



Supporting and promoting science education internationally

The ICASE Newsletter September 2008

Newsletter of the International Council of Associations for Science Education.

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1. The Role of ICASE

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

The Challenge: How can you make cereals dance ?

What you need

- see-through plastic cup
- plastic cling wrap
- grains of puffed rice cereal
- rubber band
- dry woolen cloth



What to do

Place several grains of puffed rice in a plastic cup.

Close the cup with cling wrap and secure with a rubber band. Rub the cling wrap using the dry cloth.

Observe what happens.

More to do.

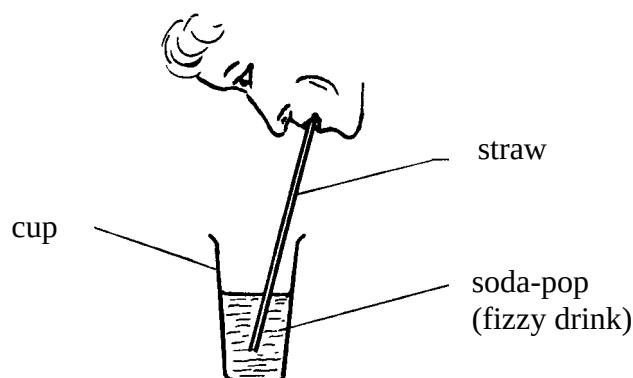
- How does the number of rubs affect the number of puffed rice grains attracted to the plastic wrap ? Design an experiment to find out. Record your observations in a chart.
- Experiment with different types of cloth and compare results. Which type of cloth makes the puffed rice 'dance' more ?
- What happens if you add more or less puffed rice grains to the cup ?
- What happens when you sprinkle water in the cup ? What happens if the puffed rice grains are wet ?
- What other things can act like the puffed rice grain. Add various things to the cup to find out if they are attracted to the plastic wrap.
- What happens when you rub an inflated balloon and hold it near your hair ?

(see page 4 for comments on undertaking the experimental work in class)

B) LOWER SECONDARY ACTIVITY

AIR EXERTING PRESSURE - THE STRAW DRINKING RACE

- Materials:**
1. Two identical drinking straws (one punctured with a few needle holes over the whole length)
 2. Two small cups and some soda drink



Procedure

1. Fill the two small cups halfway with soda pop
2. Ask two students to come up and comment: "Who would be better 'sucker'?"
3. Give each of them a straw (one of them with holes in it, but do not mention this).
4. Let them start drinking (sucking) on the count of three.
5. Give another pair of students a turn to race (the one who has the straw with holes always loses).

Questions

1. What makes the liquid go up the straw when we drink ?
2. Why is it so hard to drink through a leaky straw ?
3. What do we actually create when we suck through a straw ?
4. Would we be able to drink through a straw if there was no air pressure around us ?
5. Would an astronaut in space or the moon be able to drink liquid through a straw ?

Explanation

By sucking we create a partial vacuum or a lower pressure in the straw above the liquid that we drink. The higher pressure of the atmospheric air pushes the liquid up the straw and in to our mouth.

The student with the leaky straw sucks in air and thus cannot create vacuum about the liquid, so the liquid is not pushed up.

If there were no air pressure in the atmosphere, we would not be able to suck liquids through a straw. If the mouth of an astronaut was connected to a straw through his spacesuit to an open cup with liquid on the moon's surface, he would not be able to drink the liquid by sucking through the straw, because there is no pressure on the liquid surface that will push it up the straw.

(see page 4 for comments on how to use this experiment in teaching)

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 shows the attraction of rice grains (the rubbing of the plastic clearly does something that allows the rice grains to be attracted - but only if the rice grains are dry). The explanation needs to be kept simple and the use of the word electrostatics is not especially important (it may be used if students are familiar with the term). 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 air pressure can be reduced by sucking (at least on Earth) provided the air cannot be replaced.

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 not so easy and the ‘game’ idea presented in the actual script does provide an interesting challenge for the students, which in itself is a good learning situation. Perhaps ‘*how can we ensure we know the winner of the contest beforehand* ?’ is a possible question. But then the experiment is not so much geared to seeking an explanation, as it is in applying the explanation to a new situation. Perhaps the reader can come up with an intriguing question that initiates the scientific inquiry learning process.

3. Teaching Goals from US National Science Education Standards

Needed Changes in Assessment Practices for Teachers as 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.

Assessment too often is associated with testing; it is considered a way of indicating student success with the teaching provided by teachers. Although it was not considered by the assessment “experts” involved with the Standards, the Wiggins and McTighe book (Understanding by Design, 1998) provides a great deal of help in putting assessment in a better perspective. These authors advanced “Backward Design” as a new and important effort. It basically suggests initially establishing what would/could/should be used as evidence for meeting a particular goal. Such consideration should be accomplished before teaching and before planning the curriculum. All of this illustrates that assessment is basic to science itself; it is the collecting of evidence for meeting specified goals and the analysis of the ideas proposed and learned. It is not something someone else does for grading proposes. The NSES summarize the visions for reform in the assessment arena with but seven “Less Emphasis” conditions (i.e., what is commonly done) with seven contrasting “More Emphasis” conditions. These include:

Less Emphasis On

1. Assessing that which is easily measured
2. Assessing discrete knowledge
3. Assessing scientific knowledge
4. Assessing to learn what student do not know
5. Assessing only achievement
6. End of term assessments by teachers
7. Development of external assessments by measurement experts alone

More Emphasis On

- Assessing that which is most highly valued
- Assessing rich, well-structured knowledge
- Assessing scientific understanding and reasoning
- Assessing to learn what student do understand
- Assessing achievement and opportunities to learn
- Students engaged in ongoing assessments of their work and that of others
- Teachers involved in the development of external assessments (NRC, 1996, p. 100)

4. The MRSA Panic: More Work to be Done by Science Education?

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

I. Germs: They Can Be Good For You!

In its 12 November 2007 issue, *Newsweek* (pg 24) posted a note in “Letters” titled “Can Germs Be Good for You?” It was written by physician Brad Piatt, M.D., Moraga, California (USA) and addressed the overly protective but well-meaning parents of kids relative to the MRSA wars. It noted how parents were demanding schools to provide sterile playgrounds, antibiotic wipe use and more in order to eradicate the existence of MRSA. The more important piece of this letter was the statement that early childhood exposure to germs in fact can provide immunity. The attempt to eliminate natural flora from skin and gut, serves to only foster the development of allergies and autoimmune disease.

Where has science education failed? How can so many well-meaning parents be so misinformed about creating the sterile bubble for their children? How can they be so void of knowledge about the role of bacteria and other microbes in the ecosystem? Hopefully basic biology and life science in primary and secondary schools certainly should have addressed the MRSA type of issues and the need for exposure to good bacteria. May be these parents never got a chance to read H.G. Wells – War of the Worlds?

Bottom-line is – Yes – many germs or flora are not only good but necessary for us. What is really interesting is these same well-meaning parents promote probiotics like Kefir and yogurt for their children’s health. How do you figure?

II. The History of MRSA

Methicillin-resistant *Staphylococcus aureus* (MRSA) is a major cause of hospital-acquired infections. These infections have now stepped outside of the hospital environment into the community in places like daycare centers and schools. Current MRSA clones are becoming increasingly difficult to treat because of emerging resistance to all current classes of antibiotics.

The history of MRSA is rather brief dated back to approximately 1959 when Methicillin was first introduced to treat infections caused by penicillin-resistant *Staphylococcus aureus*. As early as 1961, the United Kingdom reported *S. aureus* isolates had acquired resistance to methicillin. Known as MRSA, the bacteria were soon discovered in other European countries, Japan, Australia, and the United States.

The methicillin clones not only are immune to methicillin but also more common antibiotics such as amoxicillin, oxacillin and penicillin. Patients with weakened immune systems were the original targets of MRSA in hospitals and healthcare facilities. More recently, MRSA infections acquired by persons having a medical procedure outpatient or people with skin infections from pimples, boils or even scratches by cat claws are known as CA-MRSA infections or community-associated MRSA.

Normally, staph bacteria (including MRSA) are located on the skin or in the nose of about one-third of the population. People with skin bacteria of this type are identified as “colonized.” They are however not infected with MRSA but are carriers who can pass it on to another person.

III. Who Is At Risk and What Are The Symptoms?

There are several main risk factors for community-associated MRSA, especially relative to school aged children. These risk factors include:

1. *Primary School Children* – Children tend to be susceptible to infection because their immune systems are not fully developed or they have not had the necessary exposure to bacteria.
2. *School Contact Sports* – School activities such as contact sports expose students to the bacteria via cuts and abrasions from skin-to-skin contact.
3. *Sharing Of Athletic Equipment* – Students tend to share equipment such as uniforms and don’t use appropriate hygiene in keeping them clean.
4. *Weakened Immune System* – With confidentiality laws, teachers often do not know if their students are ‘immune compromised’ e.g., AIDS, Hepatitis, etc. People with weakened immune systems are likely to have difficulty fighting off MRSA type infections.
5. *Working in Unsanitary Conditions* – Gym classes and sports activities today do not require appropriate hygiene practices such as clean uniforms, showers, etc. These kinds of unsanitary conditions can lead to a MRSA playground!

Science teachers, like all teachers, come in contact with many students, including the possible one-third colonizers and also those with active infections. The following symptoms would be a signal to the teacher for a medical consult with the school health care provider:

1. Small red bumps looking like boils, pimples or spider bites in an open skin scratch or cut.
2. The red bumps over a short period of time become deep, painful abscesses with the formation of pus.
3. The bacteria can burrow deep into the body, causing life-threatening infections in other organs.

IV. Advice on Prevention In School

The Center for Disease Control and Prevention (CDC) recommend the following advice for prevention strategies:

Practice good hygiene:

1. Keep hands clean by washing thoroughly with soap and water or using an alcohol-based hand sanitizer. This is especially applicable prior to and after eating.
2. Keep cuts and scrapes clean and covered with a bandage until healed.
3. Avoid contact with other people’s wounds or bandages.
4. Avoid sharing personal items such as towels or razors.

If you, or a student, has MRSA, the following protocols are advised by the CDC.

You can prevent spreading staph or MRSA skin infections to others by following these steps:

1. **Cover your wound.** Keep wounds that are draining or have pus covered with clean, dry bandages. Follow your healthcare provider’s instructions on proper care of the wound. Pus from infected wounds can contain staph and MRSA, so keeping the infection covered will help prevent the spread to others. Bandages or tape can be discarded with the regular trash.

2. **Clean your hands.** You and others in close contact should wash their hands frequently with soap and warm water or use an alcohol-based hand sanitizer, especially after changing the bandage or touching the infected wound.
3. **Do not share personal items.** Avoid sharing personal items such as towels, washcloths, razors, clothing, or uniforms that may have had contact with the infected wound or bandage. Wash sheets, towels, and clothes that become soiled with water and laundry detergent. Drying clothes in a hot dryer, rather than air-drying, also helps kill bacteria in clothes.
4. **Talk to your doctor.** Tell any healthcare providers who treat you that you have or had a staph or MRSA skin infection.

Teachers need to be proactive and police their classroom. If students are found with exposed open wounds or pustules, they should be sent to the school's health care provider for attention.

V. Are MRSA Type Infections Treatable?

First of all, more people died of MRSA in 2005 than AIDS according to statistics. Is it dangerous – absolutely! However, according to medical records and research, most victims were ‘immune compromised’ with a disorder such as AIDS. The point is, average students in the classroom are not at high risk.

The other news is that most MRSA infections can still be treated successfully with antibiotics. Like all antibiotic usage, the full dose should be taken and good hygiene practiced! Treatment may involve draining of the abscess or boil by a healthcare provider.

VI. Science Lessons to Be Learned!

The causes contributing to bacteria mutations, clones and survival via antibiotic resistance, unfortunately, is the result of human activity! The leading three causes include:

1. Unnecessary and overuse of antibiotics - Years of excessive and unnecessary antibiotic use such as prescriptions for colds, flu and viral infections.
2. Use of Antibiotic in Food and Water – For many years, the food industry has used antibiotics for cattle, chickens and pigs in the United States. These antibiotics ultimately find their way into municipal water supply systems via groundwater runoff. Interestingly enough, routine feeding of antibiotics to animals has been banned in the European Union and other countries.
3. Germ Mutation – With the use of antibiotics, some bacteria survive the dose and become resistant. They learn to resist additional antibiotics very quickly, due to a high mutation rate.

VII. Final Word

MRSA is serious but can be addressed easily and simply using the old standby – wash hands with soap and water. Equally important for the science teacher is getting this message correct out to the general public. Most bacteria are not harmful and in fact beneficial or even essential. The overkill syndrome is only doing two things –

1. Helping to foster drug resistant bacteria cloning.
 2. Making drug manufacturers and the home cleaning product industry richer!
- Be part of the solution and work with students and parents by fostering good science.

5. Calendar of Events

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

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.

We are particularly interested in attracting abstracts related to the broad topics mentioned above. Accordingly, we invite you and your colleagues 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.

We look forward to your participation in the 2nd African Science Communications Conference and to a combination of outstanding science and great fun. We hope that you and your colleagues will be able to join us.

Committee Members

Ms Beverley Damonse; Mr Diran Onifade; Prof Sospeter Muhongo; Mr Andrea Bandelli; Prof Anusuya Chinsamy-Turan; Mr Lorenzo Raynard

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

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>

ICASE World Conference 28 June - 2 July, 2010 Tartu, Estonia 3rd World Science and Technology Education Conference on Innovations in Science and Technology Education: Research, Policy Practice. The venue will be the University of Tartu, the oldest University in Estonia dating back to 1632.

Focus of the World Conference

The 3rd World Conference will follow on from the previous World Conferences held in Malaysia, 2003 and Australia, 2007 by bringing together policy makers, curriculum developers, scientists, science teacher educators, science teacher association personnel and of course science teachers to consider research developments, policy implications and innovative practices in the field of science and technology education. Estonia has a strong tradition in science, stemming from its former USSR days and today is a widely recognised centre for gene technology.

The Penang, Malaysia conference (2003) led to the development and dissemination of a Malaysia Conference Declaration and a Way Forward document suggest the path for Partnerships for the Promotion of Science Education. *Partnerships in support of science and technology education innovation* is seen as one focus for this conference.

The Perth, Australia conference (2007) led to the Perth declaration showing concern for the current state of Science Education, especially related to its popularity among students. The declaration makes recommendations for the future. Issues stemming from this, to put before policy makers, were further developed in an accompanying forum under the auspices of UNESCO. This conference will take the opportunity to highlight innovations that address popularity, relevance and ways to enhance meaningful and enlightened science and technology education for all.

Further information on the declarations can be seen on the ICASE website - www.icaseonline.com.

Conference Opportunities for Partnerships

ICASE as a worldwide umbrella organisation would like to take this opportunity, in conjunction with its local partners, the University of Tartu and the Estonian Ministry of Education, to seek expressions of interest by organisations, societies and especially member science teacher associations in being involved in the planning and direction of the conference. Estonia is a small country and thus would wish to reach out to others to form partnerships in an effort to ensure a broad conference appeal and to take even greater steps, than have been taken in the past, to promote dissemination of innovative ideas and developments in the field of science and technology education, especially those involved with primary and secondary science and technology education and with the pre- and in-service education for teachers.

Contact person: Miia Rannikmae (miia@ut.ee).

6. 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
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Past President

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Secretary

Prof Miia Rannikmaa
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Regional Representative for Asia

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Regional Representative for Australia/Pacific

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(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
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Safety in Science Education

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World Conference

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

ICASE is now seeking nominations from member organisations for the President-elect position. Contact the ICASE President (e-mail as above) for more information.