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SCOTCH COLLEGE ENVIRONMENT MANAGEMENT NEWSLETTER

The fruits of their labour

Sustainability is a major area of study for Scotch's Year 3 boys. Their studies focus on how food is grown, plant biology, the three Rs (reduce, reuse and recycle), 'nude food' (food without excessive packaging), forestry, logging, and collecting and identifying rubbish in the school grounds.

In 15 specially-designed planter boxes outside the Year 3 classrooms, they have planted celery, carrots, cabbage, broccoli, silverbeet, bok choy, onions, herbs, cauliflower and broad beans.

The planter boxes are in a south-facing area, and for comparison, another crop of vegies has been planted in large pots near the Year 1 classrooms, in full sunlight. The boys will measure and compare the growth of the plants in the differing locations.

Year 3 Coordinator, Mr Steve Grbac says gardening helps the boys understand the concept of cause and effect. 'If the plant is watered it grows, if it isn't it dies,' he says. 'The boys can see and even eat the literal fruits of their labour. Growing something themselves helps the boys understand what goes into making the food that ends up on their dinner plates, and becoming successful vegetable gardeners helps to develop their self-confidence, not to mention the science and maths involved in what they are doing.'

Year 3 boy Juniel Toh put it succinctly: 'This term we are studying "Sustainability". We are planting seed and vegetable seedlings to see how they grow, and eat them'.

ABOVE: Scotch Year 3 boys hard at work on their planter boxes.

In this edition

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EDITORIAL: DAVID ASHTON

Scotch College
www.scotch.vic.edu.au

Adding grandeur to the Scotch landscape

Standing tall and proud, directly to the west of the Sir Zelman Cowen Centre for Science at Scotch, is a particularly fine specimen of a tree which grows quite prolifically on the Scotch campus This tree, a river red gum, stands taller than the building and adds considerable grandeur to the landscape.

Planning for the new Centre for Science included ensuring that this tree could be retained and protected during construction. Scotch Curator, Michael Smith said the priority was to establish a tree protection zone (TPZ) to ensure the tree was not damaged or interfered with during the construction of the Centre for Science.

TOP: A Year 10 Environment class, led by Head of Biology, Matthew Manning.
ABOVE: Measures taken to protect a large river red gum during the construction of the Sir Zelman Cowen Centre for Science.

'This involved non-destructive exploration of the tree root zone to determine the presence or absence of any significant roots, so a positive determination could be made that the proposed works would not jeopardise the future viability of the tree,' Michael

TOP: The confluence of the Yarra with Gardiners Creek in 1965, showing nearby river red gums. ABOVE: The same vicinity in 2017.

said. 'With regular onsite discussions, it was agreed that there would be no major soil grade changes and excavation within the TPZ, further protecting one of Scotch's, and the City of Boroondara's, significant trees.'

Happily, recent observations have indicated that it has responded well to the building disturbance, exhibiting a strong flush of new season growth last year. It will continue to be monitored closely in the coming years.

The river red gum, *Eucalyptus camaldulenisis*, is the most widely distributed eucalypt in Australia, growing along rivers and floodplains. It is also the predominant canopy tree in the Scotch grounds, with 168 specimens making up 23 per cent of all trees growing on the campus. A remnant of the original riparian landscape on our grounds, the river red gums provide food and shelter for a variety of animals.

As well as being an attractive and distinctive landscape feature, river red gums are valued for their durable timber. The Kulin people used the trees to produce canoes, food containers, medicines and a variety of implements.

Except for the very driest regions, eucalypts are the dominant tree across Australia. Most eucalypts have adaptations to survive fire such as woody seed capsules that release seed after fire. Many eucalypts can also sprout new growth rapidly after fires from either epicormic buds protected under thick bark on the trunk and branches, or from swellings called lignotubers at the base of the tree.

The genus name originates from the structure of the seed pods. Eucalyptus comes from the Greek *eu*, meaning well, and *kalypto*, meaning covered, and refers to the cap on the woody seed pods. Strangely, the river red gum species is named after the Camaldoli monastery in Italy, where a specimen being cultivated was first described.

Designing for sustainability

In Design and Technology at Scotch, we encourage our boys to think beyond their own needs and wants, to consider real world issues and how today's designers and problem-solvers can make positive contributions.

Industrial designer Phillipe Starck said: 'Designers should define their role broadly as agents of good in the world, and limit their work to "legitimate" products. This means products that are needed, and those that can be made without damage to nature, or – through the unethical actions of manufacturers and investors – damage to people'.

Designers have an ever-increasing responsibility to design products that have minimal environmental impact. This involves conserving materials and conserving energy during product manufacture, aiming to make products that are as sustainable and environmentally friendly as possible.

Year 11 boys studying Product Design are directly addressing the issues of sustainability within Unit 1 of the course.

The unit focuses on the analysis, modification and improvement of a product with consideration of all the design factors; but the primary focus is on sustainability. This year boys were asked to redesign an existing seating product to make it more sustainable. Knowledge of materials and their source, design for disassembly and the impact of the product at the end of life all had to be considered. The boys explored a number of options, including the use of recycled cardboard, responsibly sourced timbers, low-melt metals and eco-friendly finishes. Efficient use of materials, such as tessellating components during manufacture to reduce waste, as well as the use of fixtures and fittings which made it easy to disassemble the product post-use, were also investigated.

The use of sustainable materials and components is an essential objective for any designer. Through studying this unit, boys have become far more aware of the need for responsible design, and the impact on the product life cycle from source to end of life and product or component re-use.

ABOVE: Year 11 Design and Technology boys working on sustainable seats made from recycled corrugated cardboard.

Understanding bushfires and fire safety

The Year 3 boys love their environmental science excursions to Scotch's Elliott Lodge property at Healesville, under the guidance of Year 3 Coordinator, Mr Steve Grbac.

During a visit in Term 2, local Country Fire Authority volunteer, Mr David Musk – who is also a member of Scotch's Music staff – visited the lodge to help the boys understand how bushfires affect the Victorian countryside, and how organisations such as the CFA deal with the threat.

This was the first time a member of the CFA had visited the boys at Healesville, and it's hoped to make CFA visits a more regular component of the Junior School environmental science program.

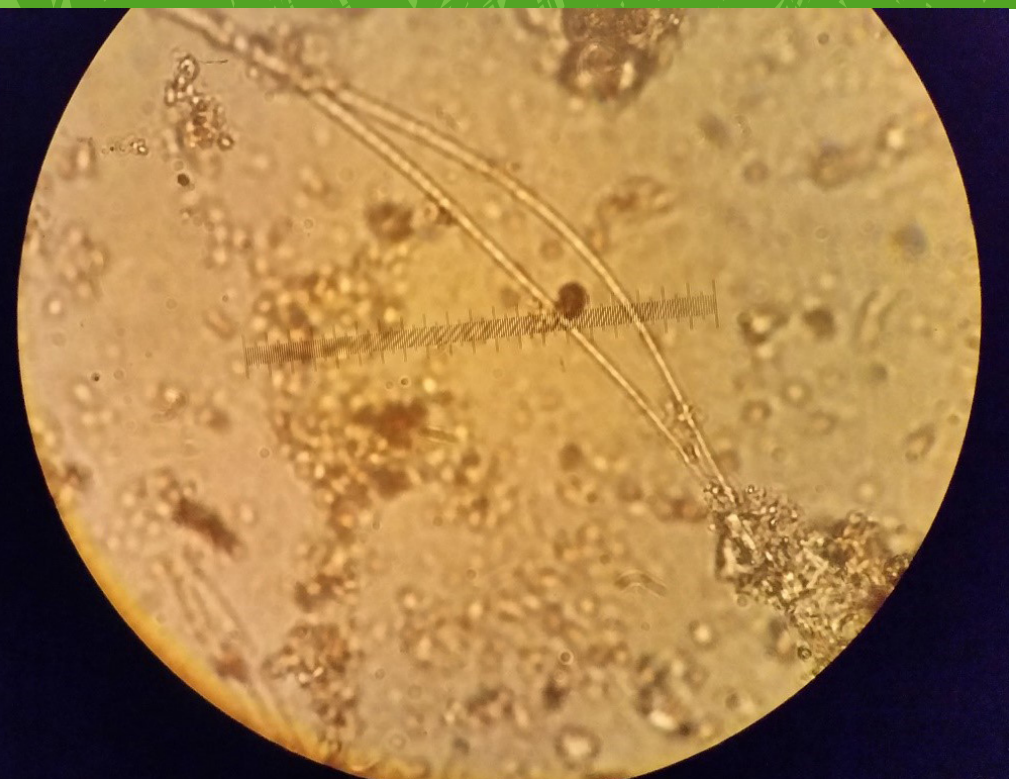
The boys came up close to some exciting fire-fighting equipment, including a fire truck. Under David's supervision they held a fire hose, and as Thomas Destefanis discovered, it isn't an easy device for a Year 3 boy to control by himself: 'We were pretending to be fire-fighters with Mr Musk,' he said. 'I was helping Christian Heng hold the hose so he did not go flying!'

The boys learned how the CFA works to contain fires, and the fire preventative measures communities in the bush can take during the hotter months.

David and the boys also discussed fire-ground safety, and looked at the ways in which firefighters protect themselves in bushfire situations. Some of the boys jumped in the fire truck, and watched as the crew protection sprays were activated from within the vehicle.

David Musk has been a member of the Sassafras and Ferny Creek Fire Brigade, one of the larger brigades in the Dandenong Ranges group, for nearly three years. The brigade is made up of volunteers from in and around Sassafras on Mount Dandenong.

ABOVE: Fire hose training: David Musk with Year 3 boys Thomas Destefanis and Christian Heng.



The Yarra's living underground cables

In a previous edition of *Environs*, we revealed a new life form which had been discovered in the muddy bed of the Yarra River near Scotch. Since the discovery, Dr Perran Cook and his team of researchers at Monash University have regularly visited the river near the Scotch boat ramp to study these strange organisms.

It happens like this. Microscopic bacteria form into long cables to conduct electricity. While only a few micrometres wide, the cables can be three or more centimetres long – quite impressive for bacteria! The cables' food is hydrogen sulphide, the smelly substance deep in the sediment, which they react with oxygen at the sediment surface by conducting electricity along their bodies, just like a living battery.

One question that Dr Cook's team is trying to answer is: what are the cables made of, and how do they conduct electricity?

The photo shows a section of two cables under a microscope. Spectroscopy of images shows that the cables have a hard outer sheath, probably containing iron, where electrons are conducted.

Another question is – how do the cables affect the chemistry and biology of the Yarra? The cable bacteria dissolve iron sulphide to consume sulphide, releasing large amounts of iron in the water and leaving a grey layer in the sediment. This is not toxic to humans, but can alter the types of microbes that live in the sediment, and the types of chemical reactions they perform.

TOP LEFT: Cable bacteria under a microscope.

TOP RIGHT: Monash University student Michaela Wawryk collecting sediment from the Yarra, near the Scotch boatshed.

The voice of the river comes to Scotch

Out on the Yarra, busily patrolling the river from the bustling port at the mouth to its more pristine higher reaches, is a group which is the voice of the river – the Yarra Riverkeeper Association. This group advocates for the river across a wide range of issues.

In June, the Vice President of the Riverkeepers, Andrew Kelly, arrived at Scotch in his boat to speak to the Junior School boys about riverkeeping. It was a case of back to school for Andrew, who is an Old Boy of the Class of 1973.

After showing the boys his boat, Andrew and the boys moved to the nearby Boykett Room, where Andrew made a PowerPoint presentation on his role as Riverkeeper. He spoke about the many facets of the job, the effects of rubbish and other pollution on the river, and the animal life which calls it home. He explained that the river has a salt water section at its bed and a freshwater zone above it (because salt water is heavier than fresh water). This allows salt water fish to swim up the Yarra, and bream can even be caught in Burnley!

Zachary Stamoulis (Year 3) noted Andrew Kelly's remarks about pollution in the river: 'Mr Kelly told us about the pollution that people put in the river, and how the native animals were dying because of it'.

Year 3 Coordinator, Mr Steve Grbac, said Scotch would like to have an ongoing relationship with the Riverkeeper, which could involve helping to clean up the banks of the Yarra, and planting trees and indigenous shrubs. Andrew Kelly said he was also keen to develop the Riverkeepers' links with Scotch.

Natural Art

Year 3 boys have been inspired by the work of British sculptor, photographer and environmentalist, Andy Goldsworthy OBE, who is a 'natural' artist, making use of materials such as brightly coloured flowers, leaves, mud, pinecones, stone, twigs, and thorns in his art. The boys have been introduced to Andy Goldsworthy's work in their art classes.

Brendan Teoh of Year 3 came up with the artwork above. 'I made three circles with a little bit of the environment,' he said. 'The outside circle is made of long, thin leaves. The next circle is made of sticks. The smallest circle is made of fat leaves. I made it because I thought of what inspires me in art, and I was inspired by Andy Goldsworthy, as he made a spiral.'

ABOVE: Brendan Teoh with his circles inspired by Andy Goldsworthy's art.

TOP LEFT: Riverkeeper Andrew Kelly with Year 3 boys.