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SCIENCE IN-SERVICE COURSES AT ST BENEDICT COLLEGE, STA LUCIA

Two in-service courses were organized in July and September for teachers of Biology, Chemistry and Physics by the Curriculum Management and eLearning Department. The theme chosen for the course, 'Facing Challenges in Science Education' highlighted the environment in which teachers of science subjects operate. The courses provided an opportunity for teachers to share good practice, experiences and challenges that one lives in the classroom.

The course was spread over three days and dealt with the use of innovative digital resources in the science class, learning by problem solving investigations and moderation of practical work. The speakers shared their experiences with the audience presenting their areas of expertise through well thought out resources which included data loggers apparatus, video clips of students during an investigation, PowerPoint presentations and even students themselves sharing how they did their problem solving investigation. Between the main sessions, there were short moments of publicity by MASE, Nature Trust, IOI Teachers Marine Talent competition and by the ERDF project manager for the purchase of science and technology equipment. The feedback received by the teachers present was one of encouragement and satisfaction.



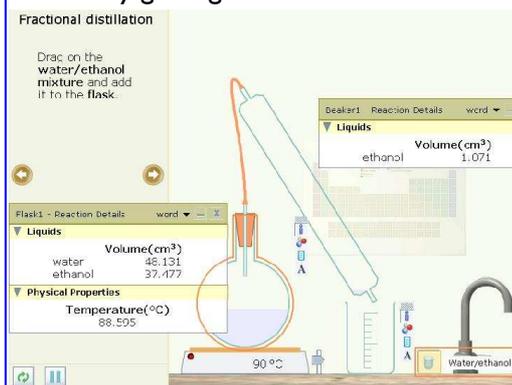
'I have learned that intelligence is of secondary importance in research. Interest and inspiration are far more telling signs of whether someone will be successful in a scientific career'.

*Tamara Davis (2008)
Science in Schools, 10, 18*

Website Review: Crocodile-clips.com

The following website review will consider crocodile-clips.com which develops education software for different subjects and provides loads of resources for science teachers. This review will focus mainly on two products — Yenka Science Bundle and Absorb Physics & Chemistry.

Crocodile Clips Ltd (www.crocodile-clips.com) develops and sells a range of educational software and hardware which covers different topics in Mathematics, Science, Design and Technology and ICT. Although Crocodile clips is a commercial website with a clear intent of selling its products, some of the packages can be downloaded on a trial basis or can even be downloaded for free. Crocodile clips also provides an option where teachers or students can use whole packages at home for free by getting a free home license.



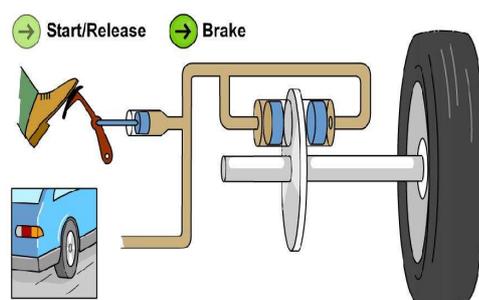
Separating mixtures of liquids

Particularly interesting for science teachers is Yenka Science Bundle (<http://www.yenka.com/>). Yenka uses a unified interface to model reactions in scientific subject areas, often in 3D. Users see results in real time, replicating actual results. Yenka also allows educators to design lessons and interactive content for students. Yenka science bundle includes:

- Yenka Electrochemistry : Involving experiments with electrolysis, using a range of electrodes and solutions.
- Yenka Inorganic Chemistry : Where over 100 chemicals can be used to study reactions safely and easily.

- Yenka Light and Sound : Involving experiments with sound, water and light waves.
- Yenka Motion : Including investigations with projectiles, oscillations, gravity and motion.
- Yenka Electricity and Magnetism : Where students and teachers can observe and simulate power generation and transmission and analogue circuits.

Another useful application offered by Crocodile Clips is the Absorb Physics & Chemistry group of resources. In order to use the whole package, teachers need register and buy a login. However the resources (not the whole package—mainly animations and graphics) can still be used online for free by just going through the resource section.



Animation showing how Hydraulic brakes work

Both programmes can be used with a whole class as a teacher demonstration tool using a projector or if you have an interactive whiteboard. The easiest way to use the program would be for the teacher to set up models for their classes to use; however, with some training, students could actually be encouraged to design their own models and control their own experiments.

The following article describes the research carried out by **Ms Joanne Grima** during her M.Ed. Dissertation. Ms. Grima teaches Environmental Science at the Giovanni Curmi Higher Secondary School, Naxxar.

Learning is an active process during which concepts based upon current/past knowledge are constructed (Brunner 1973). The learner, who is at the centre of control, selects and transforms information, constructs hypotheses, and makes decisions, relying on a cognitive structure (i.e., schema, mental models) to do so. This provides meaning and organization to experiences and allows the individual to "go beyond the information given".

A questionnaire and interview were administered to Maltese Environmental Science students probing their perceptions on global warming and ozone depletion in order to analyse the concepts that they formulated on these issues.

Results obtained:

Students showed the presence of lacunae in the knowledge regarding global warming and ozone depletion. Through the information gathered during Environmental Science lessons and the media they built logical but sometimes incorrect frameworks that explain the science behind these issues.

Conceptual understanding and reasoning follows a path of increasingly evolving models (Lawson, 1988 and Vosniadou & Brewer, 1992). However, this seems not to be happening due to unrelated teaching since different aspects pertaining to the same issue are taught in isolation, inhibiting students from visualizing the whole picture and they are failing when it comes to integrating and applying knowledge. Students should be active learners who need to be helped to reason things out so that their fragmented knowledge evolves into correct frameworks. Presently, they are expected to link things on their own. Hence, students are gaining fragmented information with a number of lacunae that are being filled with the information they gain from various sources to build a logical but still incorrect framework.

Students are not effectively transferring acquired knowledge to the "real world" (Groves and Pugh, 1996). Lave (1988) pointed out that knowledge is context-bound, and that "everyday experience is the major means by which culture impinges on individuals".

Formal science instruction does not seem to change conceptions which students have constructed in order to understand the world around them. Brody (1994) emphasised that researchers must continue to find out what the learner already knows. The challenge remains to design instructional strategies based on constructivism which address these conceptions and attempt to alter them in meaningful ways.

Recommendations

The educator should try to encourage students to discover principles by themselves thus develop a predisposition towards learning. Together they should engage in an active dialogue (i.e., Socratic learning). The task of the instructor is to translate information to be learned into a format appropriate to the learner's current state of understanding. The curriculum should be organized in a spiral manner so that the student continually builds upon what has been already learnt. Good methods for **structuring** knowledge should result in simplifying, generating new propositions, and increasing the manipulation of information (Bruner 1966).

An effective Environmental Science curriculum should include a set of organized experiences, which will aid students in developing correct concepts and awareness concerning the environment. Students need to understand science in the context of society and the future of the human race. When educators make use of constructivism as the strategic tool, students

- identify authentic issues
- conceptually analyse science knowledge related to these issues
- determine students' existing knowledge regarding these issues
- design meaningful environmental courses that aim in formulating correct conceptual frameworks.

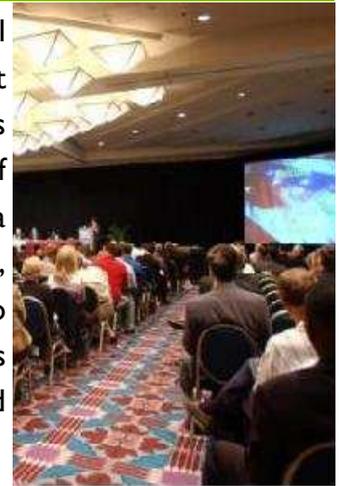
This will produce correct links between concepts, and the transfer of knowledge from one context to another would be more possible. The outcome will be the creation of more complex meaning in a structured manner.

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Science Teachers Conference to be organised by MASE

One of the activities to be organised by MASE in February 2010 is a national two-day conference on Science Education. This is the first of its kind in Malta but something which is held often in foreign countries where science education is given its deserved importance. The conference will feature a number of presentations and to raise the standard of the conference, Mr Ian B Dunne, a British chemist, qualified teacher and now a freelance performer in UK schools, will be brought over to share ideas on how science can be made more fun to students and also conduct workshops. (More information about his work is available at www.dosscience.co.uk). For this conference, all science teachers and all those interested in science education in Malta will be invited to participate.



Good Practice in Creativity and Innovation



Creativity
and Innovation
European Year 2009

For the year of Creativity and Innovation, the European Commission awarded a number of practices that managed to promote innovation and creative behaviours and thinking in people. The project 'Going Renewable' developed and maintained by a group of Physics teachers at St. Ignatius College BSS, featured among these projects and was awarded the title of good practice in creativity and innovation. This particular practice which started six year ago, encourages students to develop their own projects related to energy and renewable resources so that they can understand that the energy generated by the sun, wind and other renewable sources can be applied to everyday life situations. A detailed description of the project can now be found on the official website for the Year of Creativity an Innovation (http://create2009.europa.eu/projects/participating_countries/malta.html).

Email received from
Dr Eleanor Hayes,
editor of
'Science in School'



The journal 'Science in School' highlights the best in science teaching and research. It collect the experiences of practising teachers and researches in the various fields. It can be received free of charge either through <http://www.scienceinschool.org> or by email to Mr Christopher Schembri on audschembri@nextgen.net.mt

Dear

Thanks again for your help. Presumably as a result of your article in the e-newsletter of the Malta Association of Science Teachers, several Maltese teachers have recently volunteered to help as referees. And have proved to be excellent!

*Best wishes and thanks again,
Eleanor Hayes*

International Year of Astronomy 2009 Malta website at
<http://iya2009malta.page.tl/>

An Opportunity to Visit CERN

Maltese Association of Science Educators

52, Triq il-Germanja

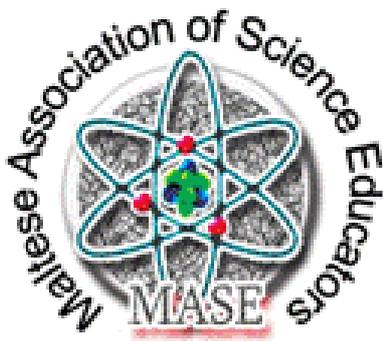
Tas-Sghajtar,

Naxxar NXR3430

Website:

www.masemalta.com

Email: info@masemalta.com



MASE has over the last few weeks been busy preparing for a forthcoming visit to CERN by 24 Physics teachers. An intensive programme has been planned for teachers to benefit from this visit to the European Organization for Research at CERN. CERN has the world's largest and most extensive physics laboratory, where the Large Hadron Collider experiment took place in Sept 2008.

The programme of the visit includes lectures by prominent scientists about various aspects of particle physics, visits to Microcosm, the Atlas Visitor Centre, the CSM detector and SM-18 (where tests of the elements of the LHC take place). It also includes group work and a presentation about the CERN teacher learning programmes.

This visit is being coordinated with the Directorate for Quality and Standards in Education, the Malta Council for Science and Technology and the Secretariat for Catholic Education. It is encouraging to see all these organizations working together for the benefit of science teachers and science education in Malta. Special thanks also goes to Lufthansa Airlines for their support in making this visit possible.

An Astronomy Night in August

MASE members were active even during the summer holidays! An astronomy night was organized on the 12th of August, with the collaboration of the Astronomy Society of Malta. The event started with a get-together activity for members, family and friends at a leading hotel in Mellieha. After the meal, we joined members from the astronomical society in observing the Perseid meteor shower at I-Ahrax Tal-Mellieha. The event was well attended and everyone appreciated the enthusiasm and knowledge of the members of the astronomy society and were thankful for their dedication and superb explanations. Such an opportunity is not to be missed.



MASE on Facebook

MASE is now also present on FACEBOOK. This global social networking website is highly popular in Malta. Many science teachers already have a personal profile on Facebook. MASE intends to promote itself and its activities using also this modern means of communication. Anyone who has a profile on Facebook can search for MASE Science Educators'. Membership is open to everyone. Once a member you can write on the Wall or take put forward your views on the Discussion Board.



We would appreciate feedback from science educators about this newsletter, its content and presentation.

Editors: Mr Gaetano Bugeja, Education Officer (Physics). gaetano.bugeja@gov.mt

Mr Michel Spagnol, Physics teacher at St. Ignatius College BSS, Handaq, Qormi. m.spagnol@global.net.mt