Supporting and promoting science education internationally

The ICASE Newsletter October 2008

Newsletter of the International Council of Associations for Science Education.

Contents of this issue

1. The Role of ICASE

ICASE is a Non-Governmental Organisation, set up by its members [National STAs. Science societies, Science centres, etc] forming an international science education communication network.

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.*

Is your national STA, or ICASE member organisation receiving this newsletter? Please help ICASE to ensure e-mail contacts are in order so that this newsletter reaches those who have an interest in promoting science and technology education within the country. If you know of someone who should be receiving this newsletter, but is not, please contact the editor (jack@ut.ee).

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 which were designed to allow young children (roughly grades 1-4) 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.

In this section each month ICASE includes a **STEP activity,** plus an activity for lower secondary level (approximately grades 7-9). Take a look !

A) STEP ACTIVITY

A **parachute**

From Nigeria

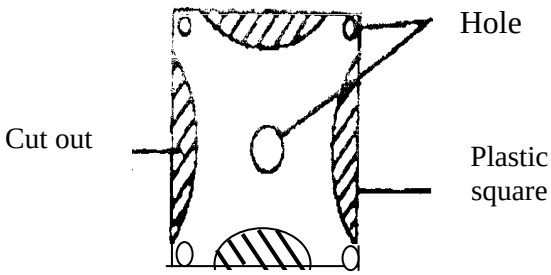
Challenge: Can you make a parachute?

What you need:

- 25 cm square paper
- thread - 4 pieces 25 cm long.
- paper clip
- another small piece of thread
- small stones

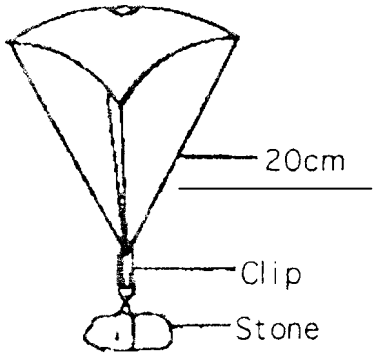
What to do :

1. Tie a thread to each corner.
2. Attach the ends to a paper clip.
3. Drop the parachute from a height. What happens?
4. Tie a small stone to the paper clip and drop the parachute from the same height. What happens`?



More to do:

- Repeat the activity with other shapes of parachutes. What shape of parachute is the slowest?
- Modify the parachute to make it go sideways. Can you make it go the furthest sideways?

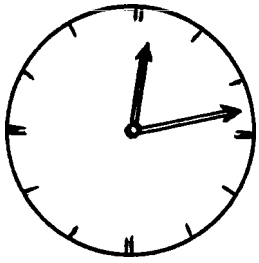


B) LOWER SECONDARY ACTIVITY

THE CANDLE UNDER THE JAR

Materials:
1. Three or more jars of different sizes.
2. Three or more birthday candles (depending on number of jars).
3 A large clock, or watches for timing the burning candles.

Inverted jar plus candle



Procedure

1. Divide the class in small groups of three to six students.
2. Give each group one jar, one candle and matches.
3. Make sure that the students can see the large clock or that each group of students have a watch for timing.
4. Ask the groups to measure the burning time of the candle under the jar: Start timing as soon as the jar is put over the candle and stop timing when smoke evolves from the wick (repeat several times, make sure to replenish the air in the jar).
5. Compare size (volume) of jar with the burning times (plot a graph).

Questions

1. Why do we measure the burning time more than once?
2. What should we do to the gas in the jar before repeating the measuring of the burning time of the candle?
3. What do you think the burning time of the candle would be, if we did not replenish the air in the jar after the first reading?
4. Why did the candle stop burning under the jar?
5. How can we measure the volume of the jar?
6. What is the relationship between size or volume of the jar and the burning time of the candle?

Explanation

Air, or actually, oxygen in the air (about 20%) is needed to sustain the burning of the candle. Unfortunately when the volume of oxygen becomes low, the candle is suffocated and the candle is extinguished. Virtually all the oxygen is replaced by carbon dioxide and water vapour. The water vapour can be seen condensing on the cold inside surface of the jar. Before repeating the experiment, the air or oxygen in the jar has to be replenished. One way to do this is by pushing crumpled paper in and out of the jar several times. A straight line relationship exists between the volume of the jar and the burning time of the candle when the data are put into a graph.

C) USING EXPERIMENTAL IDEAS IN SCIENCE TEACHING

This newsletter contains two experimental ideas. It is hoped that these will be of interest. But how to use these experiments in teaching ? Teachers need to be free to include experimentation as they feel best, but given below is ICASE thinking in putting forward the experiments in this newsletter. Teachers and science educators are welcome comment.

1. Who does the experiment ?

Clearly these experiments can be undertaken as a teacher demonstration. However, the intention is that the students are involved, either working individually, or more likely, in small groups. The apparatus is kept as simple as possible and can often be brought from home, or made by the students themselves.

Why is student involvement preferred ? We note the old Confucius saying – I hear and I forget; I see and I remember; I do and I understand. The belief is that the more students are engaged, the more they learn. Teacher demonstrations, or large group experiments, limit student involvement and are thus not preferred.

2. Should instructions be given to students ?

The section *'What to do'* and/or *'Procedure'* clearly spell out how to undertake the experiment. But it is not intended that the experiment must be used in this way. By following instructions, a *'cookbook,'* or *'follow a recipe'* situation is created. This highlights the **doing,** but **probably not** the understanding. Where instructions are provided, the student learning can be expected to be the explanation that follows. And the teacher is then focusing on students' explanatory skills. The first experiment is about making a parachute. The explanation about the working of a parachute needs to be kept simple. In the second experiment, the questions have been added to ensure that a 'cookbook' or 'do-and-forget' approach is **not intended**. The experiment leads to explaining why the candle is extinguished and can be used to determine whether this experiment leads to a measurement of the percentage of oxygen in air (probably not as the candle is likely to go out when there is insufficient oxygen rather than when there is no oxygen).

3. Inquiry learning

Can the experiments be used in an inquiry approach, whereby the students **suggest the *purpose* and *procedure themselves* ?** This is very much an ICASE recommended approach. It means students put forward the investigatory question, plus the procedure to follow. This is more suited to the grade 7-9 students as it promotes science as the seeking of explanations to questions put forward rather than to a 'wondering why' approach more appropriate for younger students.

So what would be the investigatory question for the second experiment ? This is could be 'Is air a single substance'? Or 'what air supports combustion of a candle?' Or perhaps 'When a candle uses up oxygen, does the candle go out because a vacuum is created?' The list here is not intended to be exhaustive and it cold be interesting to guide students to create their own investigatory question once the experiment has been carried out a single time.

3. Teaching Goals from US National Science Education Standards

Needed Changes in Professional Development for Science Teachers Envisioned in the U.S. National Science Education Standards (NSES)

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.

There was little or no debate about the Professional Development Standards for the continued education of teachers. These standards were not even involved in the four year debate, nor the attempts to reach consensus concerning the validity of the fourteen Less/More emphasis conditions. In fact, they were conceived after the initial draft was presented to the National Research Council leadership in the US. Discussion at the end of the lengthy process ended in agreement that "teaching" should not stand alone and needed the reinforcement of continuous learning and a research base for teaching throughout the lifetime of every teacher.

The fourteen changes needed and the contrasts between the "Less Emphasis" features and the "More Emphasis" features follow:

Less Emphasis On	***More Emphasis On***
1. Transmission of teaching knowledge and skills by lectures	Inquiry in teaching and learning
2. Learning science by lecture and reading	Learning science through investigation and inquiry
3. Separation of science and teaching knowledge	Integration of science and teaching knowledge
4. Separation of theory and practice	Integration of theory and practice in school settings
5. Individual learning	Collegial and collaborative learning
6. Fragmented, one-shot sessions	Long-term coherent plans
7. Courses and workshops	A variety of continuing professional development activities
8. Reliance on external expertise	A mix of internal and external expertise
9. Staff developers as educators	Staff developers as facilitators, consultants, and planners
10. Teacher as a technician	Teacher as an intellectual, reflective practitioner
11. Teacher as consumer of knowledge about teaching	Teacher as producer of knowledge about teaching
12. Teacher as a follower	Teacher as a leader
13. Teacher as an individual based in a classroom	Teacher as a member of a collegial professional community
14. Teacher as target of change	Teacher as source and facilitator of change (NRC, 1996, p. 72)

4. SAFE SCI: Be Protected!

Article provided by Dr. Ken Roy – Chairman of the ICASE Standing Committee on Safety in Science Education. He is also Director of Environmental Health & Safety, Glastonbury (CT), an authorized OSHA instructor and science safety consultant. Email: Royk@glastonburyus.org

MERCURY: It Is More than A Planet in our Solar System!

I. AWARENESS OF MERCURY'S VAPOUR

Two recent incidents have brought to light the importance of respecting mercury in the science laboratory. One was a safety incident, which recently transpired in a middle school. Two students duped a custodian into unlocking a door to a science laboratory so they could get a "forgotten textbook that was needed for homework." The custodian, thinking he was doing a good deed, allowed the students to enter. While one student kept the custodian entertained, the other quickly secured a bottle of mercury from the teacher's desk drawer. A few days later, the students were rushed to the hospital with mercury poisoning. A second incident involved a general malaise in a classroom by the students and teacher. After countless series of tests on indoor air quality, it was determined that occupants were being exposed to mercury vapour. The wooden floor in the aged structure served as a reservoir for mercury from broken thermometers. The room had to be isolated from the building and the floor replaced.

Mercury filled thermometers, manometers, psychrometer and barometers which, when broken, expose occupants to mercury vapour. Students and employees are also often exposed to mercury vapour resulting from chemical reactions in laboratory experiments or observing the properties of the metal in a classroom demonstration. Inhaled vapour can affect functions of the nervous system, in addition to the kidneys, skin and lungs, although this is in fact a fairly slow process as the vapour pressure of mercury is not very high.

II. WHAT IF THERE IS A SPILL?

If there is a mercury spill in the science laboratory or classroom, the following need to be done:

1. Evacuate occupants from the room. This will reduce exposure to the vapour.
2. Be cautious about tracking the chemical to other parts of the building, thus expanding the zone of contamination.
3. Commercial mercury spill kits can be used to remove small spills.
4. For larger spills, contact the government's safety or environmental agency. A commercial environmental clean-up company may also be considered.
5. Vacuuming the spill with a regular vacuum cleaner only exacerbates the situation by causing the vapour to dissipate in the air. Wait at least 2-3 days after the spill and clean up before attempting to vacuum with a regular vacuum cleaner.
6. In uni-directional air handling equipment, turn on the ventilation to help evacuate the vapour molecules from the facility. In air handling units which recycle air dampers need to be adjusted to provide for exhausting of the area.
7. These cleaning recommendations are for hard surfaces such as tiles or linoleum. Carpets or other porous surfaces should be discarded if at all possible.
8. Use a stiff material such as plastic or cardboard to pick up all pieces of glass and beads of mercury. An eyedropper can be used to suck up the beads. Plastic bags can be used to collect the glass/mercury, etc and disposed of in the regular trash.
9. If you have a floor with cracks or seams, you may wish to consider having an air quality test done to determine in mercury are at unacceptable levels.

III. CONSIDERING ALTERNATIVES:

One method of avoiding these types of problems is to consider alternatives to using mercury in the laboratory. For example, use non-mercury type thermometers for laboratory experiments or computer temperature probes sensors. Although the use of mercury is not considered prudent safety practice, some science instructors are still insisting on its use. If this is the case, limit student access to mercury by only having a display container which is kept in a secured area under lock and key. If use of mercury is required, make sure proper storage is used (avoid contact with or storage near ethyne (acetylene), fulminic acid, or ammonia). Also, storage must be in a secured area, as is the case for all hazardous chemicals.

IV. FINAL THOUGHTS!

For further assistance or help in cleaning up a mercury spill, consider contacting one or more of the following agencies: Local fire department, public health department, poison control centre, government environmental protection agency, or department of public health. Also remember that non-certified employees, such as para-professionals and custodians who work in the science laboratory area, also need special training in dealing with hazardous chemicals as part of their job.

5. Special Events offered by ICASE member Science Teacher Associations

A) NSTA International Science Education Day Conference

March 19, 2009 New Orleans, Louisiana

THEME: "Growing Professionally through International Opportunities: Field Experiences, Collaborations and Investigations"

NSTA will hold a "conference within a conference" during the NSTA National Conference on Science Education in New Orleans, Louisiana, March 19-22, 2009. The International Science Education Day Conference will focus on the wide range of international professional opportunities available to science teachers. During this conference, there will be numerous opportunities for international visitors to network together and to interact with science educators from various cultures, including those from North America. This conference is open to all registered attendees of the NSTA National Conference.

To learn more, please visit http://www.nsta.org/portals/international/intlsciedday.aspx

Submit a session proposal for an NSTA 2009–2010 conference. Our 2009 area conferences include Minneapolis, MN (October 29–31), Fort Lauderdale, FL (November 12–14), and Phoenix, AZ (December 3–5). In 2010 NSTA will holds its national conference in Philadelphia, PA (March 18–21). Deadlines for submissions are January 15, 2009, for the 2009 area conferences and April 15, 2009, for the Philadelphia National Conference. For more information, visit http://www.nsta.org/conferences and click "Presenting at NSTA Conferences." You can also pick up tips on submitting a successful session proposal.

B) New Zealand Association for Science Education Conference

NZASE Primary Science Conference 2009

PROFESSIONAL DEVELOPMENT IN PRIMARY SCIENCE

"Active learning: Science talk from the classroom to the dinner table"

For teachers who are motivated and interested in:

- developing active learning strategies to enhance children's learning
- the importance of providing contextual science experiences: science in a learner's world
- reflecting on current trends in science teaching and relating it to their own practice
- taking part in practical workshops that explore the theme of the conference
- identifying explicit links between teaching and learning in science education and the key competencies and values

2009 Dates

Dunedin
14th & 15th April

Christchurch
16th & 17th April

Wellington
20th & 21st April

Auckland
23rd & 24th April

CONTACT

Ian Milne:
i.milne@auckland.ac.nz
Phone 09 623 8899 Ext 48637

T.R.C.C
Teachers' Refresher Course Committee
Komiti Whakahauora Kaiwhakaako

TRCC assists most teachers with travel costs. Please register early to ensure travel assistance. TRCC is supported by the teachers' unions: ASTE, NZEI (primary and early childhood), PPTA.

For enquiries and registration forms contact:
TRCC, PO Box 12-381, Wellington, Phone 04 495-2300, or 0800 872 211, Fax 04 495-2299, Email: info@trcc.org.nz
Register online at www.trcc.org.nz

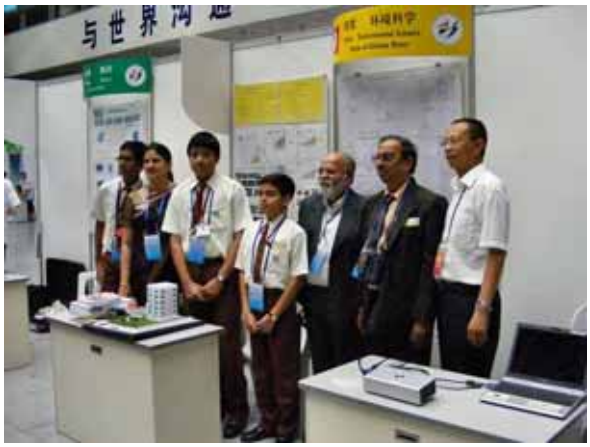
COSTS:
Early Bird Fee: $250 (by 06/03/09)
Full Fee. $300 (after 06/03/09)

Registrations close on 20th March, 2009

6. CASTIC 08

This year's annual CASTIC (Chinese Association for Science and Technology Innovation Competition) was held in Urumqi, Western China at the end of July 2008. Student teams were very much in evidence from China but there were also teams from a number of Asian and European countries. For details of next year's competition please contact Peng Xi (e-mail: pengxi@cast.org.cn)

The ICASE President with a delegation from Thailand



An Indian delegation with Peng Xi (right) – CASTIC organiser and corresponding member from CAST to ICASE

A French delegation interested in the design of ice skates

A general view of the many exhibitions, most by students from China

Some of the many exhibitions at CASTIC

Besides the innovation competition for students, CAST also organised a teacher forum reflecting on science and technology education. This year the ICASE President and the ICASE Past President were among the presenters.

The ICASE Immediate past-President, Dr Janchai Yingprayoon addressing the teacher audience and introducing a variety of ways in which teaching can be made more stimulating and interesting without recourse to expensive equipment or time consuming visits to outside centres.

Promoting Scientific Literacy
CAST not only considers scientific literacy for students, but in other areas of society for example farmers and the community.

Outline of Scientific Literacy Education for Farmers

- CAST suggests that through training and science popularization, **the scientific literacy** for farmers can be considerably enhanced.

CAST stresses the raising of the ability of farmers by using :

- advanced **practical technologies** in production
- raw materials **economically** and
- build an **ecologically sound** homeland,
- master **modern agricultural techniques**

A "**Science Education Enters Community" project** is part of the "Four Enters" initiative sponsored and organized by the Central Office for Cultural and Ethical Progress (COCEP) and nine other departments in 2002. It is deployed and implemented by COCEP and the China Association for Science and Technology (CAST).

The activity has promoted regularity, broad participation and socialisation of the **science popularisation** activities in communities and has stimulated enthusiasm in the community residents to participate in science activities.

7. Calendar of Events

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

2nd ASCC Conference
On **18-21 February 2009**, the 2nd African Science Communications Conference (ASCC) will convene in Gauteng, South Africa. The theme of the 2nd ASCC will be "Shaping Africa's Future: Science Communication's contribution to Science, Technology and Innovation, and the development of democracy in Africa ". With an emphasis on integrating academic research with policy-decision making and industry, the meeting will address important issues in the development and advancement of Science Communication.
Anchored by a highly successful 1st ASCC in 2006, thematic sessions will address:

- The translation of research for:
    - policy,
    - economically viable products or initiatives,
    - the facilitation of trans- and inter-disciplinary research; and
    - an informed society through the mass media.
- Science, engineering and technology human skills development, education and learning;
- Science and the media
- International benchmark activities in Science Communication;
- Research and development in Science Communication.

You and your colleagues are invited to submit abstracts for consideration for presentation at the conference. Please use the enclosed abstract form as your guide.
The deadline for abstract submission is October 16 2008.

NSTA Annual Conference
March 19–22, 2009 New Orleans
Celebrate science in magical New Orleans, one of our most beloved cities. Conference registration and exhibits will be at the Ernest N. Morial Convention Center. Most sessions and events have been scheduled at the Convention Center and the conference headquarters hotels—Hilton New Orleans Riverside, New Orleans Marriott, and Sheraton New Orleans Hotel. Register now for the New Orleans conference and take advantage of special earlybird rates. Instructions on making housing reservations will be available by September 15. Please check back for updated information. Starting in September, information on conference sessions and other events will be added to the website as events are confirmed.
Theme Celebrating the Year of Science … Laissez les Bons Temps Rouler!

Program Strands
- Science and the Human Spirit
- Research to Practice: The Science Teacher Professional Continuum
- Energy and the Environment: The Natural and Human-designed World
- ISTE: Meeting the Needs of the Digital Student

For more details see http://www.nsta.org/conferences/2009new/

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 African Regional Symposium
24-28 May 2009, Abuja, Nigeria
This African regional symposium is being organised under the auspices of STAN (Science Teacher Association of Nigeria)

The theme of the conference is - Meeting the Challenges of Sustainable Development in Africa through Science and Technology Education.
The Venue is the Abuja Sheraton Hotel and Towers
The Conference Conveners are 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

For more details please visit the website http://www.stan.org.ng/ICASE-2009

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
Prof Jack Holbrook
E-mail jack@ut.ee

Past President
Dr Janchai Yingprayoon
E-mail janchai@loxinfor.co.th

Secretary
Prof Miia Rannikmae
E-mail miia@ut.ee

Treasurer
Adrian Fenton
E-mail Adrianfentonicase@yahoo.co.uk

Regional Representative for Africa
Dr Ben Akpan
Executive Director of STAN, Nigeria
E-mail: ben.akpan@stan.org.ng
(Member Organisation – Science Teachers Association of Nigeria)

Regional Representative for Asia
Dr Azian Abdullah
Director, RECSAM, Malaysia
E-mail: azian@recsam.edu.my
(Member Organisation – RECSAM)

Regional Representative for Australia/Pacific
Dr Beverley Cooper
E-mail: bcooper@waikato.ac.nz
(Member Organisation – NZASE, New Zealand)

Regional Representative for Europe
Dr Declan Kennedy
E-mail: d.kennedy@ucc.ie
(Member Organisation – Irish Science Teachers Association (ISTA)

Regional Representative for Latin America
Gabriela Inigo
E-mail: gabrela_inigo@hotmail.com
(Member Organisation – Albert Einstein Club, Mar del Plata, Argentina)

Regional Representative for North America
Prof Norman Lederman
E-mail: ledermann@iit.edu
(Member Organisation - Council of Elementary Science International (CESI))

Chairs of Standing Committees

Pre-secondary and informal education
Prof Lynda Paznokas
E-mail lpaznokas@pullman.com

Safety in Science Education
Dr Ken Roy
E-mail: Royk@glastonburyus.org

World Conference
Dr Robin Groves
E-mail grovesr@ozemail.com.au