

BIG Science

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Applied Science Technologists & Technicians of BC Continues Support of BLSC

ASTTBC CEO **John Leech** announced an ASTTBC donation of \$2500 for the **BIG Little Science Centre (BLSC)** in Kamloops while on the **Jim Harrison Show, Radio NL**. **Gord Stewart**, Executive Director of the Centre, expressed his appreciation for ASTTBC's support over 10 years. "The Centre does a marvellous job of exciting young minds about science and technology," said Leech. "We are thrilled with the work they do in this region of the province." The ASTTBC Foundation is providing the funding for initiatives such as the BLSC as well as special events such as the spaghetti bridge contest at Okanagan College. Later in the day John hosted a member meeting in Kamloops, with about 35 members and a few special guests in attendance including **Annette Glover**, a founding and continuing member of the Board of Directors of the Centre. Annette spoke at the meeting praising the great partnership between ASTTBC and BIG Little.

Pictured are (L - R): Gord Stewart, Jim Harrison and John Leech.

Photo contributed.

CFJC MIDDAY Show Hosts John Leech and Gord Stewart



ASTTBC
TECHNOLOGY
PROFESSIONALS



www.ASTTBC.org

BIGScience

This Newsletter is a publication of **BIG Little Science Centre Society**

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Back issues of **BIGScience** can be viewed at <<http://web.blscs.org/newsletters>> .

The **BIG Little Science Centre** is open to the public at these times:

Tuesday to Saturday 10:00 AM to 4:00 PM

CLOSED SUNDAYS and HOLIDAYS

Phone: 250 554 2572 E-mail Gord@blscs.org or Susan@blscs.org

A family membership is \$60.00/year. An individual membership is \$45.00/year. A family membership consists of five directly related people. (This includes any combination of grandparents, parents and children). Individual day rates are:

Adults (16 to 59) \$6 Seniors (60 plus) \$4 Youth (6 to 15 years old) \$3 Family \$15.

Children 5 years old or younger) Free

Visit our website blscs.org for more details on the benefits of membership.

Drop-in Visit Information

What is a Drop-in Visit?

During drop-in times our hands-on rooms are open for visitors to tour at their leisure. The rooms have approximately 140 stations of hands-on activities to try. We also have an activity or show running Saturdays!

Drop-in Visiting hours

- Tuesday - Saturday 10:00 - 4:00
- Check Facebook or twitter for the latest information.

For safety purposes we require children under age 16 be accompanied by a minimum number of supervising adults:

- For children 4 years old and under, 1 adult per every 3 children is required.
- For children 5 years old to 9 years old, 1 adult per every 5 children is required.
- For children 10 years old to 16 years old, 1 adult per 10 children is required.

The BIG Little Science Centre is Closed Sundays and Holidays.



Shows and Activities, January 2017

The BIG Little Science Centre is open year round: Tuesday to Saturday, 10am to 4pm
Closed for Winter Break starting Saturday December 24, re-opening on Tuesday January 3 2017

The Exploration Room is open 10am to 4pm, with over 140 different exhibits to enjoy.

Special shows and activities run at the centre: daily July/August and Saturdays in the school year.

All activities are included with the standard entry fee, unless otherwise stated.

Full activity information is on the website calendar.

Saturday January 7: Super Static Electricity Show at 11am & 1:30pm

An interactive, fun show that introduces static electricity, explores how it works and produces static in many ways, including using van de Graaff generators. Is it time for your science centre hair-do?

Saturday January 14 Sound and Waves Show at 11am and 1:30pm

Sound is made with waves and vibrations. Good vibrations make music! Explore and discover sound, waves and music during this interactive show. Expect to try out some unusual musical instruments.

Friday & Saturday January 20/21:

Construction Days: LEGO! Megablox, MagNext and more!

Building materials will be out **all day** for creative constructions. Included with standard entry fee.

UNPLUG and PLAY! 10am to 4pm

Saturday January 21: Science Centre Travel Booth for ABC Family Literacy Day; Unplug and Play Kick-off

At the Henry Grube Education Centre, 9:00am to 12:30pm

Free entry. The Annual ABC Family Literacy Day in Kamloops, developed by ABC Life Literacy Canada, sponsored by KELLI and more. Entertainment stage and activities for parents and children to do together. Our goal is to create awareness that early literacy can be supported through a number of fun and easy daily activities. Children can take home one free book each.

Tuesday to Saturday January 24 to 28:

Construction Days: LEGO! Megablox, MagNext and more!

Building materials will be out **all day** for creative constructions. Included with standard entry fee.

UNPLUG and PLAY!

Wednesday January 25 The Art and Science of Geology; Lecture **Donald Bouffard, Geologist and Artist**

FREE entry, at 7:00pm, refreshments, for older children and adults. At BLSC. **See back page for info.**

Saturday January 28 Stories & Activities about Nature all day long

Science Literacy Day at the BIG Little Science Centre

FREE entry to centre. See the calendar link on the website for full details.

Location: 655 Holt Street, Kamloops, BC, V2B 5G2

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Science Centre Lecture Series at the BIG Little Science Centre

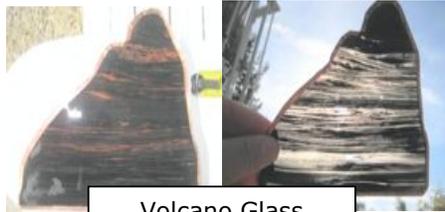
Doors open at 6:30pm, lecture at 7pm. For older children and adults. Refreshments served.

The Art and Science of Geology

Donald Bouffard

Wednesday, January 25, 2017

The adventures of an Exploration-Mining Geologist AND Artist-In-Training. Join us for an opportunity to learn about the amazing life a geologist in the field and the lab. See and touch some amazing rocks, fossils, gems and personally made works of art. Don is, even after more than 40 years, ready, willing and deliriously happy to have this opportunity to 'show off' some of his treasures, creations & adventures that have resulted in the creation of rather unique ART-SCI (pronounced 'Artsy') products such as those shown below. They are a true symbiosis of Art & Science.



Volcano Glass

Welcome to:
'Mr. B's' interactive
Show & Share
Experience



Gemstone Original

Donald A.C. Bouffard was born in Ontario on an ancient impact crater, that was made 1,850,000,000 years ago by a 15km wide asteroid/comet that punched through the crust and helped create the world famous Sudbury Nickel-Copper-Gold Orebody. So, of course, he became a geologist and amateur astronomer, what else!



A Canada-wide mining, exploration, consulting & teaching geologist/instructor most of his working life, he is now [finally] retired but, as you will see, still very active and involved in life and yes, STILL learning new 'stuff'! In his profession, Don has hiked, driven, boated, and flown throughout most of B.C.; covering all 4 points of the compass north to south from Stewart to Osoyoos, and west to east from Vancouver Island to Golden. Just another lucky scientist fortunate enough to have seen and experienced Canada, first-hand!



FREE ENTRY! Everyone is invited to attend. Wheelchair accessible. The BIG Little Science Centre is a not-for-profit, registered charity, dedicated to creating a passion for science. Contact Susan Hammond, Assistant Operator, for more information: susan@blscs.org

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How Should High School Physics Be Taught?*

Gordon Gore

My first assignment teaching physics was in the early 1960's, at Sir Charles Tupper Secondary School in Vancouver. **Physics 91** was a one-year program, interesting and quite traditional, with lots of content and *10 compulsory laboratory exercises that students had to write up formally and submit to the district superintendent at year end*. A strong point was that students *had to experience using actual physics equipment*. In those days the only mark that counted was the mark one obtained on the year-end provincial examination, although a certain percentage of students could be 'recommended' (excused from the provincial examination) on the basis of their school year's work.

The **Physical Science Study Committee (PSSC)** began developing a physics program in the USA shortly after the launching of Sputnik in 1957. The original PSSC course was a one-year program, but a two-year program was developed for British Columbia in the 1960's mainly by three B.C. authors: **Dr. Derek Livesey** (physics professor at UBC), **Dr. Harry Cannon** (Science Education Department Head in the Faculty of Education at UBC) and **Mr. Ted Ryniak**, at John Oliver High School and later Vancouver City College. The British Columbia physics curriculum was based on the PSSC program.

A major objective was to make high school physics *laboratory-oriented*. The 'new' approach was to concentrate on the BIG ideas of physics, with an emphasis on *how* physics knowledge was discovered. Well-known physicists designed experiments that young students could do with very simple equipment, to measure such seemingly obscure things as the wavelength of light, the size of a molecule (oleic acid) and even the mass of an electron.

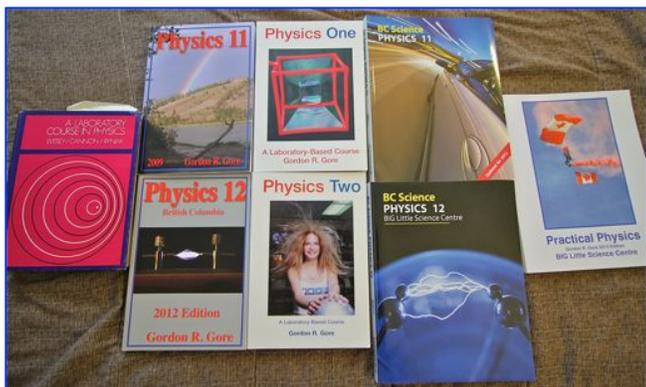
The 'experiments' in the 'new' B.C. physics program were never intended to be 'tag-on' activities one does if time permits. They were an integral part of the learning process. Textbook theory came after the experiments. The experiments were not 'confirmations'; again, they were part of the learning process.

UBC provided valuable leadership by offering very practical physics teacher-oriented credit summer courses based on the PSSC philosophy. I was privileged to participate in a course dedicated to PSSC Physics offered by **Dr. Derek Livesey**, another one of his summer courses called Experimental Atomic Physics, and yet another summer course given by a team of UBC physics staff, which emphasized recent developments in physics. High school physics teachers who took these courses thoroughly enjoyed them and valued them.

The PSSC-based courses must have fallen into disfavour with whomever had all the influence, because there was a 'revision' that resulted in having two bulky new, college-level American textbooks and a Ministry laboratory manual, all for a one-year Physics 12 course.

Yours truly decided that all the necessary ingredients for a one-year Physics 12 course could be provided by a single resource. A pilot edition of Gore's Physics 12 was self-published in 1986. It was typewritten with stick diagrams, but somehow it 'caught on'. Almost every year after that, an improved version was printed, and at last count 38,000 copies of the \$12 paper back, all-purpose book had been sold. I also produced a Physics 11 book that fit my personal philosophy better (lab-based learning). It is full of resources for teachers to make physics interesting and real to students. I stopped self-publishing the books due to serious health

problems, but both Western Campus Resources and Edvantage have made available versions of my books up to the present. Many experienced physics teachers will have seen the PSSC philosophy integrated into my original Physics 11 and Physics 12 text books, written in the 1980's, updated in the 1990's, and still used in 2016.



Livesey, Cannon and Ryniak's second edition of **A Laboratory Course in Physics** (Ph 11 and 12); samples of later versions of Gore Physics books; recent Edvantage Interactive versions of Physics 11 and 12 (still active); Gore's unpublished Practical Physics book (2013)

In my opinion, the spirit of PSSC Physics was buried by the nature of the provincial examinations, which did not measure laboratory skills. Some teachers found out that if they did fewer (or no) 'labs', they had more time to drill their students on word problems and old exams, and therefore obtain better 'stats' on the finals.

In my opinion, different populations of student will benefit from different approaches. **Paul Hewitt's *Conceptual Physics*** approach drew many more USA students into physics. His approach emphasizes the concepts of physics rather than the mathematical (endlessly plug-the-numbers-in-the-right-formula) style. Apparently students who take Hewitt's *Conceptual Physics* in high school do at least as well in first year university physics as do students who take other physics courses.

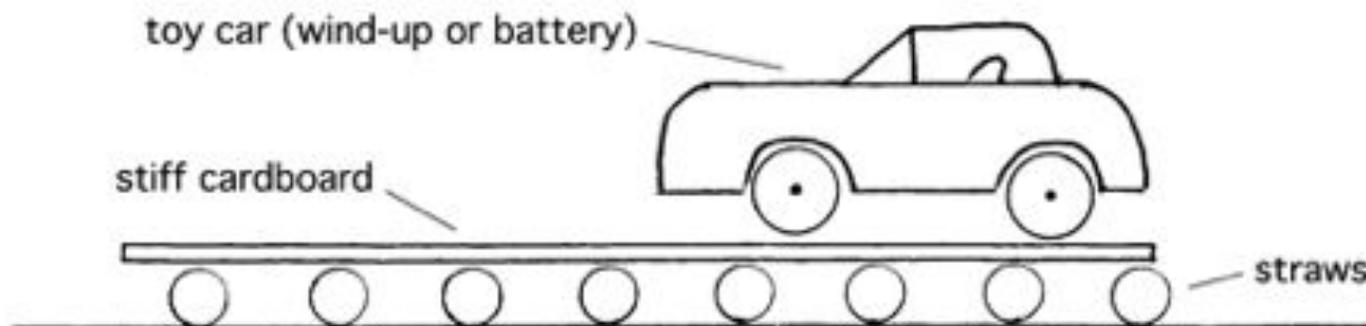
In some communities you have many young people who might benefit from a practical physics course that emphasizes how physics is applied in various trades and professions. I offered such a course decades ago, but was told I had to call it 'General Science 11'. More recently, I wrote a textbook for a one-semester course I called Practical Physics 11, but never had the opportunity to try it myself. At least three teachers used it as a resource for Applications of Physics 11, and they seemed to find it useful.

In some schools, there are apparently so many high-performing students that they can offer 'college-prep', advanced level physics courses. (Personally, I always thought Physics 12 was tough enough, but if it works, more power to you.)

What would I do if I ruled the world? I would develop a two-year program at the difficulty level of Physics 11, with a major emphasis on hands-on laboratory work. It would stress the really BIG ideas, make physics real, with manageable challenges, a compromise between a purely conceptual approach and the traditional mathematical physics course with its endless word problems. I would rather have more students taking physics than simply cater to an elite few. After all, the beauty and enjoyment (and practicality) of physics should not be just for future physicists.

*I was prompted to write this essay by an article in the December 2016 issue of **THE PHYSICS TEACHER**, titled "**100 Years of Attempts to Transform Physics Education**" by Valerie K. Otero and David E. Meltzer. See page 523 of Volume 54.

Science *KIDBits* Action and Reaction



You need:

- 10 straight soda straws (or round pencils)
- 1 toy wind-up or battery-powered car
- 1 strip of stiff cardboard, about 50 cm x 30 cm

Try this:

1. Set up the arrangement in the drawing. The 'road' is a strip of stiff cardboard, sitting on a row of soda straws. A wind-up or battery-powered toy car is placed on the 'road'.
A wind-up or battery-powered toy car is placed on the 'road'.
2. *Predict* what will happen to (a) the car and (b) the 'road', when the car is started and starts to move to the left.
3. Test your prediction!

Questions:

1. When a car moves forward, in which direction do the **wheels** of the car push on the road?
2. What exerts the force that actually makes the car move forward?

This is an example of **Newton's Third Law of Motion**. If one body (the car's wheel) exerts a force on another body (the road), the second body (the road) exerts an equal force on the first body (the car), but in the opposite direction. The road pushes the car forward!

Dr. Gordon R. Gore
Founder, **BIG Little Science Centre (retired)**

Special Memories

Gordon Gore, Founder



I had fun with kids at the centre. The challenge here was to see who could fill a bottle with 'special fluid' faster.

The 'special fluid' has the formula HIJKLMNO (all the letters from H to O). Both funnels and both stoppers look the same, so it is counterintuitive when one person can fill their bottle quickly while the other cannot.

Eventually, we pull out the stoppers and show everyone that one of the stoppers has an extra hole in it (for air to escape the bottle). Then we wipe up the mess.

This demonstration is still part of the Air Pressure show.



Peter Hopkinson showed me this demonstration years ago, and I love it! A leaf blower is used to blow a high-velocity stream of air over the top of a roll of toilet paper (or in this case a roll of paper towel). The high velocity air near the top of the roll creates a lower pressure, and normal air pressure under the roll lifts the paper. This is a great way to finish the Air Pressure show. Just look at the gleeful expressions on the kids' faces!



Gordon Gore and **Michael** have fun with the Van de Graaff generator (*Tristan Giles Photo*) One of our volunteers took this photo, and I treasure it because it captures the spirit of the BIG Little Science Centre so well.



A mother and her son cooperate to force these two strong neodymium magnets together. Both were having a lot of fun while learning about magnets. Experiences like this are remembered for a long time.