cows Create Careers. The curriculum is designed to introduce students to scientific experimental design, and to explore the science behind animal nutrition and digestion; aspects of animal welfare; and the effects of farm design and technology on the health, welfare and productivity of dairy cows. A local large animal vet provides additional support to the students in their investigations in the classroom and on-farm.

Year 8 students’ core study of microbiology will be underpinned by the production of camembert cheese, after two of the school’s science staff attend a masterclass in cheesemaking as part of the Camembert in the Classroom program. Students will also be able to access the technical expertise of local boutique dairy producers.

**Year 9 core Maths**

Students develop and apply their own maths knowledge and skills to analysis real data from a large heifer rearing business, as they also explore the parts played by maths and technology in the operation of the business. Over a semester, students develop a range of skills including data sampling and presentation, use of spreadsheets, graphs and plotting; statistical analysis, comparisons and reporting. The students each select an individual heifer to track over the period, and visit the farm to understand how technology is used in weighing and tracking the growth of the animals over time.

**Year 9-10 Commerce**

In a small business elective, students visit Sungold Field Days to undertake detailed investigations through selected stall holders, to learn about some of the costs, equipment and processes associated with the dairy industry and agriculture in general.

This includes investigating the purpose, use and cost of a particular piece of capital equipment, and an alternative to it; identifying an emerging technology and investigating its potential application and effect; identifying the purpose and link to agriculture of two businesses secondary to agriculture; and gathering information from a pasture production or animal reproduction business. The entire event is then subjected to a SWOT analysis back in the classroom.

The Sungold Field Days activities are preceded by an investigation of the small business make-up of Timboon’s central shopping strip, and followed by researching and developing a business plan (including detailed costings and marketing plan) for a lavender production and processing micro-business.

The lavender will eventually be planted on the school’s agriculture precinct. These units are supported by a local clothing retailer and a lavender grower.

**VCAL core Maths**

Centre pivot irrigation systems are a common sight on the paddocks of south west Victoria. VCAL students met with a local farmer to explore the thinking behind a decision to install such a system: the costs, benefits and impact on the farm business of planning for, installing and running such a system.

The students were then required to build a model of a centre pivot irrigator, and calculate the scale of the model, the area watered, the distance travelled by each set of wheels, the cost of irrigator, and the water usage.

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[Image of students working on a model of a centre pivot irrigator]