

SUMMARY DESCRIPTIONS OF SCIENCE EXTENDED PD MODULES

All modules are activity based and substantiated by educational research and theory. Leaders will generally model the appropriate teaching strategies, and participants will be actively engaged in learning processes relevant to a range of aspects of teaching science. Participants will be encouraged to reflect on the PD experiences and to trial/use strategies, as appropriate in their classes, for which discussion time will be available in a subsequent session.

PRIMARY and SECONDARY – Adapted as Appropriate

Science Learning and Teaching – 1-2 Modules

These first two modules focus on student learning that is intellectually active and purposeful while building student interest, engagement and a need to know. The first module is based on a set of introductory activities for a unit on the topic of light (or possibly buoyancy) from upper primary to year 10. The activities focus on identifying students' existing conceptions and using these to promote discussion, debate and practical testing related to the different conceptions. Participants will experience a number of teaching procedures associated with this approach for which they will consider appropriate teacher behaviours.

The second module develops understandings of quality learning and the ways students construct meaning in science; these allow teachers to link their teaching approaches with student learning. The activities in this module are directed towards further engaging students in their own learning through metacognitive and other approaches. One focus will be on strategies for sharing intellectual control with students. Another will be the role, in the science classroom, of student talk and students' questions that effectively engage students in learning science. Through several science contexts participants will be introduced to a range of teaching procedures that will promote these goals.

Learning Technologies in The Science Classroom

The DEET has targeted the development and application of learning technologies as a priority in schools. Having access to computer equipment, gadgets and applications is one thing, but using them to “add-value” to lessons and improve student learning is the issue of real importance. The power and innovative applications of these learning tools will be explored so teachers can understand and use the technologies in ways that realise their potential in science programs.

This module will introduce participants to a variety of low cost computer peripherals for sound and image recording. Participants will develop skills in using scanners, digital cameras, video and associated software to produce simple multimedia elements for a selected science context. They will then practise combining these elements to produce a basic multimedia resource for students and/or teachers. In addition, the module will examine how these recorded images and sounds can be integrated into other available packages, eg. “Power Point” and “Word 97”, for presentation in classes, workshops and conferences.

Assessment in School Science

If the assessment of students' science work is important for evaluating the attainment of intended learning outcomes, then it is critical that teachers develop a rich repertoire of assessment techniques, and understand the usefulness of these techniques for their different purposes. Assessment can make an important contribution to good teaching and good learning when it is seen as an integral part of the teaching and learning process rather than something which is ‘tacked on’ after the work of planning and implementing lessons has been done.

What are some of the dilemmas associated with assessment in science? How can we decide whether we are using good quality assessment procedures? This module examines some of the challenges associated with assessment in science and provides participants with an opportunity to reconsider existing practices as well as adding some new approaches to their science assessment repertoire. Content Area: Human body systems.

PRIMARY MODULES

Content Orientation: Physical Science

Identifying and implementing effective teaching and learning strategies is often difficult in areas of science where teachers feel they lack adequate content knowledge. The topic of Electricity often presents these difficulties for some primary teachers. This module aims to build primary teachers' confidence in teaching electricity through a problem solving approach. The module incorporates the use of children's ideas about electricity and highlights the important role of exploration in learning. This module explores the complexity of CSF learning outcomes related to electricity, engaging participants in a number of activities related to the topic then reviewing these in terms of the associated planning, teaching and learning issues. Based around: Learning Outcome CSF II Level 4 substrand Energy and its uses.

Content Orientation: Chemical Science

Teaching the characteristic physical properties of solids, liquids and gases as rigid definitions often seems to confuse rather than assist the learning of many students. Student's prior intuitive knowledge of the states of matter and their properties are common, so science teaching can acknowledge, build on, and challenge these ideas. This module explores science teaching whereby students' existing views are taken seriously, with the focus of teaching and learning on strategies to modify or reconstruct students' existing intuitive ideas.

Sand flows so is it a liquid? This module explores the arbitrary nature of the some definitions associated with traditional approaches to teaching the topic 'The States of Matter'. In this module The activities emphasise both the development of process skills, such as observation, classification and communication, in science and an approach that advocates a learning environment that promotes active engagement.

Based around: Learning Outcome CSF II Level 3 substrand Substances: structure, properties and uses.

Content Orientation: Biological Science

Teaching about ecological concepts in primary science has often focussed on descriptions and definitions. In this module, participants are introduced to a range of activities that could be used to explore children's ideas about ecological concepts, particularly the concept of survival. Through involving participants in various activities and discussion, implications for planning curriculum to cater for the range and development of children's ideas are explored. A common view of science for many teachers is that there is a single scientifically acceptable description or definition that students need to be told. This module presents an approach to curriculum planning that incorporates the use of children's ideas about ecological concepts. The module aims to build teachers' confidence in exploring ecological concepts with children through an emphasis on children investigating and explaining their own ideas as a precursor to considerations of scientific explanations.

Based around: Learning Outcome CSF II Level 3/4 substrand Living Together – past, present and future.

SECONDARY MODULES

Lab Work – Reality and Potential

Lab work is a common and accepted part of science and it is often assumed that it provides an effective learning experience. However, in comparison to general expectations, its effectiveness is often questionable. This module examines and elaborates upon often unrecognised learning problems associated with lab work, and expands the repertoire of effective procedures suitable for lab/practical work and for enhancing the associated cognitive engagement. It will also introduce data logging equipment and its potential uses in prac work. Content Area: Motion.

Science from Contexts

The use of meaningful contexts is the core big idea for this module. Worldwide there has been an increasing emphasis on using real world contexts for teaching science. It thus becomes a challenge for teachers to provide contexts that are meaningful to students. Through the context of *Science in Sport*, ways of developing meaningful contexts will be explored, as will the incorporation of the concepts and ideas of Science into the social and technological domains of society. A range of teaching strategies will be modelled. These will be appropriate for the specific science content under consideration, and will involve using materials that are relevant, up-to-date and topical.

Content Area: Science in Sport, with examples of other possibilities.

Cutting Edge Science

Introducing students to a cutting edge science at CSF levels 5 - 7 is often challenging because of the highly specialised nature of the content and the difficulty of sourcing current information. In addition, much of the technical material needs to be rewritten to suit students' existing levels of understanding and previous science experiences.

Participants will examine ways of locating current information from a variety of sources, including the Internet, professional journals and magazines. They will practice rewriting complex technical material to improve its intelligibility and better suit their students' existing levels of understanding. The module will also focus attention on the importance of providing students with activities that introduce new content while avoiding cognitive overload.

Content Area: Digital Imaging Technology and CCD.