The Alberta Science Teacher

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From the Editor

Welcome to the first issue of *The Alberta Science Teacher* for 2009! The new year has come quickly, and with it have come many exciting new resources for teachers and adventures for students. This issue features many opportunities for both teachers and students.

The Awards and Competitions section is larger than normal and includes competitions for students.

Some science resources are highlighted in this issue. With its focus on Alberta, the Stories in Stone: Travels in Time geology website (www.uleth.ca/edu/currlab/handouts/geology/index.html) is sure to excite the fossil enthusiast in your classroom. Also, the SEEDS Foundation has developed Habitat in the Balance (www.seedshabitat.ca), an online educational resource for teaching about socio-scientific issues and process skills concerning sustainable resources. This resource can be used for a variety of courses and grade levels.

In the Women in Science section, you will read about Rheanna Sand, a research scientist (pictured on the cover).

Look for information on Conference 2009 (to be held in November) in the next issue of *The Alberta Science Teacher.*

As always, if there is anything you are particularly interested in seeing in the newsletter, or if you have any comments or questions, please do not hesitate to e-mail me at andilynn.bender@gmail.com.

Enjoy!

Andi-Lynn Bender

Contents

Cover photo: Rheanna Sand (courtesy of Richard Siemens, University of Alberta)

Science Teacher News

Get Fit for Space, Canada!

In May 2009, Canadian Space Agency astronaut Robert Thirsk will become the first Canadian to launch to the International Space Station (ISS) aboard a Soyuz rocket to begin a four-month stay on the orbiting laboratory.

The training regime of an astronaut preparing for a mission to outer space is legendary. It takes years of concentrated effort to acquire the knowledge and build the skill set needed to leave Earth to live and work in a weightless void. Spacecraft systems, science research and robotics training alone require years of classroom and hands-on training, because mistakes on orbit can have tragic repercussions. Physical training is of equal significance and, in the case of long-term space flight, is essential to ensuring that astronauts remain healthy in space and, as important, when they come home.

Space is one of the most physically demanding environments in which to live and work. Besides suffering from motion sickness upon arrival at the ISS, the body experiences a huge fluid shift. Blood plasma pools above the waist, sinuses feel full and the head aches. Leg muscles begin to atrophy, calcium is lost and bone density begins to deteriorate—and that's after being in space for only 24 hours! Addressing these health issues starts long before astronauts ever don their big orange spacesuits, and it begins with a daily fitness routine.

Aerobic and weight-bearing exercises are key to building a strong heart and developing high bone density. Both are important for long-term space flight, so even astronauts in space work out for at least two hours each day. Pilates elastics take the place of weights (in weightlessness, dumbbells are useless). Strapped to a treadmill or stationary bicycle, astronauts can run or cycle millions of kilometres during the course of a 90-minute orbit around the Earth.

On the occasion of Canada's first expedition mission, the Canadian Space Agency invites you to Get Fit for Space with Bob Thirsk. Run, walk, cycle, swim and prepare to blast off and reach new fitness heights with Canada's space program! Sign up for the challenge on the Canadian Space Agency website at www.space.gc.ca, and receive a Get Fit for Space pedometer. Enter your fitness data as often as you like. Feel great and get fit as you virtually leave Earth and travel the 340 kilometres to the ISS, where Bob Thirsk will meet you at the airlock, invite you in and provide a personal tour of his off-world home. Celebrate this historic mission by joining Bob and Get Fit for Space!

Resources

Great New Crates!

The Science Alberta Foundation's curriculum-linked Science-in-a-Crate program uses highly visual, hands-on, minds-on activities to illustrate how science is used in everyday situations and help you bring science to life in your classroom. Collaborating with teachers, students, science experts and sponsors, the Science Alberta Foundation ensures that each crate accurately reflects real-life science and motivates learners with a wide range of learning needs to explore science and technology.

New Crates

We are excited to introduce the following new crates.

Gold Rush to 10

Kindergarten

Join Mr Lemon and his four-legged pal, Jenny, as he searches the mountain regions for his lost gold mine. This quest to "get to 10" invites students to count, build and compare sets of objects, explore the patterns and relations in our numbering system, classify and describe the attributes of objects, build 3-D shapes, and represent number operations through play and the use of manipulatives.

Grassland Gatherings

Grade 1

Become a junior wildlife biologist and explore the needs of plants and animals in the grassland regions of southern Alberta. Observe and classify the various species that make their home in this area and check out their habitats. Learn how these plants and animals must adapt to the conditions around them in order to survive, and discover how they are dependent on one another. Find out ways in which they are valued as living things, and recognize how we must provide for those plants and animals in our care.

Ways of Knowing: Teaching Time, Weather on the Trapline

Grade 5

Join Clifford and his Mooshum out on the trapline to learn about weather. Students will test various fabrics, describe the effects of the Sun's energy on seasonal changes, learn how important observation is when forecasting weather, understand and recognize different climates, describe how dew comes from the air, use digital equipment to measure and track local weather, and describe how uneven heating and cooling affects air movement. As part of the Science Alberta Foundation's Ways of Knowing series, this bilingual (English and French) crate honours Aboriginal perspectives in the study of science.

Power Productions

Grade 5

Power Productions is a large theatre company that needs help! Students will become electrical

apprentices hired to complete a list of seven jobs in order to get the theatre in working order, ready for the show. Through these engaging hands-on activities, participants will restore power, try to reduce energy costs, repair circuits and move backdrops using an electromagnet. The activities introduce students to conductors, resistors, insulators, circuits, electromagnets and electrical safety.

Crash Landing: Aeronautical Engineering

Grade 6

Have you ever wondered how living creatures and heavier-than-air machines can fly? Discover how by exploring the principles of flight, the four forces that affect objects moving through the air, and the concepts of aerodynamics and design.

Ways of Knowing: Lessons from the Sky

Grade 6

In seven beautifully illustrated activities, students will use models and stories to develop their understanding of astronomical objects in the sky. Students will learn about the motions and characteristics of stars and the Moon, explore the relative position and motion of objects in space, and model seasonal cycles and phases of the Moon. As part of the Science Alberta Foundation's Ways of Knowing series, this bilingual (English and French) crate honours Aboriginal perspectives in the study of science.

The Griffin Inquest

Grade 6

A pipeline explosion. A late-night phone call. A threatening letter. Six suspects. Use forensic techniques in the areas of fingerprints, fibre analysis, footwear impressions, tire impressions, soil analysis and questioned documents to help Sergeant Richardson and her forensic team discover the true identity of the perpetrator in The Griffin Inquest.

Journey to the Centre of the Reservoir

Grade 7

Join superhero Joules Therm and become a technology expert in enhanced oil recovery. Learn about heat transfer by conduction, convection and radiation; check out the effect of heat on the motion of particles in matter and the viscosity of fluids; investigate the thermal conductivity of different materials and digitally graph the differences between insulators and conductors; and participate in the Heat Ambush Game to reach the centre of the reservoir.

Coming Soon

Light and Shadows

Grade 4

This new crate in the engineering series is in development.

Testing Materials and Design

Grade 3

This new Ways of Knowing crate is in development.

To Book a Crate

Book a crate online at www.sciencealberta.org for only $25. It's fast and easy, and the crate will be delivered directly to you.

A listing of all crates is now available in the 2008/09 program guide. Please e-mail crates@sciencealberta.org to receive a copy.

10 Tomes for the Teacher

Here are 10 book picks I'm sure you will find interesting. I hope you'll agree that books covering current events, new science discoveries and the history of significant scientific developments offer teachers

- a sound means of emphasizing the curriculum relevance for our students, and
- some cracking good stories to flesh out the characters behind the significant ideas of science.

Hell's Cartel: IG Farben and the Making of Hitler's War Machine
by Diarmuid Jeffreys
Metropolitan Books, 2008

This book is an exhaustive account of the rather murky history of the significant events surrounding the German industrial chemical cartel IG Farben. Among other activities, IG Farben brought fertilizer production to the world using the Haber-Bosch process, helped extend the first and second world wars through synthetic diesel and rubber tire manufacture, and was indicted for crimes against humanity at Nuremberg for employing concentration camp labour at its Auschwitz Buna factory.

What Einstein Told His Cook 2: The Sequel: Further Adventures in Kitchen Science
by Robert L Wolke, with recipes by Marlene Parrish
Norton, 2005

I have yet to find an author whose books more effectively explain the chemistry behind so many of the processes that occur when we prepare food . . . and with such dry humour. Wolke does not shy away from explanations that incorporate chemical formulas and structures.

Microcosm: E. coli and the New Science of Life
by Carl Zimmer
Pantheon, 2008

Zimmer has written the definitive biography of the humble—and, more often than not, innocuous—bacterium *Escherichia coli.* E coli is the unflagging workhorse of genetic engineering research laboratories. Having read this most poetic book, you will forever feel obliged to explain to anybody within earshot that E coli does so much more than cause tainted hamburger disease!

An Apple a Day: The Myths, Misconceptions, and Truths About the Foods We Eat
by Joe Schwarcz
HarperCollins, 2007

In some ways, this latest addition to Schwarcz's popular series of books is similar to Robert Wolke's book. What sets *An Apple a Day* apart is its coverage of recent food controversies. However, it seems that some of the articles (admittedly very few) were already included in earlier Schwarcz books.

IB Diploma Programme: Chemistry Course Companion
by Geoffrey Neuss
Oxford University Press, 2007

I thought that this teachers' resource might give me a good overview of the changes wrought by the recent reorganization of the International Baccalaureate (IB) chemistry syllabus. It did give me what I was looking for and is a good resource. Unfortunately, the book has few study questions for the learner. Neuss's related IB study guide (*Chemistry for the IB Diploma: Study Guide 2/E,* 2nd edition, Oxford University Press, 2007) will more likely contain relevant study questions, but I have yet to see a copy of it. Despite the dearth of questions, this book is a solid teacher resource . . . at least until the IB program reshuffles the chemistry syllabus a few years hence!

Bring on the Apocalypse: Essays on Self-Destruction
by George Monbiot
Anchor Canada, 2008

George Monbiot is the most accessible commentator today on environmental change. The essays in this collection that address the significant environmental issues of today are a must-read.

The Periodic Table: Its Story and Its Significance
by Eric R Scerri
Oxford University Press, 2007

If you've ever wanted to find out all there is to know about the multitude of scientists (some as significant as Mendeleev) who contributed to the development of the periodic table, you need to read this book. Eric Scerri does a commendable job of detailing the research blind alleys and the honing of successive versions of the periodic table that led to the periodic table we know today.

Your Inner Fish: A Journey into the 3.5-Billion-Year History of the Human Body
by Neil Shubin
Pantheon Books, 2008

Evolution, not just human evolution, has never been so lucidly and entertainingly explained in so compact a text. Matt Ridley, beware; Neil Shubin is about to surpass your skill at employing delicious prose to explain evolution to the masses . . . and the intelligent design devotees.

Fueling Our Future: An Introduction to Sustainable Energy
by Robert L Evans
Cambridge University Press, 2007

This slim, eminently readable volume has everything you've ever wanted to know about our energy demand and supply patterns, as well as their implications for the health of our planet. Evans presents a nontechnical, balanced view of how we can morph our fossil fuel dependence into a more sustainable system by the middle of the century. We can only hope that our politicians are getting the message.

The Ferocious Summer: Adélie Penguins and the Warming of Antarctica
by Meredith Hooper
Greystone Books, 2008

Meredith Hooper has shadowed the penguin ornithologists of Palmer Station on the West Antarctic Peninsula for several years now. The effects of climate warming in this region of Antarctica have been more rapid, dramatic and destructive than virtually anywhere else on Earth. Adélie penquins depend on the ice cover close to shore that remains well into the southern summer; however, climate warming has been diminishing that ice cover with every successive year. Thus, the future survival of the penguins is in doubt. The book is not all gloom and doom, but I assure you that parts of this beautifully written book will bring you to tears.

Ian Phillips
Chemistry Teacher
Ross Sheppard High School

NASA Space Place Newsletter

NASA publishes *NASA Space Place,* a newsletter for formal and informal educators that contains information about the many useful and free resources on the NASA Space Place website (http://spaceplace.nasa.gov/en/kids/). Classroom teachers (as well as home-schoolers, directors of after-school programs, museum and library program directors, and other informal educators) will find the newsletter useful.

Download the latest issue of the newsletter from http://spaceplace.nasa.gov/en/educators.

Nancy J Leon
NASA Space Place

Stories in Stone: Travels in Time—A Geology Website, Teaching Unit and Visual Adventure

Many of us have been fascinated with rocks and fossils since childhood, because of the mysterious clues they hold to the "stories in stone" of our ancient past—epic stories of upheaval and battles won and lost, no different from the best fantasy books.

You may be an elementary or junior high science teacher, or you may teach social studies and want to find out more about how geology affects our society and economy. Or maybe you just find geological exploration fascinating. If so, Stories in Stone: Travels in Time (www.uleth.ca/edu/currlab/handouts/geology/index.html)—a Web-based visual exploration of the fossils and landscapes of Alberta and the Grand Canyon—will be of interest to you.

The creator of the site is Bill Glaister. When he is not hiking or running around looking at geological wonders, he works as the coordinator of the University of Lethbridge's Faculty of Education Curriculum Laboratory. He enjoys finding interesting connections between the science curriculum and excellent children's literature titles. For more information on Bill, see www.uleth.ca/edu/currlab/handouts/geology/bio.html.

Stories in Stone: Travels in Time includes the following features:

- Rock identification games
- Geological detective hunts based on fossils
- Time travel to our ancient past
- Geology lesson plans for elementary teachers
- Recommended geology books for students, including literature-based activities
- Links to other geology websites and resources for teachers and students

This project was partially funded by an Alberta Advisory Committee for Educational Studies (AACES) grant.

Habitat in the Balance

Teaching the skills involved in analyzing and understanding societal decision making can be difficult to work into regular science lessons. This difficulty is not as evident in social studies and geography. When it's possible to address these skills in close association with science content, students can advance toward both knowledge and skill-learning outcomes. That's why the SEEDS Foundation has developed the supplementary teaching resource called Habitat in the Balance.

Habitat in the Balance is an online educational resource for teaching about socio-scientific issues and process skills. This interactive decision-making program examines sustainable development issues in four topic areas—water, land, inhabitants and air.

Habitat in the Balance is a secondary school program that fits with learning outcomes in Grades 7–12 science, social studies, geography and environmental studies. Over the next three years, 12 modules will be developed in the first three topics. The first two modules incorporate stories about water allocation and contaminants in waterways. The program is available at www.seedshabitat.ca.

While the program develops students' skills in issue analysis and decision making, it also reinforces their understanding of content. Some of the stories are based on actual events, and others are fictitious. Nevertheless, all are relevant and deal with current issues.

Each module takes three to five days of instructional time, depending on the use of class time and the homework assigned. For example, a teacher may use one class to demonstrate the program's features, give students one class to use the program, and allow a third class for follow-up and discussion. The software stores students' work online, so students can access their work and continue to learn outside of class time.

Print support for students and teachers, resources and background information on the issues, and exercises and assignments are available as PDF and Word documents.

While the program runs on most computer platforms, for a Windows PC it requires a Pentium III processor, 256 MB of RAM and Adobe Flash Player. Access to a printer will allow students to print their reports.

Read on to see how the program works.

Getting Started

Registering with a username and password allows students to save information in their online notebook. They can then retrieve that information next time they log in.

Students gather information about an issue from the point of view of a stakeholder and from two or more perspectives. The program helps them generate a statement that includes an action

habitat in the balance

that will resolve the issue, from their chosen point of view and with consideration of the consequences. Students can print their statements and use them in a round-table discussion with other students who took different points of view.

Program Overview

Students gain an understanding of the topic from reading the issue section and the background section and collecting information. They do this by writing notes in their online notebook and copying selected points using the computer's click-and-paste function.

Next, they examine the choices that are available for resolving the issue. Depending on the point of view selected and the perspectives that are important to that point of view, students then choose an action.

The program will then provide students with the consequences of that action. After seeing the consequences, students may wish to select a different action and record any changes in their online notebook.

When students are satisfied with the information collected, the program will generate a summary report of their work with feedback that may be viewed online, printed or e-mailed.

Program Features

Figure 1 is a page from the program's scientific perspective that shows text, graphics, the notebook and the library.

Pages contain text with graphics and animations. Clicking on Play starts the animation, and the forward button advances the animation. Clicking on the graphic enlarges it, and clicking outside the graphic reduces it to normal size. Bolded terms in the text are defined in the library. Some library terms also include enlargeable graphics.

As shown in Figure 2, students can review and make changes to their notes in the perspectives sections before selecting an action to resolve the issue. Once this is done, their statement of action can be viewed with support from the perspectives.

Then, students are presented with the consequences of their chosen action. If they are

Figure 1

satisfied, they can proceed to the summary report, which shows them all the notes they have gathered and the statements generated by the program. This report may be printed or e-mailed.

The main feature of this program—the Statement Builder—helps students prepare a statement that supports the decision or action they have chosen. This feature is interactive and provides students with appropriate feedback.

The program provides downloadable supporting materials for students and teachers.

Curriculum Links

Habitat in the Balance has the following Alberta curriculum correlations:

Science

The science programs of study are available at www.education.alberta.ca/teachers/program/science/programs.aspx.

Science 7

Interactions and Ecosystems

- Identify environmental, social and economic factors that should be considered in the management and preservation of ecosystems.

Science 8

Freshwater and Saltwater Systems

- Analyze human impacts on aquatic systems, and identify the roles of science and technology in addressing related questions, problems and issues.

Figure 2

Science 9
Biological Diversity
- Identify the impacts of human action on species survival and variation within species, and analyze related issues for personal and public decision making.

Environmental Chemistry
- Investigate and describe, in general terms, the role of different substances in the environment in supporting or harming humans and other living things.

Science 20
Changes in Living Systems
- Analyze and investigate the cycling of matter and the flow of energy through the biosphere and ecosystems, as well as the interrelationship of society and the environment.

Science 30
Chemistry and the Environment
- Analyze, from a variety of perspectives, the risks and benefits of using chemical processes in meeting human needs, and assess technologies for reducing the impact of chemical compounds on the environment.

Social Studies

The social studies programs of study are available at www.education.alberta.ca/teachers/program/socialstudies/programs.aspx.

Social Studies 9
Canada: Responding to Change
- Economic growth and technological change affect the quality of life.
- Identify and evaluate alternative answers, conclusions, solutions or decisions regarding questions and issues used for inquiry and research on responding to change.

Social Studies 10
Perspectives on Globalization
- To what extent should we embrace globalization?
- Does globalization contribute to sustainable prosperity for all people?
- Analyze the impact of actions and policies associated with globalization on the environment (land and resource use, resource development agreements, environmental legislation).

Social Studies 30
Political and Economic Systems
- Political systems are organized to allocate political power that involves the authority to make and to implement decisions in society.
- Logically defend a position on an issue or a problem.

About the SEEDS Foundation

Other SEEDS Foundation resources are available at www.seedsfoundation.ca.

The SEEDS (Society, Environment and Energy Development Studies) Foundation is based in Calgary. It is a not-for-profit educational organization that develops supplementary programs about energy and the environment for Canadian schools.

The SEEDS Foundation welcomes your comments and suggestions. Please contact us at info@seedsfoundation.ca, by fax at 403-221-0876, or by phone at 403-221-0835 or 1-800-661-8751 (toll free).

David Lunn

David Lunn is a program developer with the SEEDS Foundation. He is a former high school science department head and assistant principal, and he has coauthored several science texts.

Professional Development

Alberta Science Literacy Association

The province's four science networks together form the Alberta Science Literacy Association (ASLA). Each network runs innovative programs that meet the particular needs of its community. From scientists visiting the classroom to PD workshops for teachers, the networks rely heavily on local volunteer scientists, technologists, engineers and mathematicians to help deliver programs that are relevant and have high educational merit.

The science networks are uniquely placed to offer science curriculum support to teachers at any level. Through the combination of volunteers and resource kits, the networks work to accommodate individual teachers, their classroom needs and the particular topic being taught. All services and resources are free or low cost, and they are designed to meet Alberta Education science curriculum outcomes in the classroom setting.

The ASLA is committed to the promotion of science and technology literacy through improving public awareness and understanding of scientific and technological processes, skills and knowledge. It does so through developing databases and resources, and creating communication linkages between the general public and the scientific, engineering and technological sectors. For more information, please contact Patty Rooks, acting executive director, at 403-832-ASLA or asla@hughes.net. Alternatively, visit www.asla.ca.

Praxis (Medicine Hat)

The Praxis Science Network is based in Medicine Hat but covers southeastern Alberta. Praxis works closely with schools in the Prairie Rose School Division, the Medicine Hat Catholic Separate Regional Division and the Medicine Hat School District. Services offered include classroom speakers, field trip support, science fair judges, industrial tours, workshops, curriculum support and career counselling. Praxis also offers a number of resource kits. If you live in an area where finding a classroom speaker is a challenge, there may be a kit that will help you teach a science unit. The kits contain all the resources required to develop a hands-on learning experience for the classroom, including creative ideas and experiments to make concepts come alive. Kits can be booked through the Praxis director. A list of all the kits is now available on the Praxis website (www.praxismh.ca).

Contact

Erin Greggains, Associate Director
c/o 200 7 Street SW
Medicine Hat, AB T1A 4K1
403-527-5365
praxis@praxismh.ca
www.praxismh.ca

Central Alberta Science Network

The Central Alberta Science Network (CASN) has a Visiting Scientist Program. While presentations are

generally restricted to a 50-kilometre radius of travel outside of Red Deer, the network's director has developed a number of resources that can be used in settings with local volunteers. For example, the Grade 5 chemistry unit covers basic chemical concepts that are critical to developing a more complex understanding of future chemistry units. Local pharmacists can be approached to deliver the workshop to students, using an outline that lists experiments and materials. Students not only begin to understand the principles of the chemistry unit but also develop some ideas about scientists in the real world. The CASN is also a coordinating body for the Central Alberta Science Festival, which runs the last week in May every year. World-class scientists and presenters volunteer their time to share their passion with thousands of adults and children during this one-day event.

Contact

Marion Caws, Regional Director
116 4818 50 Avenue
Red Deer, AB T4N 4A3
403-342-3767
casn@asla.ca
www.casciencenet.ca

Calgary Science Network

The Calgary Science Network's (CSN) Scientist-in-the-Classroom program reached over 12,000 students last year—at no cost to schools. Each scientist visit is designed to engage students with hands-on activities and to encourage an understanding of real-life science. Scientists can answer tough questions and increase students' knowledge of the science behind such issues as global warming, epidemics and water usage. Teacher workshops are offered in a symposium format each October over three evenings and as stand-alone sessions at other times throughout the year. In 2007/08, the CSN held 45 workshops, each led by both an experienced educator and a scientist to ensure in-depth, accurate science and practical classroom activities. Workshop fees are subsidized, and teachers are frequently given materials to take back to the classroom. As a bonus, workshops are often held at interesting venues, such as the Geological Survey of Canada ("Rocks and Minerals"), the Aero Space Museum ("Air and Aerodynamics") and the Telus World of Science ("Space Exploration").

Contact

Kristy Fairbanks, Regional Director
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Edmonton Science Outreach Network

The Edmonton Science Outreach Network's (ESON) Scientist in the Classroom program (now in its 18th year) continues to be popular with city teachers, as a core part of classroom instruction. This program connects students and teachers with people working in science-related fields. These dedicated volunteers are ESON's most valuable asset. Coming from a diverse cross-section of the scientific community, they volunteer their time to provide fun, interactive presentations to thousands of students yearly. They add depth to the curriculum, provide real-life examples, stimulate student

thinking and enlighten students about many science-related careers. They are an invaluable educational resource. Also popular is the Ask a Scientist program. If you have a science question you can't find the answer to, ESON can ask a scientist (or a technologist, engineer or mathematician) on your behalf. Questions can be submitted through the website (www.sciencehotline.ca). In 2009, a new format for PD workshops will be offered after school one day a month. The topics are integral to the Alberta Education science curriculum. Visit www.sciencehotline.ca for details.

ESON also has a presence in northern Alberta. Covering over 259,000 square kilometres, from the Northwest Territories to Grande Cache and from the BC border to Whitecourt, ESON has had to be creative in providing outreach to teachers and schools. As well as putting scientists into the classroom, the network works to bring other learning opportunities into the region. Do not hesitate to contact ESON for your science requests.

Contact

Julia Fielding, Regional Director
10537 44 Street NW
Edmonton, AB T6A 1W1
780-448-0055
exc_dir@telus.net
www.sciencehotline.ca

All four science networks also sponsor local science events in their communities through partnerships with other science organizations, libraries and community groups. They bring together people and ideas to help make science exciting and real to students and the general public.

Women in Science

The Making of a Mentor: Rheanna Sand

The following article has been provided by the Alberta Women's Science Network. The original online article can be found at www.expressnews.ualberta.ca/article.cfm?id=9501.

Rheanna Sand ran home from school in Grade 5 and proudly announced to her mother that she was going to be an astrophysicist. It had been a toss-up for a few years: space or dinosaurs.

More than 15 years later, Sand is neither a paleontologist nor an astrophysicist, although she is well on her way to becoming a bona fide research scientist.

Born and raised in Edmonton as part of a traditional extended Métis family, Sand has strong community connections and a strong sense of cultural and feminist pride, bestowed upon her by a handful of mentors.

Her grandmother, Thelma Chalifoux, the first Aboriginal woman ever appointed to the Senate of Canada, taught her about politics and feminism. Her godmother is Tantoo Cardinal, the Alberta actress who has appeared on the big screen in *Dances with Wolves, Black Robe and Legends of the Fall* and in the television series *North of 60*. From her, Sand learned not to be afraid of who she is, but to be proud of it and to celebrate her individuality.

And then there is her mother, Debbie Coulter. "My mom is very, very wise," Sand said. "I learned just about everything else from her."

Considering where Sand is today, that's saying a lot.

"I'm in my third year of my PhD [at the University of Alberta], working in Warren Gallin's lab studying voltage-gated potassium channels," she said. "I'm using a snail toxin to investigate how the protein senses voltage. This has been a puzzle since potassium channels were discovered. Also, channel dysfunction can lead to diseased tissues, so understanding what causes the failure will help medical researchers develop treatments."

For her academic accomplishments, Sand received an NSERC (Natural Sciences and Engineering Research Council of Canada) postgraduate scholarship, and was recognized by her community with an Alberta Aboriginal Youth Achievement Award (AAYAA) for senior academic achievement. Hosted by the Métis Nation of Alberta, the annual event celebrates the achievements of Aboriginal youth from across the province in a range of categories.

"To be recognized by both the scientific community and my cultural community is a great honour. At the AAYAA gala event, they showed little movie clips on each of the award recipients. I am the first one in my family to be enrolled in a PhD program, and for the first time my family got to see me in my element, in the lab doing what I love. It was also the first time my work colleagues and friends got to see me surrounded by my community. It was definitely a meeting of my two worlds."

Her community members aren't the only ones singing her praises. Gallin, her supervisor and mentor, sees huge potential in Sand as a research scientist. "She has an excellent combination of rigorous intellectual insight and focused practical skills that one rarely sees in a student at this stage of her career. She evaluates the options that she has for doing her research, makes a practical plan, and then executes it cleanly and intensely."

Sand understands that with recognition comes an expectation to be a mentor herself. According to Gallin, she has been an excellent role model from the beginning.

"She is able to mentor students starting out in the lab, giving them solid advice and teaching by leading," he said. "Rheanna demonstrates best practices, but at the same time she outlines the more common pitfalls, thus helping the student to learn the correct techniques in the context of things that could go wrong and could be avoided."

Sand has won several teaching awards for her work in some of the undergraduate laboratories, including a graduate teaching award. She volunteers her time with the Graduate Students' Association and the General Faculties Council at the U of A, and is a board member for the YWCA Edmonton. She has a keen interest in science communication and an undeniable drive to succeed in whatever she takes on.

And as she succeeds, she continues the long line of mentorship that has helped shape her success.

Awards and Competitions

Vernier Wins Worlddidac Award for Innovation in Technology

Vernier Software & Technology is the recipient of the Worlddidac Award for Innovation in Technology for its newly released product, LabQuest. The Worlddidac Award is presented every two years in Basel, Switzerland, to the companies with the most innovative products that have the highest potential to improve learning and teaching.

An international jury of education experts selected LabQuest based on its overall quality, pedagogic value, ease of use, adaptability, technological innovation, degree of interactivity and performance–cost ratio. LabQuest is splash-proof, can withstand a temperature range of 0–70 degrees Celsius and includes rubber moulding for shock absorption, making the device suitable for both the classroom and field studies. The hand-held allows students to collect data from more than 50 sensors and view the information as a meter, data table or graph on the colour graphic display.

LabQuest contains six sensor ports, a built-in temperature sensor and a built-in microphone for recording voice annotations. Its applications include a stopwatch, a periodic table, an on-screen keyboard and a scientific calculator. Users can operate the device using either its buttons or an accompanying stylus for the on-screen keyboard.

About Worlddidac

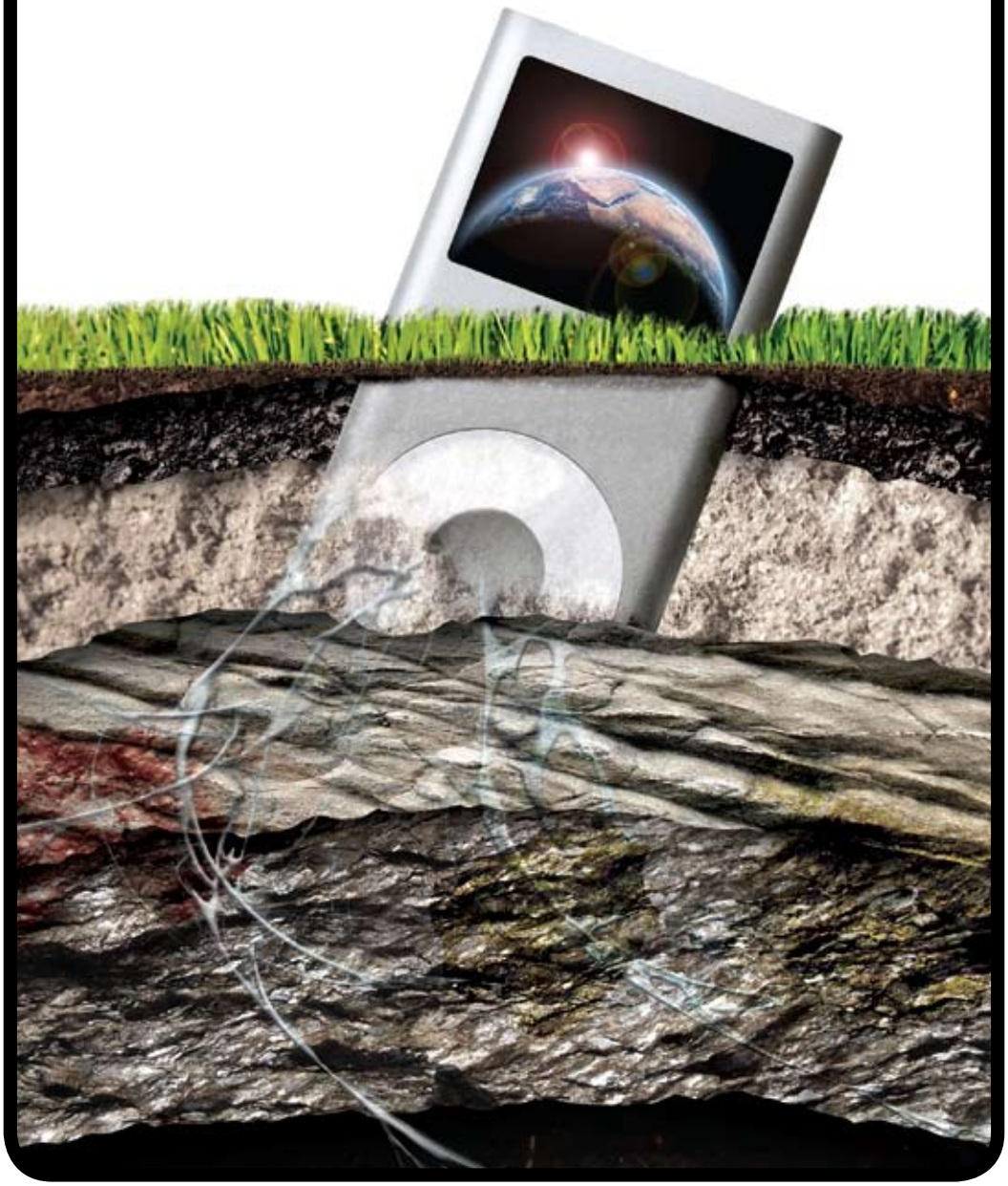
Worlddidac is the global trade association for companies that provide educational and training products to all levels of education. The Worlddidac Award was created in 1984 to encourage manufacturers of educational materials and training tools to be pioneers in their field. It is the most recognized international prize for educational resources. For more information, visit www.worlddidac.org.

About Vernier Software & Technology

Vernier Software & Technology has been an innovator of data-collection technology for 27 years. With easy-to-use and affordable science interfaces, sensors and software, its products can be found in education from elementary school to college. Vernier helps teachers enhance their science curriculum, increase learning and build students' critical-thinking skills. For more information, visit www.vernier.com.

where challenge

WHAT on Earth is in your stuff and WHERE on Earth does it come from?



Take the where challenge and Win Big!

National & regional cash prizes!

PLUS

ALL entries go into draw for FREE iPod touch!

In celebration of the International Year of Planet Earth, the first annual WHERE Challenge is asking Canadian kids aged 10 – 14 years to discover the answers to these questions: What on Earth is in your stuff and WHERE on Earth does it come from?

The WHERE Challenge is inviting kids and schools from across the country to compete for thousands of dollars in regional and national cash prizes by letting their imaginations run wild! Enter as a group or an individual. All you have to do is tell a story about what on Earth is in your stuff and WHERE on Earth it comes from. Pick a favourite object in your home, school or playground, identify one or more **non-renewable earth resources** needed to make that object and tell us WHERE on Earth those resources come from. Your story can be told through an essay, a poem, a song or a play, a painting or a poster, an audio, video or multimedia presentation or anything else you can dream up! The more original, the better! Winning entries will be used as promotional tools to demonstrate how Earth resources are essential to our everyday lives.

So think hard, get creative and find out interesting facts about your stuff. For more details on the WHERE Challenge or to learn about exciting careers in Earth sciences, please visit **www.earthsciencescanada.com**

Entry deadline February 28, 2009

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Gene Researcher for a Week

The Canadian Gene Cure Foundation (CGCF) is pleased to announce that applications are now being accepted for the 2009 Gene Researcher for a Week (GRFAW) program.

Funded in part by the Canadian Institutes of Health Research, the Institute of Genetics and NSERC (Natural Sciences and Engineering Research Council of Canada), the CGCF selects motivated and ambitious students in Grades 11 and 12 who have an innate curiosity about science, human genetics and human genetics research. This year, we plan to accept up to 25 students into the program.

The program offers high school students the following:

- *The opportunity for a hands-on learning experience in the field of genetic research.* Students gain insight into the world of genetic diseases by conducting real, hands-on scientific experiments (such as DNA isolation, PCTR, gel electrophoresis, SDS-PAGE, western blotting, cell culture and ELISA assays). Participants may also learn how genes cause human genetic disorders and how top scientists translate these findings into treatments and cures.
- *The opportunity to work in one of Canada's top gene research laboratories.* These students are placed in labs of influential Canadian scientists for one week over spring break. This experience gives young students what many have called a life-changing experience. The GRFAW mentoring program is a great opportunity for young scientists to learn about human genetics research and connect with some of Canada's best researchers.
- *The opportunity to develop a network of high-potential peers.* Student gene researchers are bright, talented and highly motivated. By participating in the program, they will have an opportunity to meet people in their host lab and institution. Some labs will host more than one student, providing a further opportunity to network with other students.
- *The unique opportunity to learn about the many exciting career paths in science and genetics.*

It is our hope that motivated science students across Canada have ready access, through high school science teachers, to this one-of-a-kind opportunity. Please encourage your students to apply on our website (www.genecure.ca). More information is available on the website, or you may contact us directly at info@genecure.ca.

Tracy Zeisberger
Foundation Manager
Canadian Gene Cure Foundation

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