

## **UV Beads Project**

**June 2011**

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August 2011



**Public Health**

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## *Background*

In the Ontario Public Health Standards, Chronic Diseases and Injuries Program Standard, exposure to ultraviolet radiation (UVR) is identified as a risk factor that Boards of Health are to address. The OPHS states that the board of health shall “work with school boards and/or staff of elementary, secondary, and post-secondary educational settings to influence healthy policy and create supportive environments”; “work with community partners to increase their capacity to coordinate and develop regional/local programs/services”, and “increase public awareness” with regard to UVR. In general there are two areas of focus with regard to UVR – sun safety and indoor tanning. Scientific and anecdotal evidence suggests that sun safety messages are best directed to young children, parents, and outdoor workers; and indoor tanning messages are best directed to youth, young adults, and parents.

To support schools, curriculum and resources targeting secondary school youth were developed in 2010. These resources include skin-enhancement software, a photo printer, a PowerPoint presentation, and a Teacher’s Resource. The equipment is available for teachers to sign out, though training must first be provided by Public Health. Given that secondary school resources were developed in 2010 and nurses are assigned to work with elementary schools on health promotion activities, direction was given that the 2011 project would focus on children in this setting before the school year end (namely the springtime).

May to June was identified as the ideal time for a sun safety campaign as it coincides with the Canadian Dermatology Association’s Sun Safety Awareness Week, which is typically held the first week of June. A Health Promotion Specialist from the Chronic Disease and Injury Prevention Team was assigned to this project, who in turn worked closely with the Elementary School Nurses of the School Health Team. Project planning took place from February to April.

## *Goals & Objectives*

The overall goal of sun safety awareness is to decrease illness and death caused by UVR exposure. The short-term objective of the UV beads and other sun safety resources is to raise awareness of sun safety. This increased awareness will hopefully lead to a change in attitude and ultimately sun protection behaviours, namely seeking shade, covering up, and wearing a hat, sunglasses, and sunscreen.

## *Target audience*

A review of the elementary school curriculum suggested that Grade 1 classes were the most appropriate target audience for sun safety resources because this grade had the most mentions related to sun safety and effects of sunshine (see chart below for a summary). Grade 2 also had a mention. Furthermore, a resource scan of existing teacher’s resources, activities, and lesson plans were primarily developed for Grade 1 and 2. Thus, this information, in combination with the limited budget, identified Grade 1 as the primary target audience, Grade 2 the secondary, and other grades as the tertiary.

**Table 1. Sun safety mentions in Elementary School Curriculum**

Subject	Grade	Area of Curriculum		Specific Mentions
Health & Physical Education	Grade 1	Living Skills	Critical and Creative Thinking	“e.g. Healthy Living: make and explain choices that protect them from the sun, such as wearing a hat and applying sunscreen”
		Active Living	Safety	“identify environmental factors that pose safety risks during their participation in physical activity (e.g. extreme heat may cause fatigue, too much sun exposure will cause sunburn...)”
		Healthy Living	Personal safety and injury prevention	“demonstrate an understanding of how to stay safe and avoid injuries to themselves and other in a variety of situations, using knowledge about potential risks at home, in the community, and outdoors (e.g. ...weather and sun hazards)”
	Grade 2	Healthy Living	Personal safety and injury prevention	“demonstrate an understanding of practices that enhance personal safety in the home...and outdoors (e.g. using UV protection...)”
Science and Technology	Grade 1	Developing Investigation and Communication Skills		“investigate how the sun affects the air, land, and/or water, using a variety of methods (e.g. standing outside on a sunny and a cloudy day and noting the differences; putting a dish of water in the sun and the shade and observing what happens) and resources”
				“investigate and compare seasonal difference in the ways we use energy and the types of energy we use (e.g. ...we stay cool in the summer by sitting in the shade or going to places that are air conditioned; we adjust the amount of light we need by opening or closing the curtains and turning the lights on or off)”
				“use scientific inquiry/experimentation skills...and knowledge acquired from previous investigations, to explore the effects of light and heat from the sun (e.g. ...by feeling the temperature of dark papers that have been in the sun and in the shade; by covering a portion of a piece of coloured paper and exposing the paper to the sun)”

## Resources

Initially, hats were suggested as the giveaway for the elementary school project based on two PHU projects promoted through the UV Network listserv. The first program, by Simcoe Muskoka, purchased hats using grant monies from the Canadian Cancer Society, which were then donated to summer camps and used as both a craft project and sun safety awareness tool. The other program, in Sudbury, collected new or gently used wide-brimmed hats which were then dry-cleaned (a service provided in-kind by a store owner), and distributed to high-needs families through an after-school program. Quotes for wide-brimmed children's hats were sought, as well as UV beads and wristbands – both of which change colour in the sun. A Communications Specialist, the Elementary School Nurses, and two Grade 1 or 2 teachers were consulted on which giveaway would be most appropriate given the target audience of Grade 1 students. The reach of each option varied, and there were benefits and drawbacks to each:



*UV beads  
(before and after UV light exposure)*

Giveaway	Estimated Reach*	Pros	Cons
Hats	400-450	<ul style="list-style-type: none"> <li>Reinforces sun protection behaviours (practical)</li> <li>Long-lasting/less likely to be lost</li> <li>Opportunity for messaging</li> </ul>	<ul style="list-style-type: none"> <li>Fashion may be unpopular</li> <li>Many or most kids already have hats</li> <li>Limited reach</li> </ul>
Rubber bands	1,700	<ul style="list-style-type: none"> <li>Opportunity for messaging</li> </ul>	<ul style="list-style-type: none"> <li>Doesn't reinforce sun protection behaviours</li> <li>Not popular anymore</li> <li>Likely to be thrown out/lost</li> <li>Limited reach</li> </ul>
UV beads on leather band (pre-made)	600	<ul style="list-style-type: none"> <li>Gimmick appeal</li> <li>Age-appropriate</li> <li>Opportunity for messaging</li> </ul>	<ul style="list-style-type: none"> <li>Doesn't reinforce sun protection behaviours</li> <li>May be less popular with boys</li> <li>Likely to be thrown out/lost</li> <li>Limited reach</li> </ul>
UV beads (loose)	All (2,700)	<ul style="list-style-type: none"> <li>Gimmick appeal</li> <li>Age-appropriate</li> <li>Wide reach</li> </ul>	<ul style="list-style-type: none"> <li>Doesn't reinforce sun protection behaviours</li> <li>May be less popular with boys</li> <li>Likely to be thrown out/lost</li> </ul>

*\*Of Grade 1 students in the Upper Grand District School Board and Wellington Catholic District School Board (including French immersion classes)*

Overall, there was more support for the (loose) UV beads which could be made into bracelets, key chains, or other crafts. Quotes were sought from several suppliers, however Ajax Scientific provided the best price (see Appendix). (Note: though Ajax Scientific's beads were the most affordable, samples provided by Rainbow Symphony produced brighter colours upon UVR exposure). An order was placed based on an 80-85% uptake by teachers as not all Grade 1 teachers were expected to participate.

In addition to the UV beads, 5 spools (or 500 yards) of pink, green, and glow-in-the-dark plastic lacing was purchased from Michael's, which had a better price compared to Dollarama (Wal-Mart no longer carries plastic lacing); a UV Bead Lesson Plan was developed; sun safety resource packages (including background information, activities, and lesson plans) were reviewed; a newsletter insert developed and submitted to the school boards; and a list of links to resources, print materials, and UV bead ordering information was put on the Educators page of Public Health's website.

### *Promotion & distribution*

The Elementary School Nurses played an integral role in raising awareness of the UV beads and other sun safety resources. This team forwarded an email to Principals and Vice Principals which promoted the resources and also followed up with specific teachers in the school to garner interest and answer questions. Further, one team member also provided a rubric for the Grade 1 curriculum highlighting the relevant areas for the UV beads. Those that were interested in the UV beads were directed to place their orders with Johanna Monckton, Program Assistant, who tracked the orders and then prepared and mailed packages to teachers. Packages included the UV Bead Lesson Plan, enough beads and plastic lacing for each student (and sometimes extra), as well as resource samples from the Canadian Cancer Society; these samples included the following: a "Rayguard" bookmark, "Rayguard" colouring book, and fortune teller.

### *Timeline*

	February	March	April	May	June	July	August
Plan development							
Resource scan							
Materials development							
Resource promotion							
Package preparation & dissemination							
Implementation							
Sun Safety Week (CDA) June 6-10 <sup>th</sup>							
School newsletter							
Survey link dissemination							
Feedback from Elementary School Nurses							
Final Report							

## Evaluation Plan

Although outcome indicators were identified for this project, the tight timeline left little time to implement a pre and post design in order to measure a change in knowledge or sun protection behaviour. Nonetheless, the reach and cost-effectiveness was determined, and a process evaluation completed through the data collection tools/means outlined below.

	Indicators	Data Collection Tool
Process evaluation	<ul style="list-style-type: none"> <li>Number of schools, classes, and children involved in lesson</li> <li>Number of UV beads disseminated</li> </ul>	<ul style="list-style-type: none"> <li>Tracking sheet</li> </ul>
	<ul style="list-style-type: none"> <li>Number of teachers who found the resources useful and would recommend them to other teachers</li> </ul>	<ul style="list-style-type: none"> <li>Online survey (Constant Contact)</li> <li>Informal feedback from Elementary School Nurses at a meeting</li> </ul>
Outcome evaluation	<ul style="list-style-type: none"> <li>Number of children with knowledge of sun safety behaviours increases</li> <li>Number of children engaging in sun protection increases</li> </ul>	<ul style="list-style-type: none"> <li>Not evaluated</li> </ul>
	<ul style="list-style-type: none"> <li>Cost of UV beads per student</li> </ul>	<ul style="list-style-type: none"> <li>Tracking sheet</li> </ul>

## Budget

### UV beads & plastic lacing calculations:

UV beads	Grade 1 Enrolment 2010-2011	Wellington Catholic District School Board:	English	= 542
		Upper Grand District School Board:	English	= 1806
			French immersion	= 344
	Total			= 2,692 students
	Estimate 20 beads/student			= 53,840 beads
	Estimate between 80% & 85% uptake			= 43,072 to 45,764 beads
Plastic lacing	Estimate 80% uptake			= 2154 students
	Estimate 8" lacing/student			= 17,232"
	36"/yard			= 478.6 yards or ~500 yards
	100 yards/spool			= 5 spools

### Budget:

UVR project (RATAY) monies in trust	\$3,000.00
UV beads (200 beads/bag x 225 bags = 45,000)	\$849.70
plastic lacing (5 spools, 100 yard/spool)	\$24.24
<b>Remaining</b>	<b>\$2,126.06</b>

## Evaluation

### Reach:

In total, 16,000 UV beads (or 80 bags) were disseminated in May and June. Beads went to 22 elementary school classes at 18 schools reaching approximately 738 students. All but two teachers used the beads for Grade 1 classes, and two used them in Grade 2 classes (presumably split classes). An additional 15 children were reached through a summer camp and some were also reached through a summer fair, for a total of 753 children.

In total, 130 bags of beads (which could reach approximately 1,300 students, or 52 classes based on an average of 25 students per class) remain for the 2011-2012 school year. Also, as the amount of plastic lacing required per student was underestimated, approximately 251 yards, or 2.5 spools was disseminated leaving approximately 2.5 spools for the 2011-2012 school year. If the same amount of lacing is distributed per student, then another 1.5 spools of lacing will be required.

### Cost-effectiveness:

The cost of one bead per student is \$0.012, based on \$849.70/45,000 beads. The cost of 12" of plastic lacing per student is \$0.016, based on \$24.24/1,500 students (18,000"/12" per student). Given that 16,000 beads were disseminated for 753 students, approximately 21.24 beads were distributed per student, which works out to \$0.25/student plus the cost of the lacing \$0.016/student, for a grand total cost of \$0.27 per student. The UV beads and lacing were very cost-effective compared to other sun safety giveaways (e.g. hats).

### Teacher feedback:

Towards the end of June, an online survey was sent to all teachers with the exception of Island Lake Public School (an email address for the teacher was not provided). In total, nearly one quarter of the teachers or 23% (n=5) completed the survey.

All teachers used the UV beads for health lessons, while four also used them for science, one for injury prevention, and one for math. Though none of the teachers had used the beads before this pilot, all indicated that they would recommend the beads to other teachers (including one that contradictorily indicated she/he did not find them useful) and several provided positive feedback. Teachers commented on how excited the kids were; how they wore their bracelets for many

"The kids were so excited to see the beads change colour...What a great activity!"

*Teacher comment*

days; how the beads fit in well with curriculum (namely solar energy and health units); and that the glow-in-the-dark plastic lacing "brought another element of excitement". In terms of constructive feedback, one teacher reported that the plastic lacing did not tie well and she/he had to use an alternate material.

"These were great...they fit in perfectly with my solar energy unit and then with my health unit...Can you do this every year?"

*Teacher comment*

With regard to other resources, teachers indicated that they found the UV Bead Lesson Plan and sun safety lessons plans/activities “useful” or “very useful”. None of the teachers had ordered materials through Health Canada’s UV Index Awareness Program which also provides UV beads to teachers. Two indicated that the information to order print materials from other organizations was useful, but the other three did not utilize that information. Teachers noted they utilized books and posters to augment their sun safety lessons.

In terms of timing, all teachers used the beads in June and preferred this time of year for a sun safety lesson, though three also indicated May was a good time.

### **Team feedback:**

Elementary School Nurses of the School Health team provided feedback on the UV beads and other resources at a meeting on July 26, 2011 from their own observations or in communicating with teachers. The team reported that the UV beads were well received by teachers as they were easy to use, and students who “felt special” receiving the beads. All team members recommended distributing the beads for the 2011-2012 school year.

In terms of areas for improvement, the team recommended promoting and distributing the beads earlier in the spring with May/June as the target months for implementation. Also, it was identified that a rubric highlighting the relevant areas of curriculum is helpful for teachers, and could be added to the website. On that note however, the team agreed that generally few teachers access materials from websites and providing a hard copy is also helpful. Also, one team member noted that a teacher misinterpreted the UV Bead Lesson Plan, attempting to apply sunscreen directly to the beads, which was very cumbersome and messy, rather than on the bag as per the instructions. With regard to the plastic lacing, none of the team members received feedback that the lacing did not tie well, suggesting the concern may have been limited to one teacher’s experience.

### ***Conclusions***

Over 750 school-aged children were engaged in a health, science, math, or other lesson that utilized the UV beads, for a total cost of \$203.31, or \$0.27/student. And though not all teachers provided feedback on the beads or other sun safety resources, most that did indicated they found them useful, and provided positive feedback on their experience. Similarly, anecdotal evidence gathered by the Elementary School Nurses indicated that the UV beads were well received by both teachers and students, and thus recommended that they be offered the following year.

Some specific suggestions regarding timing (of promotion and distribution), accessibility of the resources, and glow-in-the-dark plastic lacing over solid colours can be readily addressed. Beyond those suggestions, it is recommended that the remaining UV beads be offered to schools for the 2011-2012 school year, as it provides a free, fun, and easy educational tool (and in essence an incentive) for teachers to educate students on sun safety.