



Supporting and promoting science education internationally

The ICASE Newsletter

June 2008

Newsletter of the International Council of Associations for Science Education.

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1. ICASE endeavours

Rather than link individuals, ICASE is an umbrella organisation forming a communication network between national and regional science teacher organisations involved in science education at the primary and secondary levels. Most specifically the ICASE link is between non-Governmental science teacher associations, but also includes other organisations interested in science education such as science societies, science institutes. In recognising the important role played by Universities in pre- and in-service education and the interlinking with other science education bodies, ICASE also strives to form a link with institutions, complementing the role of UNESCO.

The ICASE role is to:

- 1. extend and enhance the quality of formal and non-formal science and technology education for all, with particular reference to the children and youth of the world.*
- 2. provide and support activities and opportunities that will enhance formal and non-formal science and technology education throughout the world.*
- 3. assist and support all members and other organisations throughout the world which are involved in formal and non-formal science and technology education.*
- 4. establish and maintain an international communication network for member organisations and their members involved in formal and non-formal science and technology education.*
- 5. encourage and support the establishment and development of professional science and technology organisations, especially teacher organisations in all countries.*

For more information and knowledge of past issues of this newsletter see www.icaseonline.net

2. Science Activities

For a number of years ICASE produced a pre-secondary newsletter which often contained one page of science activities (STEP activities – activities designed to allow young children to take a step into science by direct experience). The newsletter has been disbanded as a publication, but the ideas, strongly supporting inquiry teaching, are still valid.

Below is included a step activity plus an activity for lower secondary level Give them a go !

A) STEP ACTIVITY

Challenge: Can you raise books using air?

What you need:

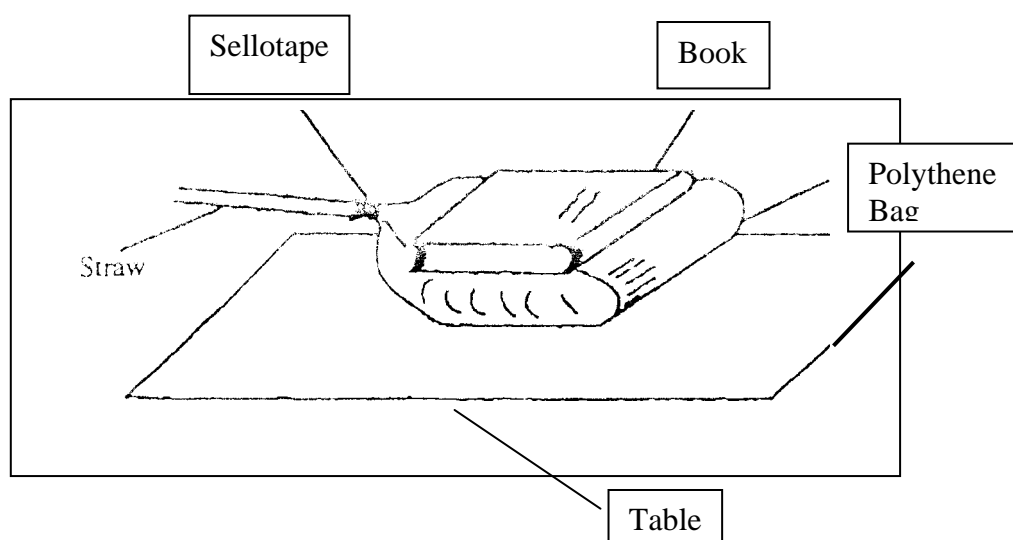
- a polythene bag
- some paper bags or balloons
- some books to lift
- a flat surface

What to do:

1. On the flat surface of a table, place one book on the polythene bag, as shown in the drawing.
2. Blow into the bag. What happens and why?

More to do:

1. Try *the* same activity with a balloon. What do you observe?
2. Then try the event with the polythene bag and make your comments.
3. Which bag better?
4. What about the balloon?
5. Place another book upon the first one and blow into the bag or the balloon. What happens ?
6. What do you observe if you try with three books? Make your comments.



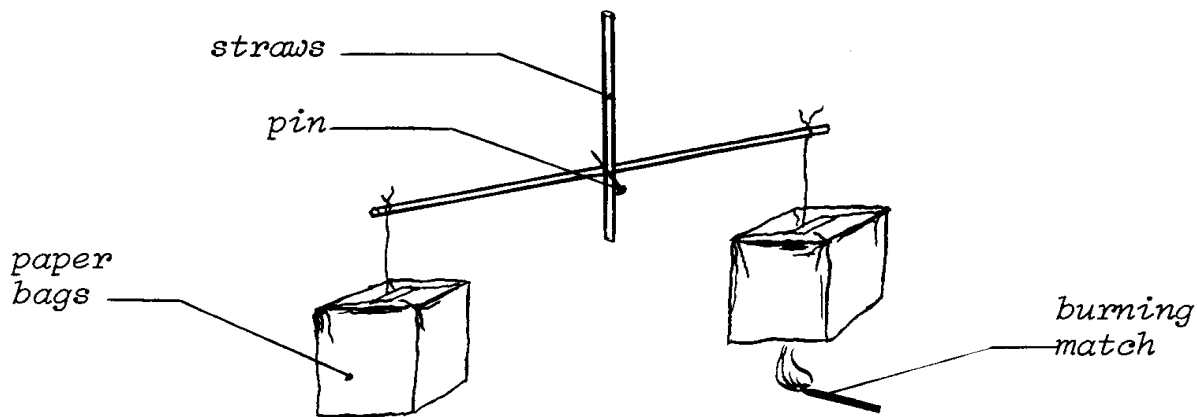
B) LOWER SECODARY ACTIVITY

Teachers sometimes find it difficult to find activities that promote enquiry learning which do not use sophisticated apparatus. In the newsletter ICASE puts forward a collection of possible activities that can be tried out, or modified to suit the situation.

EXPANSION OF AIR

Materials:

1. Two small identical paper bags
2. Two drinking straws and a pin
3. Two short lengths of thread, tape and matches



Procedure:

1. Open the two small paper bags, invert, and attach the thread to the centre of the bottom with a piece of tape.
2. Hang the two bags upside down on the ends of one of the straws, and balance this on a pin attached to the other straw as shown in the sketch (make sure that the straws move freely around the pin).
3. Let one of the students hold the vertical straw, strike a match and hold the flame under one of the bags (be careful not to set the bag on fire).
4. This bag moves up. Take the flame away and the equilibrium is restored (both bags will be in balance again).
5. Hold a flame under the other bag and this side will now move up.

Questions:

1. What is in the bags?
2. What is air doing if it is heated?
3. Why did the heated bag move up?
4. What happened after the flame was taken away from under the bag?
5. In which direction does heated air move?

Explanation:

The flame under the bag heats up the air in the bag and expands it.

This leaves less and lighter air in the bag. This lighter air pushes under against the bag and the bag moves up. When we take the flame away, the warm air cools down and slowly the balance of the two bags is restored.

This principle of making air lighter by heating is applied in *hot air balloons*.

Air inside the balloon is heated, it expands and becomes lighter and the balloon is pushed up by the lighter air (compared to the surrounding atmospheric air). The larger the balloon, the larger the force upward and thus the more weight it can lift.

3. An Introduction to Multiple Intelligence Theory

During the past century intelligent people were considered to be those who could read write and do arithmetic well. These were known as the 3Rs (reading, 'riting, 'rithmetic). However the theory of multiple intelligences, developed in 1983 by Dr. Howard Gardner, professor of psychology at Harvard University, suggests that the traditional notion of intelligence, based on I.Q. testing, is far too limited. Instead, Dr. Gardner's theory proposes eight different intelligences to account for a broader range of human intelligences.

The eight intelligences are as follows:

Linguistic intelligence ("word smart"):

Logical-mathematical intelligence ("number/reasoning smart")

Spatial intelligence ("picture smart")

Bodily-Kinesthetic intelligence ("body smart")

Musical intelligence ("music smart")

Interpersonal intelligence ("people smart")

Intrapersonal intelligence ("self smart")

Naturalist intelligence ("nature smart")

Since the terminologies given to each of the intelligences are difficult to remember for a non-science persons, simple terminology has been coined for each of the identified intelligences. These have been included within brackets in this article.

Who are the intelligent ones?

According to Dr Gardner in his book titled 'Multiple Intelligences' published in 2006, even in this century the misconceptions that linguistic and logical-mathematical intelligences are superior prevail. Still most people believe that they are the only intelligences in humans. Unfortunately, our schools are still in the same kind of state as 100 years ago, when the 3Rs seem to have all the emphasis in learning. We think that those who can read and write and who can do mathematical calculations, are the intelligent ones and the others are less intelligent. Those who cannot excel in linguistic or mathematics skills in schools, in fact, end up being labelled as having learning disabilities, or simply under-achievers and they are even sent to special schools meant for unintelligent children. In school systems, especially in Asian countries, almost all classroom activities are geared towards linguistic and mathematics.

Dr. Gardner says that we should place equal attention on individuals who show abilities in the other intelligences, such as the artists, architects, musicians, naturalists, designers, dancers, therapists, entrepreneurs, sportsman and others who enrich the world in many ways. Unfortunately, many children who have these gifts do not receive much reinforcement, or recognition for them in school. In fact, parents do not even seem to care for these intelligences and they tend to stop their children thriving in the attributes which they possess and enjoy.

Challenges to popularise MI theory

The good news is that the theory of multiple intelligences has grabbed the attention of many educators around the world, and hundreds of schools are currently using its philosophy to redesign the way it educates children. The challenge is to get this information out to many more teachers, school administrators, and others who work with children, so that each child has the opportunity to learn in ways harmonious with their unique minds. These challenges have been taken up by many enthusiastic educators.

In our own way, we have published one such practical book on multiple intelligence, aimed at both parents and teachers. The book includes chapters on using the imagination, the body, and

feelings in aid of learning, as well as chapters on holding positive expectations, having a patient attitude, and helping children with homework using multiple intelligences. This revised edition includes a special resource guide with games, software, organizations, books, learning materials, and internet sites geared toward each of the eight intelligences [ISBN 1-58542-051-4.]

Application of MI theory to class rooms

One of the most remarkable features of the theory of multiple intelligences is how it provides seven or eight different potential pathways to learning. If a teacher is facing difficulties in reaching a student in the more traditional linguistic or logical ways of instruction, the theory of multiple intelligences suggests several other ways in which the material might be presented to facilitate effective learning. Whether you are a kindergarten teacher, a graduate school instructor, or an adult learner seeking better ways of pursuing self-study on any subject of interest, the same basic guidelines apply. Whatever you are teaching or learning, see how you might connect it with – words (linguistic intelligence), numbers or logic (logical - mathematical intelligence), pictures (spatial intelligence), music (musical intelligence), self-reflection (intrapersonal intelligence), a physical experience (bodily-kinesthetic intelligence), a social experience (interpersonal intelligence), and/or an experience in the natural world. (naturalist intelligence). For example, if you're teaching or learning about the law of supply and demand in economics, you might read about it (linguistic), study mathematical formulas that express it (logical-mathematical), examine a graphic chart that illustrates the principle (spatial), observe the law in the natural world (naturalist), or in the human world of commerce (interpersonal); examine the law in terms of your own body [e.g. when you supply your body with lots of food, the hunger demand goes down; when there's very little supply, your stomach's demand for food goes way up and you get hungry] (bodily-kinesthetic and intrapersonal); and/or write a song (or find an existing song) that demonstrates the law (perhaps Dylan's "Too Much of Nothing?").

All eight ways need not be used to learn something. One has to see what the possibilities are, and then decide which particular pathways are more interesting, or seem to be the most effective teaching or learning tools. The theory of multiple intelligences make it possible for teachers and learners to use tools beyond the conventional linguistic and logical methods. This is so fascinating, because it expands the horizon used in most schools like lectures, reading textbooks, writing assignments to other interesting areas.

How to get really started on using MI theory

To get started, put the topic of whatever you're interested in teaching or learning about in the centre of a blank sheet of paper. Draw eight straight lines or "spokes" radiating out from this topic. Label each line with a different intelligence. Then start brainstorming ideas for teaching or learning that topic and write down ideas next to each intelligence. This is a spatial-linguistic approach of brainstorming. However you can do this in other ways as well, using a tape-recorder, or having a group brainstorming session. It is great to be a grade 8 teacher/learner and therefore make a revolution in the teaching learning process and make the process more meaningful according to the participant's own intelligences!

[Acknowledgments: site http://www.thomasarmstrong.com/multiple_intelligencebbbs.htm]

Supplied by Asoka Weerasinghe, Chairman, SLASME, Sri Lanka

4. Teaching Goals from US National Science Education Standards

The Goals for Science Teaching that Frame the
U.S. National Science Education Standards (NSES)
[http://books.nap.edu/openbook.php?record_id=5704&page=R1]

An Overview

In a world filled with the products of scientific inquiry, **scientific literacy** has become a necessity for everyone. We need to use scientific information to make everyday **choices**. Everyone needs to be able to engage intelligently in public discourse and **debate about important issues** that involve science and technology. And we all deserve to share in the excitement and personal fulfillment from understanding and learning about the natural world.

Scientific literacy is of increasing importance in the **workplace**. More jobs demand advanced skills, requiring that people be able to learn, **reason, think creatively, make decisions, and solve problems**. An understanding of science and the processes of science make essential contributions. Countries are investing heavily to create scientifically and technically literate work forces.

Less is More

After some introductory chapters on the U.S. National Standards, there are six additional chapters that include the essence of the Standards for Pre-K through 12 science in U.S. schools. These six chapters include: teaching, professional development, assessment, content, programs, and systems. The chapters close with a summary indicating **Less Emphasis** and corresponding **More Emphasis** conditions. In a very real sense these changes, i.e., “less to more” indicate and contrast “the” visions conceived in the document that took four years to develop with an expenditure of \$7 million dollars. The Less Emphasis conditions represent what is practiced in too many traditional schools. The More Emphasis conditions in the six chapters provide a summary of the specific visions for change that are recommended. Why are not the visions more central to the U.S. reform efforts of the 21st Century? Is the science education leadership aware of, and in agreement with, the reforms which took so long to produce?

The More Emphasis visions for teaching, professional development, assessment, content, programs, and systems were preceded with an elaboration of the “goals” for science education which should be considered prior to a look at the summary of the six chapters.

These goals indicate that all students should:

1. Experience the richness and excitement of knowing about and understanding the natural world;
2. Use appropriate scientific processes and principles in making personal decisions;
3. Engage intelligently in public discourse and debate about matters of scientific and technological concern; and
4. Increase their economic productivity through the use of the knowledge, understandings, and skills of the scientifically literate person in their careers.

(NRC, 1996, p. 13)

A series of short articles, written by Robert E. Yager, Professor of Science Education, University of Iowa, USA, summarizing each of the Less/More contrasts in the six NSES chapters. These will appear in subsequent issues of this newsletter.

5. SAFE SCIENCE: Be Protected!

By Dr. Kenneth Russell Roy, ICASE chair for the Committee on Safety

EMERGENCY EYEWASH AND SHOWERS: ARE THEY NEEDED?

Often inquiries are made relative to the requirements for emergency eyewash and/or showers in school science laboratories. The regulatory agency for employees in the US (Occupational Safety and Health Administration or OSHA) addresses this issue in their Code of Federal Regulations # 1910.151 Subpart K –Medical and First Aid. Under part (c) – “Where the eyes or body of any person may be exposed to injurious corrosive materials, suitable facilities for quick drenching or flushing of the eyes and body shall be provided within the work area for immediate emergency use.” Given that this statement is relatively generic, OSHA has provided several letters of interpretation. The bottom line is emergency eyewash and shower safety equipment are required and must meet the specifications of ANSI 358.1 (American National Standard for Emergency Eyewash and Shower Equipment, 1998 revision).

WHO NEEDS THEM?

Most secondary level (grades 6-12) schools with formal science laboratories require engineering controls such as eyewash and showers. This is dictated by direct contact or exposure to hazardous chemical products, which can harm eyes or other body surface areas. Whether it is exposure to sodium hydroxide in Chemistry, sulphuric battery acid in Physics, or hydrochloric acid in Biology, all require safety equipment to minimize injuries to the eyes.

The standard addresses engineering controls protecting the employee’s eyes or other body parts from chemical exposure implications. This category includes emergency showers and eyewash equipment, hand-held drench hoses or combination shower and eyewash equipment.

WHERE SHOULD THEY BE PLACED?

Location is everything with eyewash and shower equipment. Government regulatory agencies will vary some what from region to region. For example, ANSI in the US requires that the stations must be no longer than a maximum of 10 seconds to be reached by the injured employee. A clear path to the eyewash or shower station is a requirement. Desks, chairs and other obstacles need to be clear of the path. Signage is also required. Highly visible signs to be serviced by the safety equipment need to be installed.

HOW LONG SHOULD THE FLUSHING TAKE PLACE?

The water provided by the eyewash or shower station should be clean and tepid (60-100 degrees F or 16-38 degrees C) in temperature. Eyes should be placed in the stream of water in such a way as to provide the greatest area of exposure. The fingers may be needed to spread open the eyelids. In the case of the shower, contaminated clothing often exacerbates skin complications and therefore needs to be removed. The flushing must take place for a period of at least 15 minutes. Towels or sheets should be kept nearby for the purpose of covering up the person after clothing is removed.

WHERE DOES ALL THE CONTAMINATED WATER GO?

Emergency eyewash and showers may or may not be required to have drains, though they are often desired. Worry about the clean up after the person is out of harm’s way. If drains are used, consideration needs to be given to the destination of the contaminated water and its impact on the environment. If the water’s destination is a water treatment plant, the operator needs to be warned immediately. Depending on the nature of the contamination would also prompt warning

local authorities if septic waste is the final destination. Water on the laboratory floor can be cleaned up but first consult proper references or authorities as to how best dispose of it.

FINAL THOUGHTS!

Although eyewash and showers should be inspected monthly and activated weekly for correct operation, these are minimum expectations. It is more practical to have the laboratory supervisor test the system each day of laboratory use involving hazardous chemicals. This is a more responsible approach for the science laboratory professional.

LIVE LONG AND PROSPER SAFELY!

Additional articles on Safety will appear in subsequent issues of the ICASE newsletter

6. Peter Spratt Medal An Annual Award by NZASE

The success of the NZ Association of Science Educators is dependent on the contribution of its members in the various regions of NZ that it represents. Contributing organizations such as local science teacher associations, subject standing committees and the associated groups such as science fair committees have stayed viable due to long-term, sustained commitment from key individuals. These people work tirelessly often without a high public profile. Peter Spratt, previous executive officer for NZASE, was a person who would meet this criteria.

We are proud to announce that the inaugural NZASE Peter Spratt Medal for sustained contribution to science education will be awarded at SCICON. (annual meeting of the New Zealand Association for Science Education)

The award will be made at each SCICON and from 2008 nominations will be sought from the membership of NZASE.

SciCon 2008 ... Science to Change our World 6th – 9th of July 2008 at Te Papa, Wellington
<<http://www.confer.co.nz/scicon08>>

7. Calendar of Events

This section draws attention to events that may be of interest to science educators/teachers. ICASE is very pleased to include all events organised by its member organisation. Please send details to the ICASE President (jack@ut.ee)

SciCon 2008 ... Science to Change our World 6th – 9th of July 2008 at Te Papa, Wellington

We welcome participation by science educators from all education sectors in this national conference, run under the umbrella of the New Zealand Association of Science Educators (NZASE <<http://www.nzase.org.nz/>>). The theme – “Science to change our World” – reflects that Science educators have long been aware that science offers ways to make sense of our world and, ever more importantly, mechanisms for making decisions. In the face of information overload, the world’s citizens are challenged with making informed choices about a wide range of personal and global issues. As science educators we must determine how we can best support our students to engage with science and wisely use the information available to them, while continuing to inspire the next generations of scientists. During SciCon 2008 you will have the opportunity to meet scientists, both international and local; who will share their passions, their insight and their early inspirations. The conference will explore some of the cross discipline sciences like molecular biology and nanotechnology and topical issues that affect our future on planet earth such as sustainability and

climate change. SciCon 2008 will also be an opportunity to network with and learn from fellow science educators. Find out more about the conference at <<http://www.confer.co.nz/scicon08>> There will be a full and exciting programme of workshops, presentations and field trips as well as special sessions for primary teachers and science technicians.

SciCon is for anyone who is involved in science education: primary and secondary teachers, tertiary educators, and those involved in science education or working with pre-service teachers. There will be a comprehensive programme to cover all four strands of the science curriculum for high school teachers, and parallel programmes for primary teachers and science technicians.

Keynote Speakers include: 1. Jim Heath- Principal student involved in the discovery of C60 Carbon Buckminster fullerene. 2. Amanda Berry Monash University- expertise in Pedagogical content knowledge, investigations. 3. Russell Tytler Deakin University- Making science relevant and exciting to students 4. Bernard Beckett NZ Author Falling for science - asking the big questions

See website for more details on www.confer.co.nz/scicon08 <<http://www.confer.co.nz/scicon08>>

CONASTA 57 2008 Conference of the Australian Science Teachers Association 6-9th July 2008 at Griffin University, Queensland.

New featured speakers include Dr Alex Cook from the Queensland Museum talking about Queensland dinosaurs and Dr Dion Weatherly a computational seismologist from the University of Queensland, a talking on cutting edge modeling for earthquakes and tsunamis.

We now have a series of 'conferences within a conference' to provide substantial opportunities for teacher professional development. Currently, Monday will be a Primary Science Day, Tuesday will include the Royal Australian Chemical Institute Chemistry Interface and an afternoon program on 'New approaches to secondary science'. Wednesday's program will showcase the 'Scientists in Schools' program. The laboratory technicians have a two-day program on Monday and Tuesday. Registration is now open. Click [here](#) to register or visit <http://www.astmanagement.com.au/conasta57/>

SLASME (Sri Lanka) The 24th annual general meeting, scheduled for May 2008, has been postponed until July 19 and 20, 2008. This is particularly because of the prevailing situation in the country due to war and bombs. Planned are lectures and presentations of science investigatory projects by those interested, including secondary school students.

20th ICCE 3-8 August 2008, Mauritius .20th International Conference on Chemical Education. Theme: Chemistry in the ICT Age. Venue: Le Meridien Hotel. This is in conjunction with a **satellite conference** 11-12 August 2008, University of Nairobi, Kenya. Website <http://www.uom.ac.mu/20icce.htm>

The International Conference on Chemical Education (ICCE) is the main conference of the Committee for Chemistry Education of the International Union of Pure and Applied Chemistry (IUPAC). This is the first time that the conference will be hosted in the Sub-saharan region. There will be an online conference one month before the main conference and the latter will be followed by a satellite symposium in Nairobi. The conference will consist of plenary lectures delivered by renowned speakers and one Nobel laureate namely Prof Roald Hoffmann has kindly agreed to honour the event.

The website for the conference is <http://www.uom.ac.mu/20icce.htm>

The virtual conference will be held from 1st to 25th July 2008 and there is no registration fee. The website for the virtual conference is http://www.uom.ac.mu/icce/Virtual_conference/index.html

SMEC



"Sciences serving science: Cross-disciplinary issues in mathematics and science education" is the third in a series of biennial international Science and Mathematics Education Conferences (SMEC) that have been hosted by the Centre for the Advancement of Science Teaching and Learning (CASTeL), of Dublin City University & St. Patrick's College, Drumcondra.

SMEC 2008 will address the issues of sciences serving science, exploring questions such as transfer of knowledge and skills between disciplines, breadth versus depth in science curricula and the implications of these issues in regard to teacher education.

Papers are invited which relate to any such issues, but in particular those which will focus on:

- Breadth versus depth in science curricula
- Transfer of knowledge & skills between disciplines
- Interdisciplinarity & multidisciplinary
- Subsidiary subjects in science
- Implications for teacher education

Previous conferences in this series addressed the need for improving science, mathematics and technology education through high quality research and deployment in our education system (SMEC 2004) and the interconnections between teaching and learning of mathematics and science at all education levels (SMEC 2006). <http://www.dcu.ie/smec/2008>

XIII IOSTE Symposium 21-26 September 2008 Izmir, Turkey

Symposium theme "The use of science and technology education for peace and sustainable development" For further information consult

<http://www.ioste2008.org>, <http://www.ioste13.org> or <http://web.deu.edu.tr/ioste13/index/index.php>

International Conference on Science and Mathematics Education, October 27 – 29, 2008, UP NISMED, Quezon City, The Philippines

The University of the Philippines National Institute for Science and Mathematics Education Development (UP NISMED), in cooperation with UNESCO International Bureau of Education (IBE – Geneva), International Council of Associations for Science Education (ICASE) – Asian Chapter, Department of Education, Commission on Higher Education, and Department of Science and Technology – Science Education Institute will hold an international conference on science and mathematics education on October 27 – 29, 2008 at UP NISMED Complex, Diliman, Quezon City.

For further details, see SECTION 3 of this newsletter or contact the Conference Secretariat, UP NISMED, Diliman, Quezon City, Philippines 1101 Email: nismed@up.edu.ph Telefax: (632) 928- 3545

The 22nd Biennial Conference of the Asian Association for Biology Education

November 21-24, 2008 Osaka, Japan

This will be held at the **ANA Gate Tower Hotel, Osaka, Japan**, under the joint sponsorship of AABE and SBSEJ, the Society of Biological Sciences Education of Japan. The theme for this biennial conference is “The Role of Biology Education in Society Today.” And sub-themes - Sub-theme 1. Biology Education for Realizing the Preciousness of Life; Sub-theme 2. Biology Education in “The UN Decade of Education for Sustainable Development (UNDESD)”

Country reports will be included as usual. General papers on biology education are also accepted. The Organizing Committee of the AABE 22 strongly encourages participants to send in their Registration Form by **July 31, 2008**.

Contact person:

Dr. Nobuyasu Katayama, The Director of the AABE 22, Department of Environmental Sciences, Tokyo Gakugei University, Koganei, Tokyo 184-8501, Japan. E-mail: katayama@u-gakugei.ac.jp, Facsimile: +81-334710354

ICASE African Regional Symposium 24-28 May 2009, Abuja, Nigeria

The theme of the conference - Meeting the Challenges of Sustainable Development in Africa through Science and Technology Education. Venue: Abuja Sheraton Hotel and Towers Conference Conveners: Dr. Ben B. Akpan, ICASE African Representative and Executive Director, Science Teachers Association of Nigeria Email: ben.akpan@stan.org.ng and Professor Peter Okebukola, Faculty of Education, Lagos State University, Ojo, Lagos, Nigeria. Email: peter@okebukola.com or visit the website <http://www.stan.org.ng/ICASE-2009>

FISER'09 May 22-24 2009, Famagusta, Northern Cyprus

A forthcoming international conference on Science and Mathematics education research; [*Frontiers in Science Education Research 2009*](#) (FISER'09) will be held May 22-24 2009. The official website of FISER'09 could be accessed via <http://fiser.emu.edu.tr>.

The conference is organised by the Eastern Mediterranean University, Faculty of Arts and Sciences.

Further information can be obtained from Mehmet Garip, Ph.D. Chair, Organising Committee (fiser@emu.edu.tr)

ICASE June 2010 Tartu, Estonia 3rd World Science and Technology Education Conference. Contact person: Miia Rannikmae (miia@ut.ee). At this time the conference organiser is initiating the planning stage and all member organisations are very much invited to put forward ideas for inclusion in the conference. (see also the ICASE website www.icaseonline.net)

8. ICASE Executive Committee 2008-2011

Based on the ICASE constitution, the ICASE Management committee as well as Regional Representatives are elected by member organisations. These elected members, in turn, nominate chairs of relevant standing committees. Together these persons form the ICASE Executive Committee and are the persons who make decisions on behalf of the ICASE Governing Body. The ICASE Governing Body is the **ICASE member organisations**.

The Executive Committee (the decision making body working for the Governing Body)

President

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