Secondary Student Achievement PLD

This newsletter and the Secondary Student Achievement Professional Learning and Development contract, is funded by the Ministry of Education.

National Newsletter: All Sciences including Agricultural and Horticultural Science

Information and resources for middle leaders in secondary schools | Term 2 2016

Kia ora, Tālofa lava, Mālō e lelei, Kia orana, Talofa ni, Faka'alofa lahi atu, Ni sa bula, Greetings.

Welcome to our second newsletter for 2016. We trust that you have had a refreshing break and feel ready for yet another busy term. In this issue:

- Code of Practice
- Science national workshop dates
- Engaging students by providing choice
- SciCon 2016
- NZQA Matters
- Reading 1 - getting started

Code of Practice

You will be aware that there is new health and safety legislation that will be having an impact around the school. However, we in science can do nothing differently until a new Code of Practice (CoP) has been written.

The development of this code is a long process of sequential steps. Firstly, parliament passes the legislation - the new Health and Safety at Work Act was passed in September 2015 (and came into force 4 April 2016). With the act written, a period of consultation occurs – for the Hazardous Substances regulations of this act the consultation closed 26 February. Now civil servants are finalising the regulations. NZASE is well underway writing the new CoP based on the draft of these regulations. (This draft states that lab managers use the most recent work safe instrument, which in our case is the current CoP, so don't panic that we do not have a new version in place for April 4.)

When a new code is available there will be workshops around the country to inform the sector of the changes we need to make. Until we have a new CoP in place, continue to work safely as you are at present.

SSA Science national workshops

These will be happening this term. Contact your National Co-ordinator if you have not received a flyer. There are some date changes for workshops in the southern region.

Team Solutions	**Te Tapuae o Rehua**
May 10 - Auckland	11 May - Dunedin
May 12 - Napier	12 May - Invercargill
May 17 - Gisborne	18 May - Christchurch
May 19 - Whangarei	19 May - Nelson
May 31 - Hamilton	25 May - New Plymouth
June 1 - Rotorua	26 May - Palmerston North

More details at:

http://nzcurriculum.tki.org.nz/Secondary-middle-leaders/Professional-learning-and-development

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Engaging students by providing choice

Paris (1997) has identified that control is one of the four requisite components that underpin the motivation to learn, the others being choice, challenge and collaboration. The control refers to autonomy, taking initiative and acting independently. Choice is listed as a requisite component to motivation (and thus engagement) but careful planning of choice can also provide challenge, control and collaboration.

Differentiation is about offering a variety of instructional strategies for the same learning objective i.e. it's about choice. Meaningful choice engenders willingness, reduces alienation and increases engagement and enjoyment. It can also reduce truancy and destructive behaviour. (Nunley 2006). Context-based approaches also improve attitudes to science (Bennett et al 2007).

So how can we give science students choice and allow them to learn in contexts they are interested in? We see teachers giving choice in all sorts of ways:

- When L1 science became compulsory in one school some of the students were quite disgruntled. Their science teacher responded by giving his smallish L1 class a free choice of what they were interested in learning about. Groups of students looked at different topics and were assessed against different standards. One student looked at plant fertilisation for part of her assessment on life processes (90949) and decided she wanted to follow this up with a biology external on flowering plants (90929).
- One teacher taught the students about microbes and encouraged them to complete a task for a science internal assessment (90950). Some students chose to sit the biology external (90927) instead.
- Another teacher did a unit on heat. Her students could then investigate the applications in any context. e.g. one looked at solar ovens while another looked at wet suits.
- At one school the teacher taught students the different skills needed for investigations and then gave them a choice of a biology or a chemistry investigation in a context of their choice. She said, "When they get to Level 3 they have to work independently on an investigation of their choice and some students find making this choice quite hard. Giving them practice before L3 is useful."
- Many teachers use cars as a context for assessing student understanding of metals (90946). But cars do not engage all students. Some teachers are introducing choice. Students explore the physical and chemical properties of metals in jewellery or in bikes etc.
- The vocational pathway tasks allow students to be assessed for the same standard using tasks set in different contexts.
- When her students expressed an interest in human physiology and careers in health or sports, their teacher discussed their options with them. The class chose to be assessed with 90949 Life Processes. All students decided to look at the effect of smoking and alcohol on the unborn child as an effect on reproductive processes. For their second environmental factor some chose to find out more about the effect of cosmetics on the skin, whereas others wanted to explore the effect of sunscreens or skin lightening products, especially those that included mercury. The students were also interested as to why siblings can have a variety of skin colours.
- Other teachers are experimenting with the use of choice boards (also called tic-tac-toe or menus). This is a table of activities that students can choose from e.g. (scroll down to find the science examples) at https://daretodifferentiate.wikispaces.com/Choice+Boards

Bennett, J., Lubben, F., & Hogarth, S. (2007). *Bringing science to life: A synthesis of the research evidence on the effects of context-based and STS approaches to science teaching*. Science Education, *91*(3), 347-370.

Nunley, K. F. (2006). *Differentiating the high school classroom: Solution strategies for 18 common obstacles*. Corwin Press.

Paris, S. G. (1997). *Situated motivation and informal learning.* Journal of Museum Education, *22*(2-3), 22-27.

Revamped Careers NZ website

Careers NZ has launched a new and improved mobile-friendly website with a modern refreshed brand style:

http://www.careers.govt.nz

National ERO reports

Education evaluation reports on national educational issues are based on information compiled by ERO through its reviews of individual schools. These reports give some general principles as well as case studies that model aspects of good practice. Reports over the last 12 months relevant to secondary schools include:

- Careers education and guidance: good practice (May 2015)
- Internal evaluation: good practice (November 2015)
- Educationally powerful connections with parents and whānau (November 2015)
- Accelerating student achievement: a resource for schools (December 2015)
- Raising student achievement through targeted actions (December 2015)
- Wellbeing for success: effective practice (March 2016)

Term 2 dates

Some of these might be of interest for your diary:

9-15 May, NZ Sign Language Week
11 May, National School Nurses Day
16 May, Deadline to submit abstract for SciCon
16-20 May, Primary Science Week
http://nzapse.nzase.org.nz/
29 May - 4 June, Samoan Language Week
6 June, Matariki begins
6 June -5 July, Ramadan
10 June, National Support Staff Day
4-10 July, Māori Language week
10-13 July, SciCon in Wellington

NZQA matters

Remember that when you are using internal assessments there are a number of documents it is **essential** to refer to:

- The standard - defines what the students need to show they know and can do. This is owned by the Ministry of Education (MoE).
- The Conditions of Assessment (CoA) – provide guidelines generally and for each standard, including ways of gathering evidence and authenticity. Also owned by MoE.
- Clarification Document – written by the NZQA Moderator to explain decisions they have had to make about interpreting the standard.

Using these resources you will develop an assessment task for your students, with its marking schedule. This may be a downloaded TKI task as is or one you have modified for your students, so tasks will vary from school to school. Please note the assessment you give the students is not called the standard – the standard and the assessment are two very different things.

As well, these may be useful:

- Vocational Pathway tasks – other contexts in which the standard may be assessed (written by MoE).
- Examples of student answers (from NZQA).
- Attendance at Best Practice Workshops (run by NZQA).

Additional paragraphs in 2016 CoA

All Conditions of Assessment have new information at the front covering:

- The need for teachers to have read NZQA's generic guidance on assessment practices.
- Using a variety of methods for collecting evidence, and a suggestion that alternatives to tests be considered.
- Offering a maximum of 1 further assessment opportunity offered where manageable.
- The need to assure authenticity.

It is important that all teachers assessing internally have read this new information and thought about the implications for their assessments.

Clarifications for science standards

There are new science clarifications this year: Biology 91607 and 91601; all 4 L3 Chemistry internals (L2 imminent); Physics 91521; ESS 91187 and 91410.

NZQA's Best Practice Workshops not scheduled

There are no scheduled Best Practice Workshops from NZQA this year. You must register an interest in a subject online and enter the preferred month and region. When there is sufficient interest a workshop will be scheduled by NZQA and you will be notified. http://www.nzqa.govt.nz/about-us/events/assessor-support/maj/

This year, as well as face-to-face workshops, teachers have the option of taking part online. Schools and conferences can also request a speaker from NZQA at very reasonable cost.

SciCon 2016

This conference for science teachers provides a wealth of subject-specific PLD and is well worth attending. It will be based at Sacred Heart College, Lower Hutt. The conference runs from Sunday 10 July (welcome reception 5pm) until Wednesday 13 July (last session 12:30pm, field trips till 6pm). Scholarships of $250 are available. If you have never been to SciCon why not give it a try? For more info go to:

https://innovators.eventsair.com/QuickEventWebsitePortal/scicon-2016/scicon2016

Where to find these assessment resources

We will use as an example a Level 1 Physics standard, 90936 *Demonstrate understanding of the physics of an application*

The standard

- Go to NZQA http://www.nzqa.govt.nz/
- On the left hand side under the green heading NCEA click on Subjects
- Choose Physics
- In Curriculum & Standards documents go to Standards
- Click on level 1
- Scroll down to 90936

The CoA (Conditions of Assessment)

- Open standard 90936 (found above) and click on the link in the last Explanatory Note
- Under Resources for aligned standards choose Physics
- Choose level 1
- You will find the CoA in the Related Resources on the top right hand side of the page

Assessment tasks

- Below and to the left of the CoA in the table of approved assessment resources you will find the latest version of the A and B TKI tasks - the A task is more prescriptive and the B task is more generic
- In the right hand column are the vocational pathway tasks – 3 are available for 90936.

Clarification document

- Go to Resources for internally assessed standards on the Physics subject page on NZQA
- Click on Clarifications, All levels
- Under contents click on Level 1
- Click on 90936

Student exemplars

- Go to Resources for internally assessed standards on the Physics subject page on NZQA
- Go to Exemplars of student work, click on All levels & select 90936

Reading in Science 1 - Getting Started

Moving through school, students are asked to read increasingly complex information. How well students read, understand and use this material can affect how deeply they understand the concepts we are trying to teach them.

Many of our less able students are often reluctant readers and have less understanding of what they read than their peers. To try to help them we often give them fewer opportunities to read, and when we do, the texts are simplified. This gives these students less exposure to rich and authentic texts than their peers, so the gaps in reading comprehension between the two groups get even bigger. These students come to us with significant gaps in literacy skills such as reading. It is our job to do what we can to lift their skills in literacy by year's end.

If we do not help them to become more confident readers they will struggle to achieve at Level 1. And yet, as secondary science teachers, we often do not know where to start to help these students.

We can start with understanding what it is that good readers do

We can start with understanding what it is that good readers do. Before they read, good readers will preview (e.g. title, diagrams, tables, photos, headings, highlighted text), activate prior knowledge, predict, question. During reading, good readers will question, make connections, visualise, have strategies for dealing with things they do not understand (identify, re-read, chunk, ask questions, use clues in the text, get help), make inferences, revise predictions. After they have read, good readers will summarise, synthesis ideas, revisit predictions, question, and evaluate what they've read.

And these are the skills we need to help our poor readers with, skills we need to teach explicitly as part of our science teaching. What students read in science is a bit different to what they read in other subjects so no-one else can do this job.

In particular struggling readers need:

- To know about different text types and the best strategies for reading them.
- Multiple and meaningful opportunities to practise reading in subject-specific contexts.
- Opportunities to practise reading with appropriate resources.
- Opportunities to talk about their reading and thinking.
- Background knowledge in subject areas.
- An expanded vocabulary and word-solving strategies for reading subject-specific texts.
- Strategies for previewing texts, monitoring their understanding, determining the most important ideas and the relationships among them, remembering what they read, and making connections and inferences.
- Strategies for becoming independent readers in any context.

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It helps to find out the reading needs of your students. You could give them a short passage to read and ask some open-ended questions (e.g. identify key information, how does this link to what you already know, so what conclusions can you draw based on what you read). Analysing this would give you some information about the strengths and gaps of your students.

Then teachers need to find out about what will help those identified needs. In the box column to the right are some resources you may find useful, for both their principles and their strategies. When you next intend to base a lesson around some reading, try to incorporate some strategies like these to help the less capable students in your class.

Professional readings

- http://all4ed.org/reports-factsheets/apprenticing-adolescents-to-reading-in-subject-area-classrooms/
- How to teach reading in content areas (Phi Delta Kappa Journal, 2003). Years 9-13.
- Think Aloud Protocols: Teaching Reading Processes to Young Bilingual Students
  Research suggests that students learning to read need to be taught how to use specific strategies for understanding a text.
- Duffy, G. (2003). *Explaining Reading: A Resource for Teaching Concepts, Skills, and Strategies*. New York: Guilford Publications
- Fletcher, J., Parkhill, F & Fa'afoi, A. (2005). What Factors Promote and Support Pasifika Students in Reading and Writing? *Set 2, 2 - 8*.
- McDonald, T. & Thornley, C. (2005). Literacy Teaching and Learning during the Secondary Years: Establishing a pathway for success to NCEA and beyond. *Set 2, 9 - 14*.

Useful resources

These resources describe literacy strategies to support reading

- http://esolonline.tki.org.nz/ESOL-Online/Teacher-needs/Pedagogy/ESOL-teaching-strategies/Reading
- *Effective Literacy strategies in Years 9-13* (MoE number 30320, ordered from 0800 660 662)
- Reading comprehension strategies - Sheena Cameron http://www.sheenacameron.com/books.html
- Reading For Understanding, Schoenbach, Greenleaf & Murphy http://www.wested.org/resources/reading-for-understanding-how-reading-apprenticeship-improves-disciplinary-learning-in-secondary-and-college-classrooms-2nd-edition/
- http://goo.gl/gquyuZ Think Literacy, some cross-curricular approaches - a Canadian resource.
- http://www.adlit.org/strategy_library/ Classroom strategies.