

Science Sense-ations

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The Canning River Eco Education Centre (CREEC) is set on the scenic banks of the Canning River in the Perth metropolitan area of Western Australia. CREEC conducts many education for sustainability events, including annual science sense-ation expos.

The community science expos provide a feast for the senses. The first expo, in 2009, focused on *A Taste of Science* (Pearson & Lewis, 2009), followed by *A Dance of Science* in 2010 (Lewis & Pearson, 2011) and *A Sound of Science* in 2011 (Lewis, Gaschk & Pearson, 2011).

The one-day expos were held during National Science Week (NSWk) and engaged the general public in learning about different aspects of the science of taste, movement and sound. Planning, implementation and evaluation of the expos was achieved through a successful partnership between the Australian Association for Environmental Education - WA Chapter (AAEE-WA), CREEC, NSWk, City of Canning, South East Regional Centre for Urban Landcare (SERCUL), Swan River Trust and Great Gardens.

Aims

The expos aimed to contribute to the national objective to build a strong relationship between science and society (Department of Innovation, Industry, Science and Research, 2009, 2010). Thus the expos showcased modern science and Indigenous knowledge in an innovative, holistic manner. This involved:

- Providing an opportunity for the general public to participate in events that highlighted the benefits of science, technology and innovation.
- Promoting science careers.
- Fostering awareness of Indigenous knowledge.
- Fostering partnerships between the community, education/research organisations, local and state government, business and industry.

Innovative Model

Planning, implementation and evaluation of the expos was built on the experience and outcomes of similar events and previous science expos, in the context of experimenting with innovative approaches to engaging the general public in science endeavours.

Prior to the expos, children were invited to design art works related to the expo theme. Expo banners featured the winning artworks.



Each expo commenced with a 'welcome to country' by a local Indigenous elder, followed by numerous performances that invited community participation, such as interactive science shows, singing, drumming workshops and dancing.

Opportunities were provided for participants to engage in a wide range of hands-on interactive experiences. These included: animals encounters; exploration of microscopic biological specimens; physics experiments; bush crafts; clay creations; traditional Indigenous storytelling and rock art to pass on science knowledge.

Many displays were featured at the expo. University and Institute of Technology course information was available, while organisations such as Birdlife Australia, the Ear Science Institute Australia, and local conservation groups presented information on topics ranging from bush fire management to frogs of the Perth region.

Formal talks complemented the activities and displays. For example, Eco Education Officer, Leonard Thorn, engaged his audience through stories and activities that showcased Indigenous science and technology.



Outcomes

Three key outcomes:

1. Innovative Model Integrating Science and Indigenous Knowledge

Improved community awareness of Indigenous knowledge and technology was achieved through the variety of Indigenous stories and activities provided. For example, participants made bush 'glue' to attach a model axe head to wood. Links between traditional and modern technologies were discussed.

Evaluation of the expo was undertaken every year to determine what worked or needed improving. Various types of evaluation were utilised, from the NSWk feedback form to photographic evidence and anecdotal feedback. Table 1 presents key statistics from attendees who completed the feedback form.

2. Innovative Model Demonstrates Whole Systems Thinking

The Australian National Action Plan for Education for Sustainability (Department of the Environment Water Heritage and the Arts, 2009) outlined seven principles: transformation and change, education for all and life long learning, systems thinking, envisioning a better future, critical thinking and reflection, participation and partnerships for change. These principles were embedded into expo planning, implementation and assessment, utilising a whole systems thinking approach.

Wastewise Actions

Being wastewise is an important component of the innovative model, as waste management is a critical issue for science and society. Numerous strategies were adopted to minimise waste. Feedback forms were printed on the back of the program. Keep Australia Beautiful bins were supplied. Additional bin labelling and reminder signs were provided. Drink mugs were washed instead of using disposable cups. Bulk meat and bread was purchased for the BBQ. Eco Faerie Cara, 'Welcome' desk and 'bin monitor' volunteers encouraged patrons to be wastewise. A survey was conducted to determine participants' understandings about waste and the results informed planning for the next expo. At the end of each expo all waste was weighed, see Table 2. Waste management strategies were clearly effective given increasing attendance.

Biodiversity and Waterwise Actions

Biodiversity and waterwise initiatives reflected whole systems thinking in relation to the National Action Plan. Biodiversity issues were addressed when participants visited the various animal encounters and 'forest room'. The Great Gardens presenter discussed waterwise behaviours in the gardening workshop and expo attendees received plant give-aways suitable for the changing climate and soils around Perth. Participants had the opportunity to bring together biodiversity and waterwise understandings by planting native reeds and sedges along the Canning River. This planting action demonstrated commitment to the National Action Plan which recognises sustainability is not just about providing information, but also equipping people with the skills and motivation to actively work towards a sustainable future.

Critical Thinking and Reflection

The organising team attended debrief sessions following the expos. These included evaluation of the events in terms of the National Action Plan. Likewise, volunteers and presenters had the opportunity to critically reflect on the expos at their debrief / 'thank you' morning/afternoon teas. Table 3 shows the results of the 2011 sessions, which are being employed to guide the planning process for the 2012 expo, *Colours of Science*.

3. Innovative Model Facilitated Enhanced Partnerships

Enhanced partnerships resulted from the science expos. Partnerships not only deepened between existing partners - NSWk, AAEE-WA, City of Canning, CREEC and SERCUL - but new partnerships were established too, including the Perth Mint, Bush Rangers WA, BirdLife Australia and the Canning River Regional Park Volunteers.

Conclusion

The science sense-ation expos were highly effective in promoting science to all age groups in the community. Evidence obtained indicated the model for incorporating modern and Indigenous science knowledge was successful. Findings also revealed enthusiastic engagement in science activities and enhanced community partnerships for the promotion of science.

Finally, the expos provided engaging hands-on activities together with opportunities for environmental action. This resulted in a rich and enjoyable learning experience that enhanced science appreciation and understandings, while addressing national science and sustainability goals in a whole systems thinking context.

Special thanks to our many volunteers, presenters and expo patrons.

References

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Table 1. Results from Participant Feedback Form

Responses	A Taste of Science 2009 N = 42	A Dance of Science 2010 N = 26	A Sound of Science 2011 N = 36
Number of attendees	~300	~1000	~1200
Did you enjoy the event?	Definitely: 64% Yes: 36%	Definitely: 92% Yes: 8%	Definitely: 78% Yes: 19%
Activities most enjoyed?	Wide range: 36% Indigenous: 19%	Wide range: 38% Live animals: 27%	Live animals: 27% Indigenous dancing: 10%
Activities least enjoyed?	Nothing: 71% Rainy weather: 12%	Nothing: 85% Finished too early: 4%	Nothing: 81% Crowds: 6%
Attend event again?	Definitely: 57% Yes: 41%	Definitely: 85% Yes: 15%	Definitely: 78% Yes: 22%
Attend NSWk event before?	No: 70% Yes: 30%	No: 69% Yes: 31%	No: 53% Yes: 47%

Table 2. Waste Outcomes at CREEC Science Expos

Year	Number of Attendees	Compostable kg	Recyclable kg	Landfill kg
2009	~ 300	2.8	4.3	2.8
2010	~ 1000	11.6	3.9	1.0
2011	~ 1200	6.8	4.8	3.6



Table 3. Results of 2011 Assessments in terms of the National Action Plan for EFS

Principles of Education for Sustainability	Starting	Establishing	Achieving	Excelling
Transformation & change	4	5	1	8
Education for all & life long learning	4	4	1	6
Systems thinking	4	6	1	8
Envisioning a better future	1	9	4	1
Critical thinking & reflection	1	5	3	5
Participation	1	4	4	10
Partnerships for change	1	4	4	13

Key:

Organising Team N=5; highlighted principle identified for 2012 action
Volunteers/Presenters N=15; participants did not respond to all items;
highlighted principle identified for 2012 action

