



Bringing the environment and sustainability to life
Engage Discover Inspire

# 2019 Annual Report





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### Context

Victoria's network of Science and Mathematics Specialist Centres aims to improve student engagement and achievement in science and mathematics by providing innovative learning programs that encompass new and emerging scientific thinking, state of the art facilities and cutting edge technologies.

Ecolinc is one of Victoria's six Science and Mathematics Specialist Centres established by the Department of Education and Training (DET) (see below).

The centres provide specialised programs that are accessible to all Victorian students and professional learning programs for all Victorian teachers. They have an equity focus on rural and disadvantaged metropolitan schools.

Each centre is hosted by a government secondary school. The centres each have an area of specialisation, while operating collectively as a state-wide network. Ecolinc's area of specialisation is on the environment, sustainability and conservation.

The development of partnerships with local organisations, industry and universities is a focus for the centres.

The Science and Mathematics Specialist Centres' Network proudly operates under the following Governance Principles:

- Excellence
- Integrity
- Transparency
- Equity
- Accountability

In 2019, the network of six Science and Mathematics Specialist Centres collectively engaged with over 90,500 P-12 students from across Victoria, surpassing the previous high of 86,000 in 2017. Each Centre engaged between 13,000 and 19,000 students from Government, Catholic and Independent schools, with 90% of students coming from government schools, 4% from Catholic and 6% from Independent schools. 57% of participating students were from schools in regional and rural Victoria, with 43% from metropolitan schools.

Victoria's vision as the Education State and enabler of excellence in STEM education has been realised through the engagement of Victorian Primary and Secondary students from **672** schools across the state through the Specialist Centres' onsite and outreach programs.



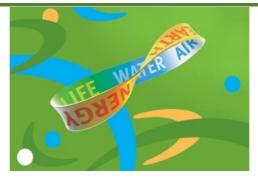












# **About Ecolinc**

Ecolinc opened in 2005 and is hosted by Bacchus Marsh College. The Ecolinc logo is a stylised Growling Grass Frog (*Litoria raniformis*), a threatened Victorian species which was first observed in the Ecolinc stormwater wetland in 2007. The wetland provides habitat for a range of native flora and fauna, including a variety of vertebrates and invertebrates and is used extensively as part of our programs.

The name Ecolinc refers to the links between the Centre, schools, tertiary institutions, related government and environmental organisations and the community, in relation to the environment and sustainability.

Ecolinc provides onsite, online and outreach programs as well as field trips in the surrounding areas. We utilise innovative technologies, the building's ecologically sustainable design elements and the natural resources of the surrounding area to provide a wide range of educational programs for F-12 students, teachers and the community. All programs are aligned to the Victorian Curriculum and VCE and provide engaging, unique and 'hands on' learning experiences based around 5 key themes:

Life Water Air Energy Earth

In 2019, 18,854 students either visited the Centre or participated in an outreach program or a fieldtrip. Our aim is to engage and inspire the next generation to pursue careers in the STEM pathways.





### **Director's Message**

What a huge year 2019 has been with over 18,000 students participating in either an onsite or outreach program, the development of our online learning hub: *Ecolinc Learn Online* and the launch of video conference programs being delivered through *STEMlinc*. Once again, this is a great testament to the work that the dedicated Ecolinc team are doing to provide high quality, inclusive and innovative environment education programs for Victorian school students.

Our new educational annex at the Deep Creek Reserve, Pakenham was officially opened in October 2019. This day was a significant highlight and a culmination of many years of work by the Cardinia Shire Council, the Cardinia Environment Coalition and Ecolinc. The schools open day held on Friday November 22nd showcased the unique facilities and allowed students from a number of primary schools in the eastern and south eastern regions to participate in learning workshops designed to give them a taste of what will be on offer in 2020.

A particular focus in 2019 has been on the delivery of professional learning for Year 7 & 8 teachers as part of the Ecolinc ViSTA program. The network of specialist centres applied for and were successful in obtaining a grant from the Department of Education and Training to deliver high-quality STEM professional learning using Cisco virtual learning technologies provided to all Victorian Government schools. As part of this proposal, Ecolinc focused specifically on building teacher capacity and student engagement in STEM learning. The blended learning program included workshops with Glen Pearsall, a renowned educational consultant, author and coach, and Ben Newsome, founder of Fizzics Education.

Another significant highlight was the GEMS conference held in May 2019. Thanks to the generous support of Toyota, Ecolinc was able to run a 2 day Women in STEM conference featuring a range of guest speakers, workshops, panel forums, industry visits, a careers speed dating session and a Careers Expo. 120 Year 9 & 10 girls from western suburbs government secondary schools participated in the 2 day conference.

Once again, I would like to take this opportunity to acknowledge and thank our dedicated and hardworking Ecolinc staff, the schools who support us with their attendance, our partners and our Ecolinc board for your commitment in continuing to make Ecolinc a centre of excellence in STEM education.

Linda Flynn Ecolinc Director.

Our Vision, Purpose and Values
Our Vision Bringing the environment and sustainability to life Our Purpose • To demonstrate excellence and innovation in science education in the areas of environment and sustainability.
<ul> <li>To provide unique and exciting opportunities for students in the Science, Technology, Engineering and Mathematics (STEM) areas that will encourage students to pursue career pathways in these areas.</li> <li>To provide high quality professional development in STEM in order to build collective capacity.</li> <li>To develop and sustain strategic partnerships that will provide significant additional value to the learning &amp; teaching experience.</li> <li>Our Values</li> <li>Engage Discover Inspire.</li> </ul>
Image: Discover Inspire

### **Our Staff**

The integrity of a Specialist Science and Mathematics Centre and its ability to deliver high quality learning and professional development programs is reliant on its ability to attract, employ and retain suitably qualified and experienced staff. Ecolinc staff are highly skilled practitioners and education support staff who deliver programs that cannot be replicated in the 'normal' classroom. In 2019, Ecolinc employed 9.5 Equivalent Full Time (EFT) staff, plus one Outreach Officer on a casual basis.

Role	Staff	EFT
Director	Linda Flynn	1.0
Assistant Director	David Tait	1.0
Education Officers	Carolanne Glynne	1.0
	Bob Hartmann	0.6
	Anthony Fernando	1.0
	Nicole Mason	0.7
	Colleen Filippa	0.6
Outreach Officers	Ainsley Bellette	Casual
Admin Officer	Julie Gogeff	1.0
Horticultural Technician	Tyrone Cain	0.5
IT Technician	Son Do	1.0
Lab Technician	Patrice Kennedy	0.9
LMS & Special Programs	Jo Tate	External

The Director and all of the Education Officers are qualified teachers who design, develop and deliver onsite and outreach programs. This includes the development of online resources and teacher professional learning programs. This is often carried out in collaboration with education, science and mathematics experts to ensure contemporary and effective STEM and education practices are applied. Our education and support staff have rich and diverse backgrounds and demonstrate a strong commitment to improving student learning outcomes.



### Onsite

### **Participation**

Ecolinc had 18,854 students participate in either an onsite, outreach or field trip in 2019.



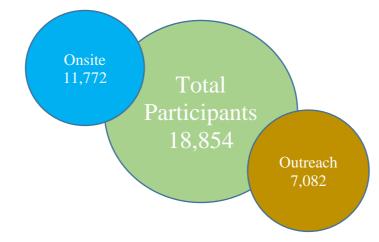


Table 1: Percentage of student participants by category – Onsite programs.

Year	Rural (R)	Metro Disadvantage (MD)	Metro Non/Government Standard* (SR)
2013	35.90	33.56	30.54
2014	31.99	42.61	25.40
2015	42.42	34.40	23.18
2016	34.01	42.61	23.38
2017	33.46	49.04	20.50
2018	46.85	36.24	16.91
2019	34.02	51.10	14.88

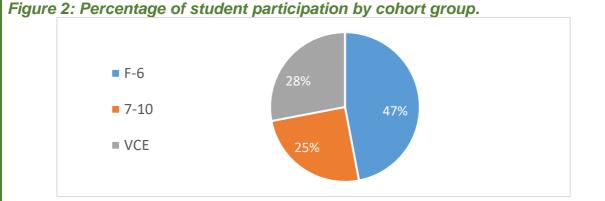
• Standard students as defined by Specialist Centres Funding Model includes schools in the Moorabool LGA.

# Table 2: Percentage of participants by Government & Non-Government Schools– Onsite programs.

Year	Government	Non-Government
2013	75.78	24.22
2014	78.88	21.12
2015	79.07	20.93
2016	81.60	18.40
2017	82.64	17.36
2018	84.42	15.58
2019	87.07	12.93

### Engagement

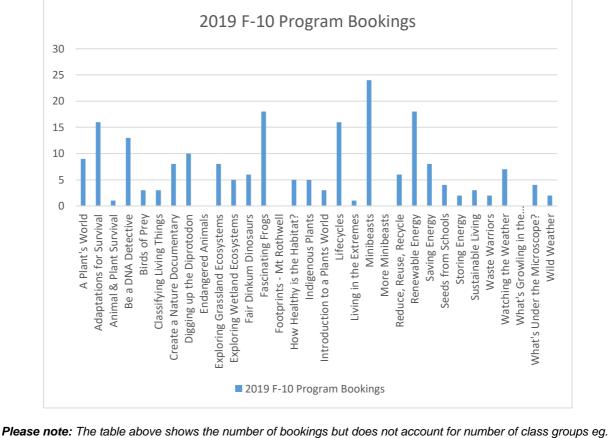
In 2019 Ecolinc set up an enrolment policy to further enhance equity by only allowing school groups to book in for 1 program per year and setting caps for each cohort group. Our target in 2019 was to increase the percentage of students from the Year 7-10 and VCE cohorts and whilst the largest percentage of student onsite participants remains from the primary school cohort group, the percentage of students from Year 7-10 has increased from 12% in 2018 to 25% in 2019 and in VCE from 14% in 2018 to 28% in 2019.



### Impact

Ecolinc delivered 32 distinct onsite curriculum programs F-10, 18 VCE programs and 15 Outreach programs in 2019. The most popular onsite F-10 programs were Minibeasts, Renewable Energy and Fascinating Frogs



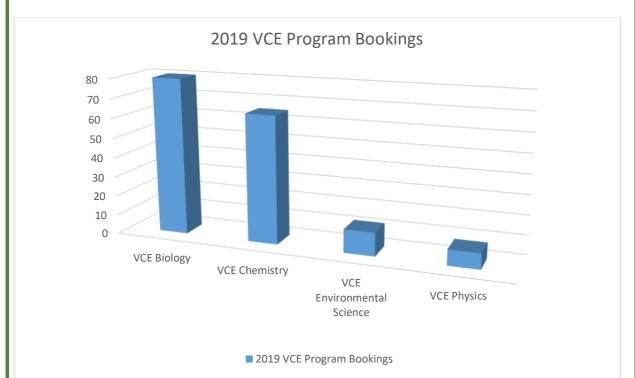


If a school books a program for 100 students, this accounts for 1 booking not 4 class groups.

9

#### Of the VCE programs, VCE Biology had the highest number of bookings.

#### Figure 4: 2019 Program Bookings for VCE



#### Testimonial

We absolutely loved our excursion to Ecolinc last week. We were blown away by how much information the students picked up and retained. We wish we could come back! Our students (and us teachers) were really touched by the information we received about the Eastern Barred Bandicoots and we decided to begin the Fighting Extinction challenge and try to collect 300 5 cent pieces. Well! Our students have already collected 300 in less than 4 days. They were so keen and excited and now want to start the second round of 300 coins. We are going to create a pattern tomorrow using the coins, which we will send, but for now I have attached some photos of our collection and set up. Thank you for inspiring our kids! (Teacher, June 2019)



In 2019, Ecolinc established and embedded a number of organisational tools as well as qualitative and quantitative feedback assessment strategies to more accurately assess our success and impact with students and teachers.

Some of these include:

- Student Onsite Program Survey Students in Year 3-12 are encouraged to complete the onsite program survey whilst visiting Ecolinc. The data gathered focuses on engagement, satisfaction and understanding of the environment/STEM.
- Teacher Onsite Program Survey Teachers are encouraged to complete the onsite survey whilst visiting Ecolinc. The data gathered focuses on centre access, administrative efficiency, impact on student learning, effect on teacher pedagogical practice and perceived impact on student attitudes to STEM.
- Student Follow-up Program Survey & Interview An Ecolinc Education Officer visits selected schools to survey & interview a small number of students approx.
   2 weeks after a visit to Ecolinc. The data gathered focuses on impact on learning & attitudes toward STEM.
- **Teacher Follow-up Program Survey & Interview** Ecolinc Education Officer visits selected schools to survey & interview visiting teachers approx. 2 weeks after a visit to Ecolinc. The data gathered focuses on impact on learning, attitudes and teacher practice.
- Student and Teacher Outreach Program Surveys Students and teachers are encouraged to complete the outreach program survey. The data gathered focuses on engagement, satisfaction and attitudes toward STEM.
- Learning Management System Students and teachers are able to provide feedback on courses that are on the LMS.

### Table 3: 2019 Primary Student Onsite Survey: Engagement with science

Question: Do you think you will enjoy Science more since coming to Ecolinc?

Answer	Responses %
Yes	87.50
No	12.50

#### Figure 5: 2019 Primary Student Onsite Survey: Satisfaction

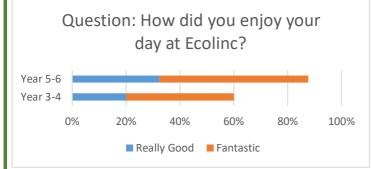
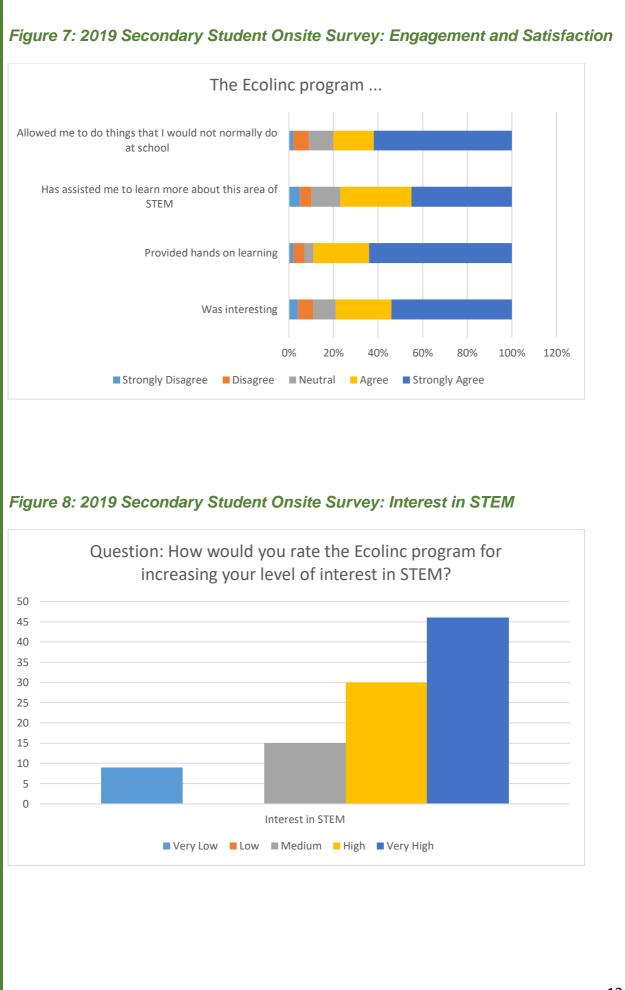
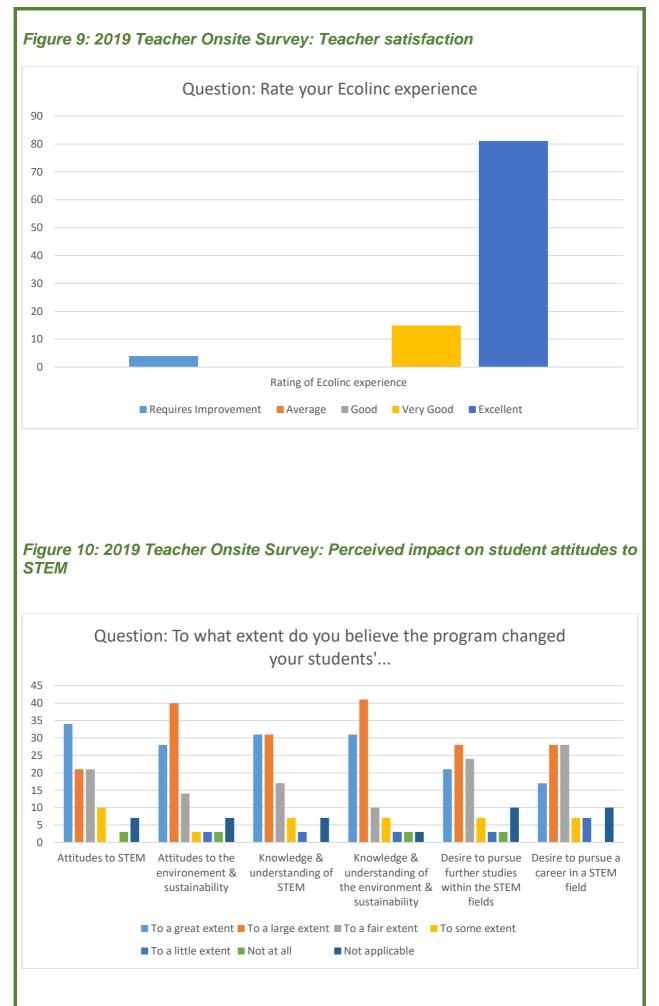


Figure 6: 2019 Primary Student Onsite Survey: Knowledge of Environment

Question: Since coming to Ecolinc, do you know more about the Environment?

Responses %
77.78
22.22





### Outreach

Ecolinc offers Outreach programs through five delivery modes:

- Outreach incursion programs: these are available to eligible primary schools and are conducted by an Ecolinc Education Officer as part of a pre or post visit to Ecolinc, or as a stand-alone program and are offered to government rural and metrodisadvantaged schools within a 1 ½ hour radius of Ecolinc.
- **Rural/Remote outreach tours:** Each year Ecolinc visits 3 rural centres and Education Officers provide an outreach experience to schools in and around these rural centres. Ecolinc has developed a 5 year outreach tour plan to ensure that all Victorian Regional centres are covered across the 5 years.

In 2019, the Outreach Road trips were to Mildura, Horsham and Warrnambool.

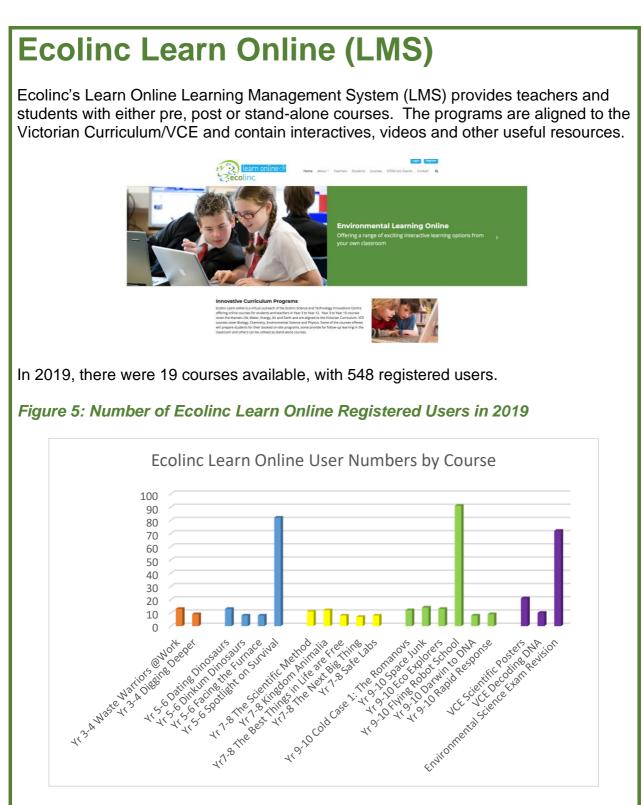
- Online programs (Ecolinc Learn Online): a range of online outreach programs and resources are available on the Ecolinc website and through Ecolinc Learn Online (Learning Management System) (see below for more information).
- Video Conferencing (STEMlinc): a variety of video conferenced events are scheduled each term delivered by Ecolinc Education Officers or auspiced from other environmental organisations (see next page for more information).
- **Cardinia:** Ecolinc opened a new annex at the Deep Creek Reserve, Pakenham in October 2019 to deliver environmental education programs (see following page for more information).

### **Participation**

Table 3: 2019 Total Outreach Participants by term.

Outreach Participants				
	Term 1	Term 2	Term 3	Term 4
Full Day	912	1581	1478	1862
Half Day	37	238	712	239
Quarter Day		118		
Total Mildura	949	1937	2095	2101
Fossils-				
5Participants				
Total FTE	930.5	1729.5	1834	1981.5





The aim in 2020 is to increase awareness of the Ecolinc Learn Online resources with teachers and to dramatically increase the number of registered users.

#### Testimonial

"I am an Environmental Science teacher at Hoppers Crossing Secondary College. My Assistant Principal forwarded the email you sent about the revision resource through your LMS portal and I am really just sending you this email to thank you! As you are well aware I am sure, there are very little resources available for VCE Enviro students and this resource is allowing me to differentiate revision activities in this stressful ad chaotic time for the year 12s. So thank you and the team for putting this together, it is much appreciated!" (Teacher, October 15 2019)

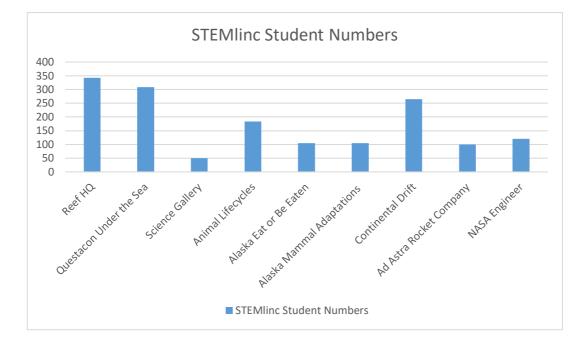
# **STEMlinc**



A range of video conference sessions were offered to primary schools in 2019, with the first commencing on May 15th. The video conference sessions were either delivered by Ecolinc and auspiced from organisations such as Questacon, Reef HQ, Science Gallery, Ad Astra Rocket Company, NASA and the Alaskan Sea Life Centre. The video conferences are interactive and schools also receive a 'STEM in a box' kit with materials so that they can conduct the experiment or undertake a STEM activity (with instructions) in their classroom while the video conference is taking place.

The video conferences are free to government primary and secondary schools and are delivered to a maximum of 4 classes at a time to allow for interaction with the presenter. Schools are able to use Webex, Zoom or Skype to join in.

In total, 1578 students participated in a video conference event in 2019.



#### Figure 6: Number of student participants in STEMlinc in 2019

#### **Testimonials**

"I really appreciate the extra materials included in our STEM box for use next week with the other classes. I was wondering how I would get access to the video recording of today's session please? Please pass our gratitude and thanks to all involved; we all really enjoyed participating." (Teacher, September 2019)

*"Our students loved the experience. We can't wait to do more with your program." (Teacher, October 2019)* 

"Thank-you so much for involving us in the live dive it was amazing and the children got a lot out of it." (October 2019)

"Our kids and their parents raved about the presentation. They were engaged and involved in the activities. We would very happily be involved in this again, it was awesome! Please send our thanks to Anthony. The best part of course, was the animals! Thanks again." (Teacher, November 2019)

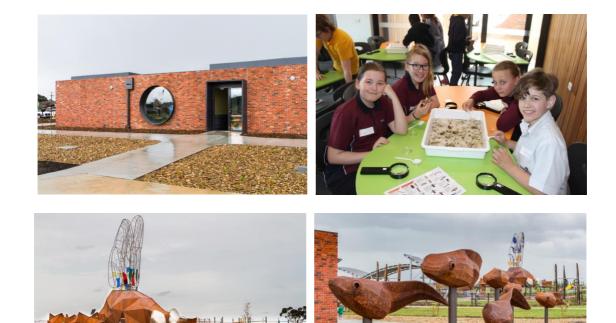
### Cardinia

Over the past few years, Ecolinc has been working with the Cardinia Shire Council and the Cardinia Environment Coalition as part of a consortium arrangement to bring environment education to schools in the east. October 2019 saw the opening of the Deep Creek Reserve Environment Education Centre and the first of our Ecolinc programs commenced onsite in November.

Thursdays have been set aside in 2020 as the teaching day at Deep Creek. Whilst we will initially offer four primary school programs available to schools, the intent is to develop a greater variety of onsite and outreach programs in the future.

Program offerings:

- Year 3 & 4 The Life of Plants
- Year 3 & 4
- Fascinating Frogs at Deep Creek • Year 5 & 6 Deep Creek Nature Documentary
- Year 5 & 6 How Healthy is the Deep Creek Wetland



# **Professional Learning**

### ViSTA

Ecolinc, along with the other Science Centres, worked collaboratively to deliver high quality STEM professional learning as part of the Virtual STEM Teaching Academy (ViSTA) in 2019. This professional development program allowed us to leverage our unique capabilities and resources to:

- provide a blended learning approach, commencing with face-to-face engagement and transitioning to the use of Cisco WebEx Teams
- support the Victorian Curriculum F-10
- apply robust contemporary STEM pedagogy aligned with FISO priorities
- employ a Communities of Practice model
- focus on improving teaching and learning capabilities
- adhere to principles of highly effective adult learning
- provide access to leading scientific and educational expertise, learning materials and resources.

The Ecolinc ViSTA program, , titled 'Becoming a Better Science Teacher', provided Year 7 & 8 beginning and out-of-method area teacher's from regional, rural and remote schools access to:

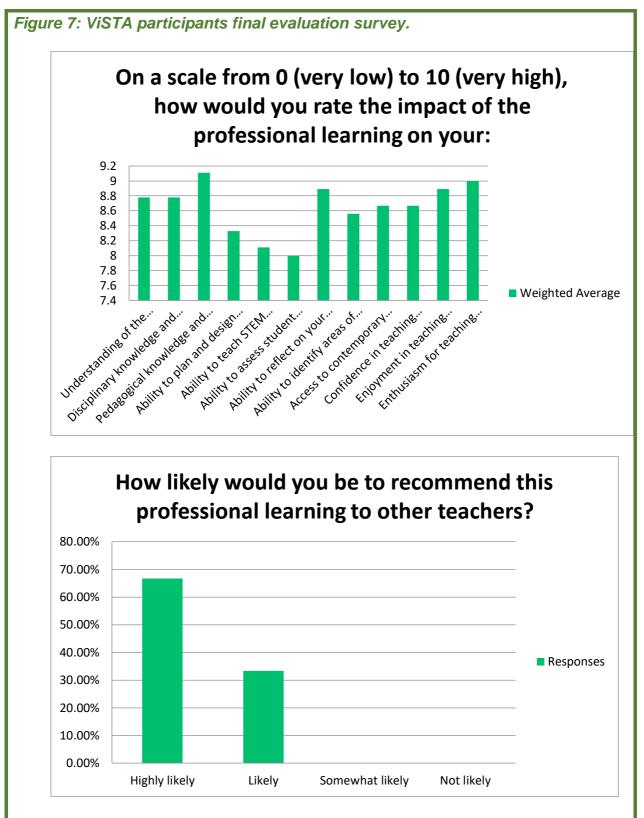
- 4 days PD at Ecolinc (fully funded by Ecolinc)
- Afterschool professional development sessions via video conferencing 3 4 times per term using the Cisco Webex virtual learning technologies
- Afterschool reflection/coaching sessions via video conferencing 3-4 times per term using Cisco Webex virtual learning technologies
- Visit by the Ecolinc Coach to the teacher's home school in Semester 1.

The 'Becoming a Better Science Teacher' program worked directly with 2-3 teachers from 8 schools to deliver an intensive professional learning program designed to build teacher capacity and student engagement in STEM learning.

Teachers participated in a series of workshops that highlighted evidence-based teaching strategies and pedagogical models that actively engage students to develop deep understanding of STEM concepts and skills. Teachers received ongoing support to reflect and refine their pedagogical content and practice.

The program adopted a blended approach including onsite workshops with Glenn Pearsall and Ben Newsome, in-school PD and use of the Cisco Webex technologies. Participants had access to an Ecolinc teaching specialist to help build their capacity in STEM education. It was expected that each participating teacher would be in a position to influence STEM teaching and learning in their school and to form a CoP within their own school. The focus of the PL program will be in response to the schools' point of need – framed by the FISO principles and incorporating HITS.

Program name	Becoming a Better Science Teacher
Program	1 cohort
structure	
Delivery mode	4 F2F workshops, 8 Webex sessions, mentoring via Webex
	Additional Webex sessions in Semester 2
Participation	20 Year 7 to 10 teachers from 8 secondary schools
Dates	February to June, Webex sessions 3.30 to 4.30 pm on
	Thursdays
	10



#### Testimonials

"I have started using questioning strategies in my classroom and also trained other staff on this." (Ecolinc ViSTA participant)

"Able to see how and in what ways concepts connect across the curriculum. Focus on the process, thinking, design just as much as the final outcome. 'Engineer's perspective'." (Ecolinc ViSTA participant)

"We have rewritten our Year 7 assessments to focus on science skills rather than just summative assessments and are looking at offering more STEM electives for our year 9 and 10 students." (Ecolinc ViSTA participant)

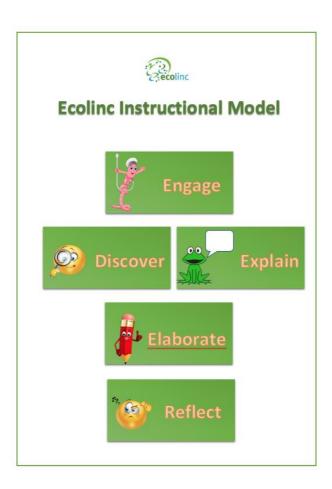
### **Ecolinc Staff PD**

#### **Glenn Pearsall:**

Ecolinc staff undertook professional learning with Glen Pearsall across 2 days in 2019, 4th September and 9th December. The first session focused on developing our understanding of the High Impact Teaching strategies (HITs), in particular on expanding our questioning techniques.

The second session focused on the development of an Instructional Model for our learning programs. This will drive our practice and the development of onsite, outreach and online programs moving forward.





#### **STAV Conference:**

Ecolinc staff attended the STAV Conference on Friday 29th November to engage in professional learning and to hear more about the roll out of the new study designs for VCE Biology & Environmental Science.

### Volunteers

Ecolinc would like to thank our Uni student and community volunteers for their assistance throughout the 2019 and to acknowledge the valued contribution and difference they make to the learning of students who visit the centre.

### **Partnerships**

Ecolinc would like to acknowledge and thank our university, industry and school partners and affiliates for their continued support and involvement with Ecolinc:



# **Other Programs:**

### **Emerging STEM for Women:**

Ecolinc held two 'Emerging STEM for Women' programs in 2019.

The first was held in May 2019 and, thanks to the generous support from Toyota, we were able to hold a 2 day conference for 120 girls Year 9 and 10 girls from western suburbs government schools. A range of immersive activities featured across the 2 days including:

- Keynote speakers
- Women in STEM panel forum
- Overcoming life's hurdles: Inspiring stories from women in STEM
- Industry visits
- Careers expo
- Emerging science workshops
- Careers speed dating

Feedback from conference:

- Women in STEM Conference Overall Rating: 91.74% rated the conference as Excellent to Very Good.
- 91.89% of students indicated that as a result of attending the conference, they want to further investigate a STEM career pathway.

Testimonials:

- I liked that there were multiple women and that they covered the different aspects of STEM
- The panel forum was possibly the best thing about the whole experience as we saw how the women interacted with each other and the way that these diverse individuals come together to share a passion
- The information from the Careers Expo about the different universities and pathways was very insightful and valuable in helping me start to consider where I want to study in the future.
- The speed dating was my favourite. It was so fun to know the ladies lives and how they got there
- The speed dating was so beneficial. Best part of the whole program I've got a clear idea of where I want to go and how I want to get there.
- Amazing. Super beneficial to hear real people talk about how they go and their personal experiences.

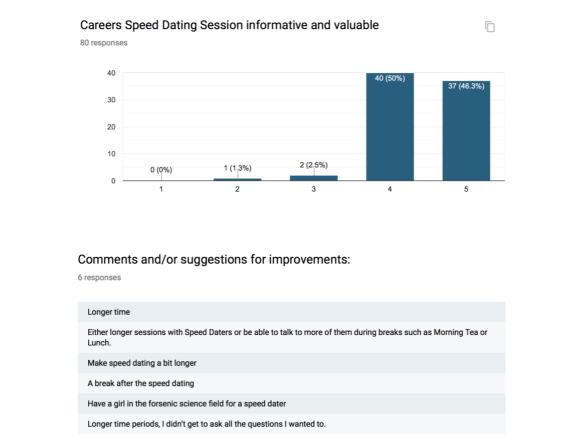




The second Emerging STEM for Women event was held in October. This was a one day program and featured Tiffany Yao, an electrical engineer from the Ad Astra Rocket Company live via video conference from Houston Texas. and Sarah Duncanson, a Paediatric nurse in the Intensive Care Unit at the Royal Children's Hospital as the two keynotes. The program also consisted of workshops and a speed dating session.



#### Figure 8: Emerging STEM for Women feedback, October 2019.



As a result of the feedback we have received from the students, we will be providing an informal opportunity to mingle with the women after the speed daters session at future events.

The Emerging STEM for Women programs are proudly supported by *Women in STEMM Australia* and we thank them immensely for their support and commitment to our program.



Ecolinc would like to also acknowledge and thank the many dedicated and supportive women who contribute voluntarily as guest speakers and speed daters to our Emerging STEM for Women programs each year.

### Science Week (12th - 16th August):

The 2019 Science Week theme was Destination Moon: more missions, more science.

Ecolinc ran a number of events across the week including:

Monday 12th August: The Aark Mission Moon program - A cataclysmic climate event has occurred; the government has managed to save the people but the animals are in peril. Students from East Lodden P-12, Dandenong SC and Westall SC engaged in a range of problem solving activities to respond to the moral dilemma of which animals' DNA is going to be saved as they put together a rescue plan called The Aark Mission Moon.



Wednesday 14th August: "Space Junk" Students from Bacchus Marsh College, Donald High School and Dandenong HS participated in a program exploring the unique recycling issue of space junk. As part of this program students were able to listen to a renowned scientist, Professor Kefei Zhang, who is the founder and director of the Satelite Positioning for Atmosphere, Climate and Environment Research Centre. Students also participated in a range of workshops, a 360 degree VR space shuttle experience and designed a scientific poster illustrating their solution to the issue of space junk.



### Testimonial

"Thank you so much! This really warmed my heart. They were so excited on the way home and LOVED their day yesterday. They raved about it to anyone who would listen today too! It was such a valuable experience for them. You and all the staff at Ecolinc did a phenomenal job. It clearly took a mountain of work organising yesterday and it was an outstanding day! One I'm sure the kids (and myself) will remember for many years to come!" (Teacher, August 2019)

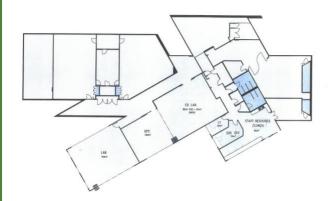
#### • Friday 16th August: Model UN Conference

90 Year 10-12 students from a range of schools (government and private) participated in a mock UN Conference on the topic of *Space Research and Sustainable Development: Improving Life on Earth*?

# **Other Highlights**

### **Building Program**

Building extension works were completed in September 2019 and we were very excited to move into our new classrooms, conference space, new Chemistry lab and staff work spaces. This addition to Ecolinc has allowed for increased booking flexibility in Term 4 and beyond.





### A New Face at Ecolinc!

In December, we had the very great pleasure of welcoming Dr Pat Vickers-Rich, a renowned palaeontologist from Swinburne University, and her team who visited Ecolinc and erected a skeleton of an Australian dinosaur called a Bullockornis in our front foyer.

The Bullockornis features in our new program called 'Fair Dinkum Fossils'.



### **Seasonal Dreaming Mosaic Panels**

Ecolinc's habitat garden was enhanced greatly by the acquisition of 4 mosaic panels depicting the changes in the seasons on the Western Volcanic Plains. Designed and made by two local artists, Chris Cocking and Jill Guerts, this fantastic piece of art took 18 months of painstaking research and work to put together. The panels portray the animals, plants and landscape features of the Western Volcanic plains in summer, autumn, winter and spring.

Not only will the panels give added colour and interest to the Ecolinc habitat garden but students will also be able to analyse and learn from them as they participate in the Watching the Weather program and others.



Figure 9: Ecolinc's facebook page:

