November 2016 SASTA

Newsletter of the South Australian Science Teachers Association Inc.

Latest Events

For the latest events and Conference information go to SASTA's website:
www.sasta.asn.au

For information about science competitions go to:
www.oliphantscienceawards.com.au

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Conferences/Events

STEM (6-11) Conference

Friday 25 November 2016, Playford International College, Elizabeth

See page 4 for details

Open Source Teaching Psychology

Friday 25 November 2016, Education Development Centre, Hindmarsh

Further information & registration available at www.sasta.asn.au

New Opportunities for Teaching and Learning in SACE Earth & Environmental Science

Friday 9 December 2016, Education Development Centre, Hindmarsh

Further information & registration available at www.sasta.asn.au

Psychology Summer Conference

Friday 20 January 2017, Education Development Centre, Hindmarsh

See page 5 for details

Teachers New to SACE Stage 1 & 2 Workshops

Biology and Chemistry, **Monday 20 February 2017**

Physics and Psychology, **Friday 24 February 2017**

Nutrition, **Friday 3 March 2017**

Education Development Centre, Hindmarsh

Further information & registration available at www.sasta.asn.au

Annual Conference – Call for Workshop Presenters

The next Annual Conference & Expo will be held on Thursday 27 & Friday 28 April 2017 at Brighton Secondary School. See page 7 for more details.

Feature Articles

SU, SIS and SHE: SACE Stage 1 Biology in 2017

To further our mission of 'Supporting teachers of science: Advancing science education' SASTA has been organising workshops, developing resources and sourcing articles from respected educators to assist members with the implementation of SACE Stage 1 next year. The first article written by Dr Kathy Adams for biology teachers appears on page 11.

Also, in this edition, Adjunct Associate Professor, Debra Panizzon and the Registrar of the Teachers Registration Board, Dr Peter Lind discuss **Taking Ownership of Professional Learning** on page 13.

South Australian Science Teachers Association Inc.

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Member of Australian Science Teachers Association (ASTA)

Supporting teachers of science • Advancing science education

SASTA South Australian Science Teachers Association

SASTA
South Australian Science Teachers Association

2016 SASTA Committee

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Dr Leanna Read FTSE, FAICD, Chief Scientist for SA

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Newsletter copy deadlines 2017

(Advertising deadlines one week earlier)

Edition	Deadline
February	11 January
May	11 April
August	11 July
November	10 October

Advertising

Advertising rates & booking form online at www.sasta.asn.au

Views expressed in this newsletter are not necessarily those of SASTA or the editors. Whilst every effort is made to be factual, no liability is accepted for the accuracy of information presented.

Adhering to the following guidelines would be appreciated:

Save as a Microsoft Word document

Tables to be set up as text with one tab between columns and a return at the end of each row.

For spelling please use the Macquarie Dictionary and where several alternative spellings are listed, use the first. The exception to this is when you are citing, referencing or quoting directly from a source which uses alternative spelling. Photographs should be high quality untouched digital photographs.

From the President

The 2016 SASTA Oliphant Science Awards continue to be a highlight of the year for us. This year we had more than 2,000 projects entered by over 2500 students from 90 schools across SA. Prize winning projects were displayed at open day and approximately 1200 people attended our 'come and try' science activities for the whole family at the Festival Function Centre. The presentation night this year was held in the Concert Hall at Brighton Secondary School. The students, parents, grandparents and invited guests clearly loved the awards, prizes and the formal recognition given to participants for all their hard work. Congratulations to Alexandra Stephenson from the Adelaide Hills Home School Group who took out the Oliphant Trophy this year.

Make sure your students don't miss out on the fun next year! Congratulations to the convenors of the event, Peter Turnbull and David LeCornu for managing such an outstanding event, as well as our dedicated office staff, volunteers, coordinators and judges who put in such a huge amount of time behind the scenes.

As a member organisation SASTA is continually looking to improve its range and quality of services to members. Following member feedback, SASTA is currently investigating how we can improve services to country members, particularly those in isolated schools and regions.

SASTA offers a comprehensive range of science resources for teachers and students. These resources include Study Guides, Workbooks and Text Books. Resources are distributed through schools, book shops, the SASTA Office, and our online store.

To coincide and support teachers with the introduction of the SACE Stage 1 Australian Curriculum in 2017 SASTA has produced brand new resources for Biology, Chemistry and Physics. They contain a range of new original questions for students with worked solutions. All questions are mapped to the new performance standards for Stage 1 and there is a topic test for each chapter. The SASTA resources cover all topics outlined in the new SACE curriculum in an easy to read format and will be printed in colour and rich with illustrations and diagrams to enhance learning.

World Teachers' Day held annually on 5 October is a UNESCO initiative, a day devoted to appreciating, assessing, and improving the educators of the world. The real point is to provide a time to look at and address issues pertaining to teachers. Strangely one of the most central, vital professionals to society does not receive the respect it deserves in some parts of the world. Teachers are producing global citizens, so they are global teachers, who need to situate their advances on a global level. WTD is an opportunity to rethink national issues facing teachers from an international perspective, to benchmark progress made by national teachers in a global context. SASTA and other teacher associations will be celebrating teachers' achievement at the CEASA World Teachers Day Event on the last Friday of October. Over 50 educators have received awards from their associations throughout the year and the event offers the opportunity to once again recognise and celebrate the contribution made by South Australians to the education profession.

Everyone can help by celebrating the profession, by generating awareness about teacher issues, by ensuring that teacher respect is part of the natural order of things. Take the opportunity of the day to discuss, compare, learn, argue, share and improve.

Karen Palumbo

2017 SASTA Awards

There are many great teachers out there that SASTA would like to acknowledge, but often they don't get nominated for Awards because teaching is a very busy job and people don't get the time to fill in nomination forms.

Start thinking now. Alert your Principal. There are a number of Awards for SASTA members.

SASTA Medal

SASTA offers its members and award for excellent contribution to science education or teaching or both. The SASTA Medal is awarded to an individual who has made a significant contribution to SASTA and has been active in science education.

Credit Union SA/SASTA Outstanding Teacher Award for junior primary, primary, middle years and senior years' teachers

The Outstanding Teacher Awards recognise teachers' contributions to the education of students in science.

Helen Castle Memorial Scholarship

This Scholarship is in memory of Helen Castle, a dedicated and enthusiastic science teacher who tragically died during the Eyre Peninsula bush fires in 2005. The Scholarship is designed to assist country science teachers attend the SASTA Annual Conference and gain professional development to assist themselves and other country teachers to maintain a high standard of science teaching in country areas. Two (2) scholarships of $500 will be awarded to enable country based science teachers to attend the SASTA Annual Conference on Thursday 27 & Friday 28 April 2017.

Nomination forms are available at www.sasta.asn.au.

Nominations close Friday 3 March 2017 at 4.00 pm

STEM 6-11 Conference

Friday 25 November 2016,
Playford International College,
Philip Highway, Elizabeth

The South Australian Science Teachers Association in conjunction with the Mathematical Association of SA have organised a STEM conference for teachers of years 6-11. This one-day conference will provide high quality professional learning opportunities for teachers and educators, in the fields of science, mathematics, ICT and design and technology.

Workshop focus on STEM Education

The conference is designed to bring together teachers, educators and exhibitors who are interested in sharing and exploring tools, resources and related activities that will ensure successful implementation of STEM education into our schools and communities.

Some workshops will address the critical importance of connecting different areas of STEM by considering ways of interrelating science and/or mathematics topics using the tools of technology and engineering emerging through hands-on and real-life applications. Other workshops will address activities

to support teaching and learning in more specific topics in the disciplines of mathematics, science, design & technology and IT.

Networking Opportunities

The conference will also provide an excellent opportunity for educators and teachers to exchange ideas about STEM teaching and learning and to maintain and develop valuable networks.

BOOK NOW!

The program and registration is available online at www.sasta.asn.au

Australian Government | Ansto

Teacher Professional Development Days

Access a number of syllabus-focused educational resources to teach areas of the **Year 9 Science and Yr 12 Physics curricula.**

- ✔ Hear from prominent Australian scientists
- ✔ Learn about Australia's capabilities in nuclear science
- ✔ Participate in workshops
- ✔ Receive new educational resources

PRE-SERVICE TEACHERS	**DATE** Thursday, 8 June 2017	**TIME** 9.00am - 3.00pm	**COST** Free	**LOCATION** The Science Exchange, 55 Exchange Pl, Adelaide, SA
IN-SERVICE TEACHERS	**DATE** Friday, 9 June 2017	**TIME** 9.00am - 3.00pm	**COST** Free	**LOCATION** The Science Exchange, 55 Exchange Pl, Adelaide, SA

REGISTRATION AND FURTHER INFORMATION

www.ansto.gov.au/education

Hosted by The Royal Institution of Australia

RiAus

Stage 2 Exam Post Mortems

FREE to attend; No booking required

Physics

When: Tuesday 8th November 2016 - 6.30pm for a 7.00pm start.

Where: Prince Alfred College (Piper Pavilion), 23 Dequetteville Terrace, Kent Town

Biology

When: Monday 14th November 2016 - 6.30pm for a 7.00pm start.

Where: Nazareth Catholic College Secondary Campus (senior school building), 1 Hartley Road, Flinders Park

Chemistry

When: Wednesday 16th November 2016 - 6.30pm for a 7.00pm start.

Where: Eynesbury College, 19 Franklin Street, Adelaide

Psychology Summer Conference: Keynote Address

The Psychology of Creativity and Innovation

Creativity and Innovation are hot topics in education, business and government. Creativity is generally understood to be concerned with the generation of new ideas, while innovation addresses the exploitation of those new ideas. Both, however, are driven by psychological factors including personality and cognition. In this presentation I will discuss those elements of motivation, personal properties, feelings and thinking styles that appear to favour creativity – what are they, and how are they measured – and will set these in the broader context of creative problem solving. I will outline the relationship between creativity and educational factors such as intelligence, and the presentation will also touch on darker aspects of creativity – how is creativity sometimes misapplied, and is there a relationship to less desirable personal characteristics such as narcissism? Finally, I will also outline the role that psychology and creativity play in shaping organisational performance – why do schools and other organisations need to learn how to be creative?

Biography

David Cropley is the Associate Professor of Engineering Innovation at the University of South Australia.

Dr Cropley joined the School of Engineering at the South Australian Institute of Technology (SAIT) in 1990, after serving for four years in the United Kingdom's Royal Navy, including deployments to the Middle East. Following the establishment of the University in 1991, he completed a PhD in Measurement Systems Engineering in 1997, and a Graduate Certificate in Higher Education in 2002.

From 2003 until 2007 Dr Cropley was Director of the Systems Engineering and Evaluation Centre (SEEC) at the University, leading a team of engineers specialising in research and education in the field of complex defence systems. In 2007, SEEC was transformed into the larger Defence and Systems Institute (DASI), where he was Deputy Director from 2007 – 2012.

Dr Cropley has taught a variety of courses on engineering, creativity and innovation at the University, and has facilitated creative problem-solving workshops for various organisations, including BAE Systems and DSTO. His research interests lie in the measurement of creativity and innovation in engineering processes and organisations, the role of creativity and innovation in terrorism and crime, and the nexus of creative problem-solving and engineering.

Dr Cropley is author of four books including *Creativity in Engineering: Novel Solutions to Complex Problems* (Academic Press, 2015); *The Psychology of Innovation in Organizations* (Cambridge University Press, 2015); *Creativity and Crime: A Psychological Analysis* (Cambridge University Press, 2013) and *Fostering Creativity: A Diagnostic Approach for Higher Education and Organisations* (Hampton Press, 2009). He is also co-editor of *The Ethics of Creativity* (Palgrave MacMillan, 2014) and *The Dark Side of Creativity* (Cambridge University Press, 2010).

Now a recognised expert in creative problem solving and innovation, Dr David Cropley was a scientific consultant and on-screen expert for the Australian ABC TV Documentaries *Redesign My Brain* (2013), *Life at 9* (2014) and *Redesign My Brain*, *Series 2* (2015).

Dr Cropley is also a keen rower and member of the Adelaide Rowing Club. He has set two world records in indoor rowing in his age group – in 2010 for a 24-hour tandem row, and in 2012 for a tandem 100km row. He is also an occasional actor, appearing in ANZAC Girls (ABC, 2014) and as a zombie in series 2 of the SBS show *Danger 5* (2015).

SASTA Psychology Summer Conference

Being innovative in psychology

Friday 20th January 2017

Education Development Centre, Milner Street, Hindmarsh. SA

Program

9.00 a.m.	**Conference Opening** Housekeeping and welcome	Lois Ey
	Keynote Speaker: Associate Professor David Cropley University of South Australia **The Psychology of Creativity and Innovation**	
10.30 a.m.	Morning tea Credit Union SA	A word from our sponsors
10.45 a.m.	**SACE Examination and Moderation Review**	
12.00 noon	**Concurrent Workshops 1**	
	1.1 Here's how I do it: *Stage 1 – Human Psychological Development*	Kathy Ayliffe
	1.2 Task design – *How not to screw up school assessment.*	Bob Buxton
	1.3 Psychology in the Australian Curriculum	Kate Cutts
1.00 p.m.	Lunch	
1.30 p.m.	**Concurrent Workshops 2**	
	2.1 What every psychology teacher needs to know when working with young people (including vulnerable ones)	Prof Sarah Blunden
	2.2 Task design – *How not to screw up school assessment.*	Bob Buxton
	2.3 Psychology in the Australian Curriculum	Kate Cutts
2.30 p.m.	**Concurrent Workshops 3**	
	3.1 What every psychology teacher needs to know when working with young people (including vulnerable ones)	Prof Sarah Blunden
	3.2 Here's how I do it*: Stage 1 – Human Psychological Development*	Kathy Ayliffe
	3.3 Introducing psychology for Year 10 students	Jane Hoffman and Shannyn Siemens
3.30 p.m.	**Conference Plenary**	

Attention: Science Teachers and Coordinators

Call for workshop presenters

SASTA Annual Conference & Expo 2017

Thursday 27 & Friday 28 April 2017 at Brighton Secondary School

SHARE your good ideas … submit a workshop proposal for the conference!

Presenting workshops for your colleagues is an excellent way to share best practice and develop a community of educators across the State.

TAKE PART in a broad program of professional learning workshops for primary and secondary teachers, including laboratory and computer workshops, hands-on activities, seminars and discussions.

GAIN valuable experience in leading learning that will enrich your own professional standards.

Conference themes

The Conference will address a range of the content and pedagogies of the Australian Curriculum: Science, however it will also incorporate the theme 'Raising Standards of Teaching & Learning. Participants should be actively involved in the learning through a practical and investigative approach. Sessions that link to real world examples of contemporary science are encouraged.

Possible workshop ideas:

- Hands-on activities for primary, middle and senior school science teachers & laboratory officers;
- Use of technologies in teaching and learning;
- Integrated units of work of Science and Literacy etc;
- Ways of motivating students to consider science in their future careers;
- Improving student's confidence and experiences in Science.

Share your good ideas … submit a proposal for the **SASTA Annual Conference at** www.sasta.asn.au **by 31 January 2017.**

NEC kits for secondary students

The Nature Education Centre (NEC) leases a variety of kits that provide information, specimens and suggested hands-on activities, and which are relevant to several aspects of the National Curriculum for years 8 to 10.

Most NEC kits are hired out only to member schools, but special provisions are made for High Schools that do not wish to take out full NEC membership. They are able to hire kits for prices between $12 and $15 per week, which are a little higher than the members' prices.

Relevant kits available at present are:

Year 8 – Rock Activities, Minerals Identification, Living with Minerals, and

Year 10 – Fossils and Evolution

Years 7, 8 and 10 – Crystals, Cleavages and Classification

For more details about the kits, see the article in the October SASTA journal, or email Cynthia Pyle: Cynthia_p@iprimus.com.au.

The NEC's contact details are:

Location – 505 Fullarton Road, NETHERBY SA 5062

Phone (08) 8357 3413 **Fax** (08) 8372 6999

Website – www.nature.sa.edu.au

2016 SASTA Oliphant Science Awards

Congratulations to all students who completed entries and to the major prize winners.

Ms Monica Oliphant presented the prestigious **Oliphant Trophy** to Ms Alexandra Stephenson from Adelaide Hills Home School Group for her Scientific Inquiry entry 'Vibration Damping on the Cello by Cello Mutes' at the presentation ceremony held on Friday 23 September at the Brighton Secondary School Concert Hall.

DECD Young Scientist

Primary

1st Toby Trenwith – Virginia Primary School

1st Caitlin Wood – Adelaide Hills Home School Group

2nd Benny Woodrow – Stirling East Primary School

2nd Chloe Mickel – Virginia Primary School

3rd Joshua Wright – Linden Park Primary School

3rd Amelia Pudney – St Peter's Collegiate Girls' School

Secondary

1st Seran Perera – Prince Alfred College

1st Alexandra Stephenson – Adelaide Hills Home School Group

2nd Oliver Sprey – Glenunga International School

2nd Jasmine Pople – Urrbrae Agricultural High School

3rd Idris Kellermann Williams – Glenunga International High School

3rd Amber Washington – Pulteney Grammar School

Rowe Scientific Country School Award

R-7 Memorial Oval Primary School

8-12 Wudinna Area School

DSTG Secondary School

8 – 10

1st Walford Anglican School for Girls

2nd Glenunga International High School

11 – 12

1st Glenunga International High School

2nd Seymour College

Department of Primary Industries & Regions South Australia & South Australian Research & Development Institute

6-7 Larissa Berginetti – St Aloysius College

11-12 Jasmine Pople – Urrbrae Agricultural High School

Australian Grain Technologies

6-7 Alexander Profiris – Cabra Dominican College

11-12 Jasmine Pople – Urrbrae Agricultural High School

Australian Institute of Energy

R-2 Ophelia Harding – Burnside Primary School

3-5 Sebastien Ireland – Westminster School

6-7 Nikhil Mendis – Linden Park Primary School

8 Emma Pincombe – Glenunga International High School

9-10 Matthew Drown & Ned Wheaton – Pembroke School

CSIRO Education

CREST Schools

Mawson Lakes School & Glenunga International High School

Non-CREST Schools

Burnside Primary School & Walford Anglican School for Girls

Catholic Education SA

1st St Andrew's School

2nd Walford Anglican School For Girls

Nature Foundation SA

6-7 Teagan Powell – Wilderness School

9-10 Amber Washington – Pulteney Grammar School

Flinders University - School of the Environment

9-10 Hannah McGrath – Mitcham Girls' High School

Flinders University – Faulty of Science

11-12 Jasmine Pople – Urrbrae Agricultural High School

Primary Industries Education Foundation Australia

3-5 Eva Russell – Burnside Primary School

11-12 Jasmine Pople – Urrbrae Agricultural High School

Australian Institute of Physics

3-5 Aaron Walsh – Highgate School

Australasian Radiation Protection Society

8 Maeve Allen – Horvat – Unley High School

Australian Society of Biochemistry & Molecular Biology

3-5 Emily Muggleton – Mitcham Primary School

Collison & Co

9-10 Seran Perera – Prince Alfred College

Royal Australian Chemical Institute

11-12 Marika Colby – Glenunga International High School

The University of Adelaide: Faculty of Engineering, Computer & Mathematical Sciences

9-10 Seran Perera – Prince Alfred College

The University of Adelaide: Faculty of Sciences

9-10 Hannah McGrath – Mitcham Girls' High School

A special thank-you to all our Sponsors, Committee Members and Volunteers who contributed to this year's event!

Topics for 2017?

Have you any good ideas?

We need topics for the Scientific Writing, Poster and Photography categories. Contact us at office@sasta.asn.au by 1 December 2016.

Visit www.oliphantscienceawards.com.au to download complete Presentation Ceremony Booklet, see our new video or past event photos, to register as a judge or volunteer or find out more information about the competition!

SU, SIS and SHE: SACE Stage 1 Biology in 2017

Dr Kathy Adams

Stage 1 Biology in 2017 under the guidance of the new subject outline, written to reflect the senior Australian Curriculum, is arranged around 4 topics (Cells and Microorganisms, Infectious Disease, Multicellular Organisms, Biodiversity and Ecosystem Dynamics). This arrangement provides countless possibilities for new programs, innovative and interesting contexts and a potential for having inquiry or science as a human endeavour as the central focus for units. The flexibilities of the new subject outline should be viewed by teachers as an opportunity to excite students to continue to study Biology, into Stage 2 and beyond. While the new course is somewhat more prescriptive than its predecessor, it maintains the options for teachers to choose the

a) content described under the heading of Science Understandings for each topic,

b) contexts or themes,

c) order and length of time programmed to teach these concepts

and to naturally integrate the three strands; Science Understanding, Science Inquiry Skills and Science as a Human Endeavour into a program.

Science as a Human Endeavour (SHE): The inclusion of Science as a Human Endeavour and its integration through the topics adds much scope for teachers and students to explore and understand the interaction between science and society and also provides opportunities for students to consider many innovative and contemporary developments in Biology. As a part of the Investigations Folio (Assessment Type 1), teachers will need to design a task that will enable students to critically explore and understand how science interacts with society. The science as a human endeavour task will enable students to connect their research to an aspect of how science and society interacts that has been broadly incorporated into 4 inter-linking aspects: communication and collaboration, influence, development, applications and limitations. The countless possibilities of this task enables students to pursue a personal interest of Biology, that may or may not be linked directly to the curriculum being taught and enables students to investigate real life scientific

Table 1: So what could the focus be for a program at Stage 1?

Topic	Theme	Some concepts that could be covered
Cells and Microorganisms	Microbes: Villains or Friends? Friend or Foe?	Types of microbes, cell structure, role of microbes in health and disease, agriculture, food spoilage etc. Examples of microbes used in biotechnology, food preservation, food production. Genetic engineering
Cells and Microorganisms Biodiversity and Ecosystem Dynamics	Shaping Ecosystems	Environmental Focus: biogeochemical cycles, human impact, altering natural cycles, use of fertilisers, crop rotation, role of microbes in oceans, role of decomposers, keystone species
Cells and Microorganisms Multicellular Organisms	Animal Biology	Consider the connection between animal organ systems and the role of microbes e.g. digestive systems of various mammals, comparisons between different mammals and their organ systems.
Cells and Microorganisms Infectious Disease	Drug Design	Cell structure, cell membrane, molecular recognition, disease, treatments
Infectious Disease Cells and Microorganisms Multicellular Organisms	Epidemiological Perspective of Disease	Disease agents: bacteria, virus, microbial growth, disease spread and control, case study approach of a particular disease outbreaks, limitations of strategies to control disease, vaccination, immune system
Infectious Disease Cells and Microorganisms Multicellular Organisms	Organ Transplantation	Human Body, hierarchical structure, organ systems, ethical considerations, immune system, organ rejection
Multicellular Organisms Infectious Disease Cells and Microorganisms	Epigenetics	Cell differentiation, gene expression, cell structure, lifestyle vs genetic vs infectious disease, immune system

advances, innovative technologies or factors that contribute to public debate around the introduction of these for use into everyday life. This task is in broader application and has a slightly increased word limit than the issues investigation currently undertaken by students, as the science as a human endeavour task will require students to consider beyond just the advantages and disadvantages of an issue of Biology.

Science Inquiry Skills (SIS): The emphasis for the science inquiry skills has also altered, with students expected to consider and show a deeper understanding of how to design a method, to think about and /or undertake investigations where the outcome is unknown, evaluate the limitations of conclusions, how some factors may not be able to be controlled and how this impacts the results obtained. In addition, students need to have opportunities to deconstruct a problem and design a method to solve that problem. Other requirements that have more detail or emphasis include the use of primary and secondary data, sources of uncertainty and the clear expectation for a minimum of 8-10 hours of practical activities, where students directly have opportunities to develop the science inquiry skills.

Science Understanding (SU): The contexts in which the 4 topics are able to be taught are countless (see Table 1 for some possibilities), with each of the topics supporting the other, with natural and innovative ways to provide students with knowledge of Biology and also enabling the development of all of the general capabilities that have also been integrated into each topic. Of particular importance are the general capabilities of critical and creative thinking, personal and social capability and ethical understanding. In developing programs, teachers will need to consider the cohort, their interests, abilities and future directions. The way the content is structured and the flexibility for programming means that teachers may choose to have a particular context (e.g. Human Biology for student interested in medical fields), or theme (e.g. Can microbes solve all the world's issues?). The later approach has great potential, with the endless sources of information about the latest developments in disease, technology or treatments at our fingertips through the internet and other sources. In table 2, an outline has been presented of how a single scientific article, in this case, one featuring microbes, can be used as the basis for the entire teaching program. It enables not only Topic 1 to be taught but also aspects of Topic 4 and also enables the integration of science as a human endeavour.

In summary, the new content of the Stage 1 Biology course is a collaboration between the three strands, that encourages the development of programs that should enable student to learn interesting and relevant Biology so that they are able to consider not only the concepts but have opportunities to critically analyse and explore the latest advances across innovative and contemporary technologies, and develop problem solving and creative thinking for finding solutions to problems.

Table 2: Microbes: The Answer to Human Induced Problems?

Article Reference: Adee, S, 2016. They've got the power. *New Scientist*, 30 July 2016, 24.

Topic	**Concepts**
Cells and Microorganisms	Energy Systems in Cells- aerobic and anaerobic respiration
Biodiversity and Ecosystem Dynamics	Impact of Humans on the environment- pollution of water, energy consumption, carbon cycle
Cells and Microorganisms	Microbes: requirements for survival, growth and reproduction
Cells and Microorganisms	Different cell types: prokaryotes and eukaryotes
Cells and Microorganisms	Different kinds of microbes: what are they used for? Could they all be used for the same application? Which are better suited to which applications?
Cells and Microorganisms	Heterotrophic vs autotrophic nutrition
Science as a Human Endeavour: Development	Advantages of new technologies, compared to conventional models.
Science as a Human Endeavour: Development, Application and Limitation	Limitations of the Technology Potential risks of the use of this technology How to minimise the risk?
Cells and Microorganisms Science as a Human Endeavour: Development, Influence	How can the metabolism of a microbe be used to our advantage? E.g. generate electricity How do microbes assist humans with ecological problems e.g. oil spills, plastics etc.
Biodiversity and Ecosystem Dynamics	Renewable water? Benefits to ecosystems where human activity is high. Impact of humans on ecosystems
Biodiversity and Ecosystem Dynamics	Ecosystems and the interactions between biotic and abiotic factors

Taking ownership of professional learning

Debra Panizzon

Adjunct Associate Professor, Science Education, Monash University

Dr Peter Lind

Registrar, Teachers Registration Board of South Australia

Professional learning ensures that just like our students we too continue to learn and grow throughout our life as a teacher. Given our busy schedules, it is easy to rely on the professional learning opportunities provided within the school/centre environment and not look further afield. However, as science teachers it is important for us to continually reflect upon the ways in which we teach science, the contexts we use with our students to support their learning, and even what we actually understand by 'scientific knowledge and understanding'. Challenging our own thinking and learning in a world of constant change is critical given that what constitutes scientific knowledge is not static but growing. As science teachers, we must maintain our 'currency'!

Professional learning is the preferred term in educational research because it moves thinking away from professional development, which historically encompassed 'one-hit', short-term sessions conducted for teachers at particular points in time. However, the research indicates that this type of approach often has minimal impact on teacher practice because it does not meet their immediate teaching needs nor align with their own existent knowledge and views about learning (Desimone, 2009). Without the opportunity to implement new ideas into their teaching there is unlikely to be any major shift in teacher thinking or practice reducing the overall impact of the professional learning experience.

New requirements around professional learning:

Recent changes around teacher registration in South Australia (and other jurisdictions in Australia) requires all teachers (regardless of whether currently teaching or not) to undertake a minimum of 60 hours of professional learning along with professional practice over the term of their registration. As part of this process, teachers need to document their professional learning. Ownership of professional learning therefore lies with the individual teacher with the Teachers Registration Board of South Australia (TRBSA) encouraging

- online learning
- teacher formal study
- individual research
- face-to-face opportunities, and
- communities of teacher practice within schools/centres.

The only requirements is that teachers must be able to align their professional learning to the Australian Professional Standards for Teaching (APST) developed by the Australian Institute for Teaching and School Leadership (AITSL, 2012) and must identify evidence regarding the professional learning completed.

Recent evaluation of teacher professional learning

To identify and explore the nature of teachers' professional learning around these new requirements, the TRBSA conducted an evaluation of 25% of teachers renewing their registration in the 2015-2016 period. Findings from the evaluation identified some confusion regarding the kinds of activities comprising professional learning as opposed to professional practice and the 'core business' of teachers. Many of the results also found significant differences between cohorts of teachers and their needs and challenges around professional learning. For example, Teacher Relief Teachers emerged as a particular group of teachers who are meeting a number of challenges with their professional learning.

A copy of the Executive Summary of findings Final Report (full technical report) is readily available from http://www.trb.sa.edu.au/renewal-evaluation

Science teachers with questions regarding their professional learning or teacher registration should contact the TRB on (08) 8226 2666 or on email at info@trb.sa.edu.au

Reference

Desimone, L. (2009). Improving impact studies of teachers' professional development: Toward better conceptualisations and measures. *Educational Researcher*, *38*(3), 181-199.

Science Resources Catalogue

Biology Levels of Life

Brian LeCornu and Tony Diercks

Biology Levels of Life – Teacher Resource Pack
BILOL.TRP **$110.00**
Includes lesson notes and complete Workbook answers.

Biology Levels of Life – Text Book
BILOL.S2.TB **$62.00**
A comprehensive resource now in full colour. Covers all Key Ideas and Student Outcomes. Up to date and relevant information with study questions for each chapter.

Biology Levels of Life – Workbook
BILOL.S2.WB **$24.00**
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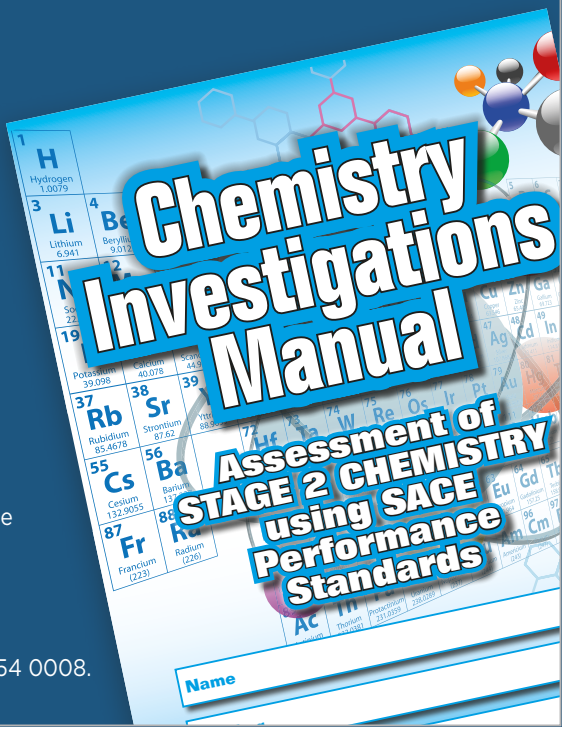

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