BACKGROUND & 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.

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 statewide network.

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

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

- Excellence
- Integrity
- Transparency
- Equity
- Accountability

We are one of six science and mathematics specialist centres in Victoria.
DIRECTORS MESSAGE

I always appreciate the process of writing this report. It’s a wonderful opportunity to reflect on and evaluate the year from a different perspective. So often the business of everyday clouds our ability to celebrate the small achievements which then accumulate to become the large achievements.

This report provides a forum to bring together the year’s work and communicate the way in which BioLAB is growing, maturing and developing into a truly unique entity.

Throughout the year we have continued to build and develop partnerships with our host school, industry, tertiary, community partners and the Science Centres Network. Without this ongoing support we would not be able to achieve the things that have been made possible this year.

At the conclusion of 2013 and beginning of this year our team developed the foundations for our strategic statement which summarised our key performance indicators. This was a rewarding process and provides the framework around the wonderful direction in which our centre continues to move and grow.

We continue to see growing support from schools around Victoria from all sectors. Our bookings system was overwhelmed at the beginning of the year and BioLAB was booked out for the entire year by the end of Term 2.

We saw 11,805 students from all school types and regions of Victoria participate in our programs throughout 2014.

Our teacher professional development programs provided an opportunity for schools to receive intensive support to develop and implement a whole school science curriculum.

We have developed programs which allow students to participate in real life research and STEM applications.

These are just some of the key characteristics of BioLAB for 2014. I hope you enjoy the read and we thank you all for your support and contribution.

Signing off with a smile,

Yvonne Van Der Ploeg

About BioLAB

BioLAB provides programs to upper primary and secondary students throughout Victoria. We are hosted by Belmont High School and located in Belmont, Geelong.

BioLAB programs deliver cutting edge, engaging educational content and integrate the use of the latest ICT and AV technologies.

We showcase the very best of the region’s research and career opportunities through hands on educational programs and partnerships. Our lead partner is Deakin University and we also maintain partnerships with a number of industry and community organisations.

BioLAB’s aim is to engage and inspire the next generation in science and mathematics careers using innovative technologies and techniques.

Our programs are linked to AusVELS and built around a number of science, technology, engineering and mathematics (STEM) career pathways.

We showcase the latest in bioscience research and careers including focus areas such as medical, sport and health sciences, biotechnology, materials technology and biomechanics.

Our programs are themed around the specialisation of Human Performance and Sport.
**OUR PRIORITIES**

We stand for educational programs of quality, relevance and excellence.

Our vision is to engage and inspire the next generation in science and mathematics careers using innovative technologies and techniques.

We aim to increase awareness of scientific and mathematical career pathways and encourage lifelong learning by providing relevant, high quality educational programs to Victorian students and teachers.

Our programs highlight the wonder of science and mathematics using the theme of Human Performance and Sport.

We strive to find new and unique ways to best engage and interact with a broad cross section of students and teachers in Victoria.

We design quality programs that can be adapted to suit individual student needs.

BioLAB provides specialised programs that are accessible to all Victorian students and professional learning programs for all Victorian teachers. We have an equity focus on rural and disadvantaged metropolitan schools and take these groups into consideration when designing program content.

Learning intentions are incorporated into all BioLAB programs to ensure that a consistent message encompassing curriculum objectives and BioLAB priorities is delivered to all recipients of our programs. These learning intentions make the key ideas of each program clear to our staff, visiting teacher and students.

This approach has led to the delivery of effective programs with a considered and deliberate emphasis of key ideas that promote a greater degree of student engagement in science and mathematics.

Success criteria have allowed the application of knowledge which students have obtained during programs to be assessed.

Strategically incorporating literacies of science into these criteria has helped to raise the profile and relevance of real science that occurs in the world around these students every day.
OUR NEXT GENERATION

...new experiences, real research, relevant applications and career pathways.

School bookings were very strong throughout the year and we are beginning to see an ever growing trend of our programs being booked out well in advance. This is a very good indication of the quality of our programs and the service that we provide to schools across Victoria.

We continue to see a very good spread of school types visiting the centre. We have an equity focus on cohorts from disadvantaged and rural schools and this focus sees 70% of our student groups derive from these schools.

We have seen schools from across Victoria come to visit the centre with all DEECD regions represented in our participation figures for 2014.

Students are at the core of our program design process. Our programs are designed to ensure we offer an experience that is unique, engaging, inspiring and applicable to multiple curriculum areas.

We continue to find a good balance between outreach and inhouse programs. Throughout 2014 we have run 2036 students through outreach programs and 9769 students through onsite programs.

Many programs and variations were added to BioLAB’s repertoire throughout the year with the most popular programs being Metabolic Madness, BioCATS, Coded for Success, Inner Sanctum, Come Clean and Human Machine.

We have also seen an increase in participation in our VCE programs which are gaining popularity amongst Victorian schools.

The increase in participation can be attributed to a number of developments in the centre’s strategic focus, staffing, partnerships, program development and consolidation.

BioLAB programs are offered across years 5-12 with our target groups being upper primary and lower secondary. We also had a strategic aim this year to increase our years 7-10 program participation.

The participation data demonstrates achievement of both performance indicators in 2014 with these groups (Years 5-6 Primary / Years 7-10 Secondary) making up 87% of our visitation and year 7-10 program participation numbers showing a positive increase.

2014 BioLAB attendees by age group.

<table>
<thead>
<tr>
<th></th>
<th>Primary yrs 5-6</th>
<th>Secondary yrs 7-10</th>
<th>VCE yrs 11-12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students</td>
<td>5102</td>
<td>5166</td>
<td>1540</td>
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Participation by school type

- Standard: 34%
- Metro Disadvantaged: 30%
- Rural: 36%
BioLAB maintains a strong community of teachers, and we have professional development programs which aim to build teacher capacity and confidence in teaching science and mathematics.

Throughout 2014 we ran the BioBLAST program which involved working with five local schools who did not have an existing science program. The teachers involved in this program were provided with training, resources and mentoring to build capacity and confidence and to facilitate the development of students who have a thirst for scientific knowledge.

Participants of this program;

- attended two days of structured professional development at BioLAB.
- received two classroom visits that focussed on applying the professional development knowledge and implementing resources. These visits included a mix of modelling, coaching and team teaching, dependent upon the needs of individual participants.
- attended two days of structured professional development that focussed on practical solutions for integrating science into existing curricula.
- received a one-hour consultation with the BioBLAST consultant which focussed on the future direction of science within each school.

The BioBLAST program focussed on building teacher capacity and confidence in not only the teaching of general science inquiry skills but also in the scientific knowledge of the perceived hard to teach area of Chemical Sciences.

The BioBLAST program was offered to schools in the Geelong region and following an application and selection process five schools were accepted into the program. These schools; Lethbridge Primary School, Inverleigh Primary School, Little River Primary School, Herne Hill Primary School and Roslyn Primary School each had one teacher who oversaw the schools involvement in the program.

Through use of pre-program and post-program surveys participating teachers reported that there had been an improvement in their perceived confidence over the course of the program. All respondents reported an improvement in their scientific knowledge and their repertoire of strategies to incorporate this into the existing curriculum within their schools. This is evidenced with the majority of the participating schools providing science opportunities for their students in the range of 30 minutes to 2 hours each week.

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The BioLAB in a Box: Sports Nutrition program with the support of the City of Greater Geelong. This resource was developed to assist teachers, students and the community to link educational outcomes and content with regional capabilities and career pathways.

The BioLAB in a Box program was designed to assist teachers to bring science and mathematics into their classroom in a fun, interactive and relevant way.

This program was offered to twenty primary schools in the Geelong region and provided teachers with one-day of professional development at BioLAB, an “all in one” teaching resource kit, teacher resource training and an outreach visit by a team of Education Officers to their school.

We encourage our students to “think outside the box”, so we must also do the same.

“The all in one” resource kit that teachers received as part of this program enabled students to explore their scientific inquiry skills and develop their understanding of chemical science concepts, whilst gaining hands on experience in the career pathways of nutritional product development, testing and innovation.

The program also aims to arm students with the skills to think critically and make educated decisions about the nutritional and marketing claims that they see in their daily lives.
We have a focus on playing an active role in our education and local communities and with partner organisations.

Our partnership with Rip Curl, a global industry leader, has also offered an insight into real career pathways and commercial research and development of wetsuits. This partnership is an important link between career pathways, industry and commercialisation of scientific research.

Our Lead Partnership with Deakin University concluded in July 2014 with many wonderful outcomes over the 3 year partnership. The culmination of this was the successful introduction of internships for Deakin students at BioLAB and the launch of the Winning Edge program.

Our Geelong Football Club partnership has continued to be a wonderful link between industry, community and education. This year has seen many wonderful outcomes including the BioCATS program, Sport Science Careers Evening, AFL Indigenous Round and our Match Day partnership.

The City of Greater Geelong are a foundation partner of BioLAB and came on board this year as a key supporter of our BioLAB in a Box resource. This resource was developed to assist teachers, students and the community to link educational outcomes and content with regional capabilities and career pathways.

Teacher Feedback

Throughout the year we have been focused on better capturing the feedback and impact of our programs. All staff are asked to complete a survey which captures their thoughts, opinions and experiences at BioLAB. These are regularly reviewed and actioned by our team to ensure we continually improve our practice.

96.4% of teachers rated their BioLAB experience as Excellent to Very Good.

96.2% of teachers rated their student’s engagement as Excellent to Very Good.

When teachers were asked what motivated them to visit BioLAB (ability choose multiple answers):
• 69.7% visit related to specific curriculum
• 54.6% aimed at increasing engagement
• 37.2% aimed at encouraging pursuit of science and maths career pathways.

Student Feedback

We aim to capture the thoughts, and experiences of our student cohorts when they participate in a BioLAB program. This year has seen the introduction of our student survey which helps us gauge our impact with students. We are also in the implementation phase of a pre and post knowledge capture project for our inhouse programs which will be an important indicator of program effectiveness in reaching identified learning intentions.

Student Quote: “From this day, I now know what I want to do for my future after school. I am attending the Deakin University open day to find out more about Exercise and Nutritional Science courses...” - Winning Edge participant Yr 12

91.5% of students stated that BioLAB has had a positive influence on their attitudes to science and maths.
ACHIEVEMENTS

BioLAB’s Outreach program has proven very popular this year with an increase in participation and demand. The team have travelled to many schools far and wide with visits occurring in the Colac, Alpine, Werribee, Surfcoast, Warrnambool and outer Geelong regions. Below is an update on some of our developments.

Beat That

Beat That is one of our most popular outreach programs for primary school students. This year it was adapted to a secondary version which incorporates curriculum links to mathematics, physical education and science learning areas.

Students calculate work rates, training zones and use physiological sensors and datalogging technology to monitor cardiac output.

Beat That remains one of our highest requested and participated programs and has seen over 2000 students participating in this program throughout 2014.

BioLAB delivered exciting, hands on programs to 2036 students in our Outreach program.

- **BioLAB in a Box: Sports Chemistry** program. This is an inquiry based program where students use their scientific skills to unlock the secrets of a number of sporting supplements. This program was successfully delivered to 20 schools in the region and will be continued throughout 2015.

- **Fast and Curious** was delivered in the Victorian Alpine region for the first time this year to wonderful groups from Myrtleford P-12. This program will take another exciting leap in 2015 with plans to travel back to the alpine region with the Deakin Engineering Team to test some of the physics of snowsports.

- The BioLAB Team conducted two tours to the Warrnambool region this year to visit many primary and secondary schools. Our Term 2 visit to primary schools and Term 3 to secondary schools across the region with the Beat That and Eye in the Sky programs.

- For its third year BioLAB supported the Grampians regional schools by attending their annual camp to deliver our Beat That program. This tour also involved Earth Ed which was a wonderful way for two regional science specialist centres to combine forces and take their programs on the road.

“Learn from yesterday, live for today, hope for tomorrow. The important thing is not to stop questioning”

- Albert Einstein
The Winning Edge

Term two saw the launch of our exciting new Deakin partnership program The Winning Edge. This program was developed in conjunction with the faculty of Exercise and Sport Science and also encompasses the Deakin Internship program.

The Winning Edge is delivered onsite from Deakin’s state of the art School of Exercise and Nutritional Science building. The program was designed to give students a practical and theoretical introduction to University and research level Anatomy, Physiology and Biomechanics. The program offers a fantastic insight into exercise, health and medical science career pathways.

Throughout The Winning Edge students are immersed in experiential activities that investigate the Science, Maths and Technology of sport and human performance. Students rotate through three laboratory experiences, using cutting edge technologies, which allow them to measure, investigate and record a number of biomechanical, anatomical and physiological concepts. Over terms 2 and 3 over 380 students experienced this program.

Materials Technology

This year has seen 300 students participate in the Materials Technology program.

This program makes strong links between Secondary Science, Maths, and Design and Technology curricula and recent research carried out at Deakin University.

Our partnership with Rip Curl, a global industry leader, has also offered an insight into real career pathways. This was strengthened by combining the program with tours of the Rip Curl Headquarters in Torquay.

We also saw some fantastic outcomes such as with Year 10 students being offered work experience programs as a direct result of their participation in the program.

The primary aim of Materials Technology is to allow secondary level students to explore how science and maths, technology and engineering is used in higher education and industry to find creative solutions to real world problems.

BioCATS

BioCATS is our most highly participated in program for the year with 2211 students experiencing the program. It’s popularity with schools throughout Victoria has been exceptional and this trend will continue through 2015.

Students learn about skill acquisition, nutrition, hydration, materials technology, GPS data analysis and statistics, as well as the importance of health and wellbeing.

BioCATS explores the latest trends in technology to improve human performance, through real world science and maths student experiences. This education program also promotes health and well-being, alongside career pathways in sport.

The focus this year was consolidation, ensuring the solid foundations in maths, science and health curriculum outcomes plus ensuring product quality.

The diversification of school visitation from students across the state, was also a priority with an aim to attract new and rural schools to the program. Nine new schools participated in the BioCATS program for the year. As our reputation grows we are continuing to expand our reach to many more regional communities.

BioLAB and the Geelong Cats hosted a group of indigenous primary students and teachers from the South Western Victoria region as part of the AFL Indigenous round. Over 50 students participated in a full day experience at the Deakin Cats Community Centre, receiving an exclusive tour of the clubs inner sanctum and a special visit from the Cats Indigenous players. This marquee event will continue to feature annually on the BioCATS calendar.

ACHIEVEMENTS

BioLAB continued to deliver innovative and engaging programs onsite throughout 2014.

Below we have highlighted the newest programs to be developed throughout the year, as well as taking a look at the developments in our existing programs which are constantly updated to stay as relevant and exciting as the day they were launched!

9750 students experienced onsite programs at BioLAB throughout 2014.
Sprinters Gene has been updated to include a protein electrophoresis gel activity in addition to the DNA gel electrophoresis. This increases the level of analysis techniques that students are able to utilise as part of this VCE program. Sample SAC questions have also been developed to assist teachers to assess the content included in the full day program. We saw 242 students through this program and many new schools.

Skin Deep now has a new senior version of the program which sees the utilisation of thermal camera technology, datalogging and physiological sensors so students gain a deeper understanding of the structure and function of skin, including variations in thickness, skin mass and body temperature. This new version of the program had 332 participants through from Years 7,8.

Coded for Success was introduced as a new program this year to 780 students. The program is based on current research in the field of exercise genetics. Students develop an understanding of the role that genetics plays in generating differences amongst individuals, including the genetics behind seemingly superhuman or injury-prone athletes. There are two versions of Coded for Success aimed at curriculum in introductory general science (yrs 7,8) and middle school science electives.

Inner Sanctum was adapted this year to incorporate our new Batak reaction time machines. This program introduces various methods and techniques used by sports psychologists to train elite athletes. Students utilise physiological and psychological methods to identify personality traits, monitor the stress response and collect their own performance data using our Batak reaction time and Smart Speed timing gate systems.

BioLAB Strategies: we will achieve our vision through the following integrated strategies;

- Programs are linked to AusVELS across a range of subject areas including; science, mathematics, physical education and health.
- Utilise a number of pedagogical and communications techniques to ensure the narrative and program outcome are easily recognisable.
- Grow program delivery capacity, depth and quality.
- Showcase local and worldwide research and career opportunities.
- Provide current and relevant real life applications of science, technology, engineering and mathematics.
- Monitor and evaluate program outcomes
- Provide access to further information and application of science, technology, engineering and mathematics.
- Programs promote a positive health and wellbeing message.
- Develop targeted and productive partnerships with other education institutions, industry and community.
- Build employee capacity through professional development, mentoring and onsite training.
- Ensuring diversity of specialisations amongst employees.
- Embed new and emerging technologies into BioLAB’s programs.
- Use IT/AV technologies to contribute towards building an innovative educational environment.
- Encourage a culture of life long learning amongst our staff, students and community.