

Spokane Youth Environmental Conference

2010 Journal of Projects



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Representatives of keynote speakers *Voyages of Rediscovery* stand with conference organizer, Ann Murphy.

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2010 Conference Summary



The 13th annual Spokane Youth Environmental Conference (SYEC) was held at Spokane Community College on June 3, 2010. Over 125 students presented their environmental science projects at the conference as a Session Presentation or a Poster Exhibit. Session Presentations are given 10 minutes and students typically prepare a PowerPoint slide show. Poster Exhibits are in the form of a table-top display and are available for viewing throughout the conference.

Each project is evaluated by local area scientists, environmental educators and/or communications specialists. Considerations include the appropriateness of the experiment to test the hypothesis, the originality of the experiment, the level of experimental control while accounting for variables, the organization and visual interest of the presentation/poster, and the extent of appropriate references. The projects that exhibit the greatest combination of the above skills are given a "superior" designation. Students receive a blue ribbon and a gift card from a locally-owned business. Participating schools also receive a cash donation for their science departments.

This year, keynote speakers, representatives of, *The Voyages of Rediscovery* shared their exploration of the Columbia River, from how they build their hand-made canoe to wildlife and obstacles they've met on their trips.

2010 Participating Schools and Teachers

Central Valley High School - Lori Buratto and Krista Larsen

Freeman Middle School - Mindy Poindexter and Donna Preble

St. Mary's Catholic School - Kendra O'Dea and Lauri Nauditt

Visiting teachers from Centennial Middle School - Diane Nations and Heather Wright

Sponsors

The conference would not happen without the generous support of the business community. The funds raised go towards student prizes, cash grants to participating schools' science departments, and notebooks made from recycled materials. Sponsors contributed \$2,350.

Conference Organizers

A committee of nine organizations plan the conference. Their time and in-kind services, over \$5,000, pay for the infrastructure and promotion of the conference.

2010 SYEC Superiors

The Big Green Environmental Saving Machine

*Billy Broussard, grade 8
Freeman Middle School*

Project overview: Are hybrid cars actually worth buying?

Hypothesis: My project is called The Big Green Environmental Savings Machine. The point of this project is to compare the mpg, cost, and then figure out how long it will take for a hybrid owner to recoup the initial cost of the hybrid, and then find what hybrid will take the shortest time to recoup the money. My questions: are hybrid cars worth the extra cost and if so how long will it take to get the initial MSRP cost back.



Experiment or research: I compared three models of hybrid and non hybrid cars (Lexus RX, Toyota Camry and Honda Civic), determining the cost difference, the mpg difference and the length of time it would take to recoup the initial cost of the hybrid vehicle.

Key facts and findings: The hybrid model that recouped the extra cost of buying a hybrid vehicle the quickest was the Lexus RX and the model that took the longest time to recoup that cost was the Toyota Camry. The Honda Civic was in the medium. The Lexus hybrid recouped its extra cost the quickest due to the fact that although the initial MSRP cost was greater and the gas mileage not as efficient as the other vehicles, it consumed more gasoline in a given year.

Recommendations: In conclusion, when considering buying a hybrid vehicle for cost reasons alone, higher MSRP vs. gas mileage efficiency can be inversely proportional. ###

Splish Splash in the Bath

*Madison Rountree, grade 9
Central Valley HS*

Project overview: I wanted to see how much water could be saved by turning of water while shaving, putting on shampoo, etc. I found that you could save an average of 8.543 gallons.

Hypothesis: That you could cut the amount of water used in a shower of 15 minutes in $\frac{1}{2}$.

Experiment or research: I showered & turned off the water when applying shampoo, conditioner, & shaving while having the tub plugged. Then after my shower I measured the # of gallons used. My control was the # of gallons used in a 15 minute shower. I then repeated everything several more times. Next I collected and recorded the data on a data table.

Key facts and findings: I found that you could save 8.543 gallons of water per shower.

Recommendations: If you are really worried about saving water you can turn off the water like I did. Or you can take shorter showers and purchase a low flow shower head. All of these ways can save water. And if we really want to make a difference everyone should try to conserve water in or out of the shower. ###

Doggone Radon

*Peter Underhill, Grade 8
Freeman Middle School*

Project overview: The purpose of my project was to research the accumulation of radon in buildings, and to investigate the levels of radon in our homes and at our school.



Hypothesis: In my project Doggone Radon, I wanted to test the amount of radon in our homes and at Freeman Middle School. A dangerous gas, radon is known to be a cause of lung cancer and, according to the EPA, kills about 21,000 people every year. It naturally accumulates in buildings, but certain levels of radon can prove fatal. I asked if such dangerous levels of radon existed in our school and homes. The areas I tested included the basement level of a home would have a higher level of radon, as it was older and more prone to radon leaks. The newer Freeman Middle School building, I reasoned, was probably constructed with certain radon guidelines in mind.

Experiment or research: First, I went to a hardware store and bought a radon test kit with two different canisters to be set up. Next, I chose two testing locations in the basement and storage room that were twenty inches above the ground and three feet away from the walls. Finally, I removed the lids from both of the canisters and let them test for four days, (96 hours). After letting the test devices sit for the prescribed amount of time, I collected them, replaced their lids, and mailed them to the laboratory to be analyzed. I then waited for the results.

Key facts and findings: Upon looking at our results, I found that our short-term test gave higher results for the storage room of the school than for the basement of the home. I was very surprised at the results, because I expected that the home's basement would be less radon-proof due to its age. The school building was newer, so I thought that it would have been assessed for the threat posed by radon. I am currently conducting further test in the areas of concern to verify our first test results. I hope that through these investigations we can determine whether there are serious health risks due to radon exposure in our middle school. ###

Go Green Limericks

*By Mrs. O'Dea, Mrs. Nauditt & the
NOAA Gang*

I love my lunch plate!
It's ceramic, not plastic.
It's environmental consequences
are not as drastic.
No plate in the landfill
will my dish fulfill.
Cuz saving the Earth is fantastic!



Worm Food

Will Kable, grade 9
Natalie Riel, grade 9
Central Valley HS

Project overview: Our goal was to find out what effect earthworms had on plant growth. We planted grass in two containers. Only one had earthworms.



Hypothesis:

For our project we wanted to research agriculture. The topic we found most fascinating was the concept that worms have an effect on the growth of plants. According to the Journal of Biology and Fertility of Soils, earthworms can have a "hormone-like" effect to plant growth. Our experiment will test this theory. We believe they are receiving the most nitrogen.

Experiment or research: To test the effect earthworms had on plant growth we used a species of fescue called "blue grass." We had two samples. Our control sample contained only a rock base, organic soil and the grass. The other was our basis for comparison. This sample was identical to the control except that it contained 12 earthworms. The two samples each received equal sunlight and water. We then recorded and compared the height over a four week period.

Key facts and findings: We found that worms had a significant impact on the growth of our grass. The grass with worms grew up to 212 centimeters in a four week span while the grass without worms only grew to 130 centimeters. This is a significant increase. This is in part because the worms created tunnels allowing better distribution of nutrients throughout the soil. We believe that this change is also due to the amount of nitrogen in the soil. The worms eat and leave castings, which contain high levels of nitrogen. Our conclusion was that earthworms do have an effect on growth.

Recommendations: We recommend that more study be done on the effects that earthworms have on other species of plants as well as different types of ecosystems (e.g., agricultural and undeveloped areas). We believe scientists can use this information to develop more environmentally friendly agricultural practices. ###

Are You a Carbon Bigfoot?

Malena Nystuen, grade 9

Christen McAndrew, grade 9

Lauren Allen, grade 9

Central Valley HS

Project overview: We tested electric efficient items such as laptops and light bulbs that helped reduce energy use and costs.

Hypothesis:

Our hypotheses is that by simply turning off certain electrical devices, you can save money on electricity.

Experiment or research: What we did was test how much energy an electrical item uses when on for an average time of day for laptops and televisions and how much energy and money you could save when those items were not in use. When we noticed the change was negligible we decided to research and test the difference between CFL'S and incandescent light bulbs.

Key facts and findings: We found that one CFL is equal to 10 incandescents. Also that by replacing incandescents with CFLs you reduce energy use and costs.

Recommendations: We recommend that every person changes at least one incandescent with a CFL so that we can reduce green house gas emissions equal to 800,000 vehicles. ###

Go Green Limericks

By Alanna Hamilton & Rachel Vore

Don't be wastin' water in your fish tank.
If you're doin' it, you're pretty darn "jank".
Savin' water is good.
Let that be understood.
Now that's something you can take to the bank.

Floor of Power

Emily Gallafent, grade 9
Alex Wende, grade 9
Kyle LeBlanc, grade 9
Central Valley HS

Project overview: We wanted a simple, cost effective way of harvesting the energy of walking. We built a device that collects mechanical energy applied to it and converts it to electricity.



Hypothesis:

Our hypothesis is that human motion is a reliable source of quiet energy that has minimal environmental impact.

Experiment or research: We first built a proof of concept model that we tested on an oscilloscope. We found that on that model it had a very low energy return rate and would not be cost effective. So we built a new model that had more efficient winds of copper coils and more magnets. On the oscilloscope it showed that it could generate 2 volts with one magnet and 3 copper coils rapped in series. So after testing we concluded that our idea was a potential green energy source for the future.

Key facts and findings: With our prototype we used a combined magnet force of 20 pounds with 2000 winds of copper magnet wire. We produced 3.1 Watts per hour. With math and reasoning, figured a magnet with 30 pounds of force and more efficient winding system we could get 4000 + winds. With all the revisions we could produce over 248 watts per hour.

Recommendations: An upgraded model of our prototype could generate 160 volts every 2 minutes of normal walking. This equates to 248 watt hours (w-h). This is enough energy to power a fluorescent tube for over 4 hours. With 30,000 upgraded tiles in a school, over 7.4 megawatt-hours, could be produced from students and staff walking. This is equivalent to about 4 barrels of oil, which costs about \$300. So for an entire school year, the building would save 720 barrels of oil and \$3000. This may not sound like much but it equates to 550,000 less pounds of CO₂ in the atmosphere every year per building. ###

Decomposition Mission

Carly Wolf, grade 9
Taylor Butters, grade 9
Katy Weisbeck, grade 9
Central Valley HS

Project overview: We tried to see if different types of soil can be used in landfills and which type made the decomposition process occur faster.

Hypothesis:

We hypothesized that composted soil would increase decomposition rate because of the bacteria found in the soil would act as a catalyst.

Experiment or research: In our experiment we divided one Sun Chips bag into 3 sections and put one in soil, potting soil, and composted soil. We tested the rate of decomposition over a 6 week period of time.

Key facts and findings: We found the composted soil decomposed the sun chips bag faster.

Recommendations: We recommend that landfills use a layer of composted soil to aid in decomposition. ###

Kung Pow Chicken

Amanda Anderson, grade 9
Salina Johnson, grade 9
Ashley Stewart, grade 9
Central Valley HS

Project overview: We researched the effects of recycling, food waste, by donating it to animals. We discovered it would reduce farmers cost, food waste, and the amount of things going in landfills



Hypothesis:

We believe that by recycling food waste by donating it to farm animals we can improve the health of the animals and reduce our waste.

Experiment or research: We researched how much we waste as a nation, what chickens are fed, if people would be interested in such a program as we present, and what farm animals health is currently like.

Key facts and findings: We found Americans waste nearly 100 billion pounds of food per year. We also found that farm animals are currently legally being fed same species meat, blood, and feathers. We found that a farmer who already participated in a project such as we suggest was very happy with the results and had very healthy chickens. We found many members in our community would be interested in a way to recycle food waste.

Recommendations: We recommend that we take steps as communities to set up ways to get our leftover unspoiled food to the farmers in our local areas according to their specific needs in order to reduce waste and help our local economies to flourish. ###

Go Green Limericks

By

*Beth Primmer, Marianne Wiff,
Kristen Fuchs & Brooke Williams*

The forest is very beautiful.
There are trees that are very fruitful.
They can save our lives,
But can give us hives.
We should be so much more careful!

The Powerless Pool

*Dylan Oviatt, grade 9
Josiah Brubaker, grade 9
Central Valley HS*

Project overview: By using relatively cheap and easily accessible materials, we were able to create a system that effectively heated a pool solely on clean solar energy.



Hypothesis: We believe that by using simple building materials, we can create a pool heating system that uses only solar energy.

Experiment or research: 1. Gather materials, 2. Assemble heating system, 3. Place two totes in equal sunlight, 4. fill both totes with 20 gallons of temperature controlled water, 5. attach one to heating system, 6. start system, 7. check water temperature in both totes every 15 minutes for an hour and a half.

Key facts and findings: The starting temperatures for both were 56°F. The final temperature for the control was 64.5°F and for the manipulated was 71°F.

Recommendations: People who have pools should consider a solar heater such as this. It would help to reduce the need for environmentally harmful gases. ###

Fruits of the Roots

Alec Bumgarner, grade 9

Erik Bodrock, grade 9

Daniel Borisov, grade 9

Central Valley HS

Project overview: Tried to discover a substance that would promote tree root growth to help prevent erosion.



Hypothesis:

Our problem is that erosion is creating destruction all around the world.

Experiment or research: Our experiment was to grow 4 aspen trees with different liquids for 30 days. We tested the length and circumference of the roots.

Key facts and findings: Coffee worked exceptionally well. Water didn't grow the tree very much.

Recommendations: We recommend/propose people donate coffee to the government to "water" trees in erosion susceptible areas. ###

Watts Up

Katie Mullin, grade 9
Stephanie Brown, grade 9
Central Valley HS

Project overview: Testing how unplugging electrical devices when they're not in use can save energy.

Hypothesis:

Can you save energy by unplugging electrical devices when they're not in use?



Experiment or research: Gather electrical devices (curling irons, blow dryers, phone charges, etc.) Unplug them all, measure energy for five minutes. Plug all in but don't turn on. Measure energy for five minutes. Repeat three times.

Key facts and findings:

Average energy used for appliances plugged in: 43.66 kW

Average energy used for appliances not plugged in: 29.66 kW.

Difference: 14 kW.

In 5 minutes one house wastes about 14 kW of energy.

Recommendations: Please, just unplug things after you use them. ###

Go Green Limericks

*By Matt Angelis, Max Axtell
& Mitchell Young*

The future of Earth is our choice.
We all need to raise up our voice.
You must face the truth.
We have shown you the proof.
So let Mother Nature rejoice.

This world we must learn to sustain.
It is not that much of a pain.
But, quite oddly enough,
some folks don't recyle stuff.
I guess they just don't use their brain.

Grey Water to Green

*Kara Cook, grade 9
Brittney Goodman, grade 9
Central Valley HS*

Project overview: We made a simple, cheap, and effective water purifier that allowed us to water thriving lettuce with recycled grey water.

Hypothesis:

We hypothesized that under the proper conditions, grey water could be purified to the point where the resulting "green" water could be used to water plants, producing the same results as everyday tap water.

Experiment or research: We tested a measured amount of grey water, "green" water, and tap water on our plants in special germination soil for 7 days. To make our green water we used a mini-aquifer simulation filter to purify the grey water to "green". We watered our lettuce with 1/8 cup per day of the designated water type. We constantly recorded data and compared sprout types.

Key facts and findings: We were able to draw the conclusion from our experiment that the purified grey water not only lead to living plants, but plants that thrived.

Recommendations: We recommend that people begin using our method or even one of their own to recycle water. People could also just try and use less water while bathing or washing their hands. ###



Saving Nemo

*Kaitlyn LeBlanc, grade 9
Alex Sweeney, grade 9
Shawnee Guegel, grade 9
Central Valley HS*

Project overview: We tested phosphorus and dissolved oxygen levels in local water sources and found that increased



aquatic growth correlated to decreased oxygen saturation which impacts the quality of aquatic life.

Hypothesis: We predicted that if we found an increased level of phosphorus in our sample water supply, we would find an increased amount of algae because phosphorus is an element in fertilizer. The increased growth of algae will cause lower dissolved oxygen levels thereby decreasing available oxygen to support aquatic life.

Experiment or research: Our two part investigation consisted of testing the phosphorus and dissolved oxygen levels in local water sources. Our experiment highlights the importance of small consistent changes in our daily lives that can benefit our local water resources.

Key facts and findings: Phosphorus (P) is a nutrient required for plant and animal metabolic reactions. It is found in human and animal waste, industrial pollution, detergents and fertilizers. Levels higher than 0.03 ppm contribute to overgrowth of plants and bacteria. P promotes growth of algae and other aquatic plants that remove oxygen from water when they die and decay. P is banned from dishwashing detergent sold in Spokane County, but is common in industrial processes and discharges. P also enters the watershed from agricultural fields, golf courses, and cleared forests.

The quality of aquatic life depends on high dissolved oxygen (DO) levels at 5 to 6 ppm. Cold aerated water holds more DO. Thus warmer outdoor temperatures, and warmer stagnant water with high levels of bacteria from sewage, rotting vegetation, or bacteria consumption of available DO, can cause the saturation to decrease. The decreased saturation then affects the aquatic ecosystem; below 2 or 1 ppm will not support fish.

Our field study results supported our hypothesis that phosphorus increases algae growth which in turn decreases available dissolved oxygen, thusly impacting the quality of aquatic life in local water(s).

Recommendations: From our literature review and interviews with local water quality resource organizations, we have found the following ideas to help improve water quality:

Control non-point sources

- Phosphate free fertilizer
- Washing cars in the grass to avoid water run-off
- Watch what goes down the drain

Everyday Help

- Use less water, use water wisely
- Stabilize eroding river/stream banks

These results were validated by local water quality testing by Spokane County and the Washington State Department of Ecology who have found decreasing P levels since the county ban on the sale of phosphorus containing soaps. If we could do more testing, we would test again and add sites close to industrial areas and sewer treatment plants. Publishing our results will bring attention to water quality and save aquatic life in our local water. ###

Magnetic Mobility

*Brett Siddoway, grade 9
Casey Strauss, grade 9
Derek Bischoff, grade 9
Central Valley HS*

Project overview: We tested if magnets could save energy by reducing friction. We made a floating platform and found that much less friction was created, which saved energy.



Hypothesis: If we place magnets along a test track and along the bottom of a piece of wood, repelling each other, then friction created from sliding down the track will be greatly reduced because the board will be floating.

Experiment or research: 1. Place the Magnet board on the test track. 2. Lift the track up and measure the degrees with a protractor. 3. Repeat steps 1 & 2 two more times. 4. Place the wooden block on the test track. 5. Repeat steps 2 & 3 adding the lubricants (water/wax) each time.

Key facts and findings: The lowest angle we were able to get with the wood block was 10.5° when we had the wax lubricating it. The magnet board had the least with 4.3° so, the magnets are able reduce friction drastically, which can be applied to vehicle power places to reduce friction thereby reducing energy needed less fuel consumption and less CO₂ put into the atmosphere.

Recommendations: By using magnets to reduce friction, the places of high friction such as the drive shaft or wheels of the vehicle could be started with magnets which will reduce the amount of energy needed to power it. ###

Genetically Modified Organisms

Abigail Mansoor, grade 9
Central Valley HS

Project overview:

Using data from various organizations, I researched the effects of genetically modified organisms (GMOs) and a way to reduce these effects.



Hypothesis:

Genetically modified organisms are harmful to the environment.

Experiment or research: The findings of various experiments were compiled to draw my conclusions. These were found from extensive exploration of sites including the FDA, Monsanto (producer of many GMOs) and several newspapers recording interactions with GMOs in nature.

Key facts and findings: 60% of all processed foods contain GMOs, mainly from soy, corn and sugar, with over 40 GMO crops having passed through the process for commercial sale. Cross-pollination creates "superweeds" which become nearly impossible to kill and increase herbicide usage. GMOs have caused death, illness, new allergies, holes in the stomachs of rats and changed body weight depending on gender. Butterflies, bees, and other insects have died from GMOs. As species are decreased or become extinct in areas ecosystems will suffer.

Recommendations:

On an individual scale: people should avoid GMOs in food. To do this people can search for soy, corn, canola, and sugar (anything not 100% cane) in ingredient lists or use non-GMO shopping lists found online or iPod apps.

Global scale: This plan would have to be government controlled.

- Begin with labeling GMOs
- Reduce land dedicated to growing GMOs (282 million acres)
- Return to testing stages
- Resort to vertical farming, all the benefits of GMOs without environmental, they can be used in vertical farming.

###

Insecticides: The Inside Story

*Alanna Hamilton, grade 9
Rachel Vore, grade 9
Central Valley HS*

Project overview: We have learned so much throughout our research project - Insecticides: The Inside Story – and were able to answer all of the burning questions we had.



Hypothesis: Insecticides are thought to be dangerous and harmful to humans and animals but through our research we have learned that they are not as bad as we originally thought.

Experiment or research: We consulted with people who use the products, sell the products, and even people who regulate the use of the products.

Key facts and findings: In the beginning we believed that insecticides were harmful to people and animals causing negative effects from nausea and headaches to even cancer, but throughout our research we uncovered the truth. During the course of our study, we observed the dramatic changes between the past and present. During the past, many insecticides were very harmful to not only the person applying it, but the people consuming the products with insecticides such as, rotenone, a so called "organic" insecticide that was used to protect plants, but had dire effects, giving humans Parkinson's disease and killing birds and fish. Now in the future we have made dramatic steps in the right direction improving the products that we use. Products now are safer, healthier and even more effective than those of the past. We talked to Byron Seimers, a local farmer in the Green Bluff community, and an expert on insecticides. He told us how all the products he used were relatively safe for humans and animals because of the strict regulations the government has on chemical use. The exception being Guthion, a product used to get rid of worms in apples. Through research we found it causes headaches and nausea at the worst and because of that is will be banned in 2012. This fact shows that even products that cause the smallest of symptoms are banned when those symptoms are discovered. This leads us to believe that majority of insecticides being used on local and

commercial farms cause no more than minor symptoms and are relatively safe. Byron informed us of many insecticides used on his farm including: Thiodan, Lorsban, Diazanone, and many others. Once we turned to helpful websites such as www.bayercropscience.com and www.dowagro.com we discovered that these were barely harmful to humans or animals, proving the statement the insecticides are not that bad.

Recommendations: In the course of extensive research our team would conclude that insecticides are not to be classified as extremely harmful to humans or animals, which supports our thesis. Through great strides in the pesticide field our products have developed greatly into user-friendly solutions with harmful or less user-friendly solutions being eliminated from the market over time. We believe our project is important to alert and inform our community of improving the reputation of insecticides and to no longer fear their negative effects. ###

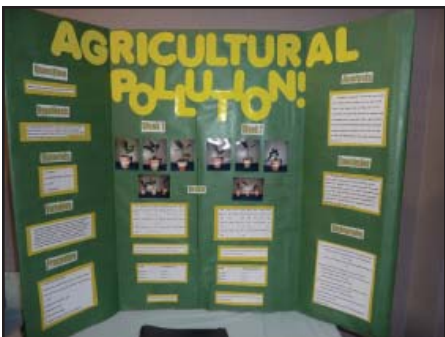
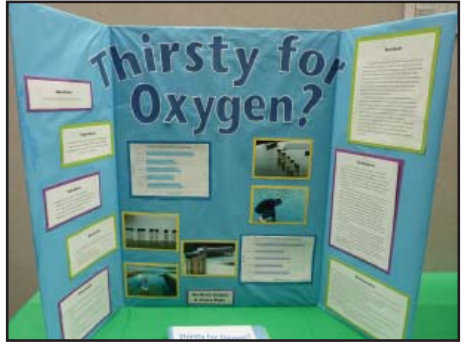
Recycling Rap

*By Haylee Millihan, Taylor Butters
& Natalie Riel*

I'm recycling.
No you're not dude, don't lie.
I'm recycling.
Driving around in my mom's "hybrid".
15 years gone by and I'm looking up
ways to recycle.
I'm recycling.
No you're not dude, don't lie.
I'm recycling.
Driving around in my mom's "hybrid".
15 years gone by and I'm looking up
ways to recycle.
I put all my cans in a bin.
Got another for aluminum and tin.
We can't afford to waste today
'cause our Earth is here to stay.
I'm recycling.



Students share their limericks and raps with a "go green" theme at lunch time.



Images from 2010 SYEC

Parent email to a participating teacher about SYEC 2010

From: Sharon
Sent: Thursday, June 03, 2010 6:27 PM
To: Buratto, Lori
Subject: SYEC !!

Lori,

I have a very excited, jazzed girl this evening! She loved doing the SYEC. She actually gave me a full report on presentations she heard, the lunch rap, and the insecticide skit! I understand there was a great debate going with the judges -- good for them to take a stand and defend it.

What a good experience. I like the way you get your classes involved in activities outside school -- its a taste of real life. I may have to volunteer to help with the conference next year- I didn't know anything about it, but then found out my company is a sponsor!

Sharon



Pictured above: 2010 SYEC Superior Award winners.

Conference Organizers

- National Weather Service
- NEW ESD 101
- Spokane County Water Resources
- Spokane Regional Clean Air Agency
- Spokane County Conservation District
- Spokane River Forum
- Spokane Regional Solid Waste System
- Washington Department of Ecology
- West Valley Outdoor Learning Center



Conference organizers eagerly wait at the welcome desk for the arrival of SYEC participating schools.

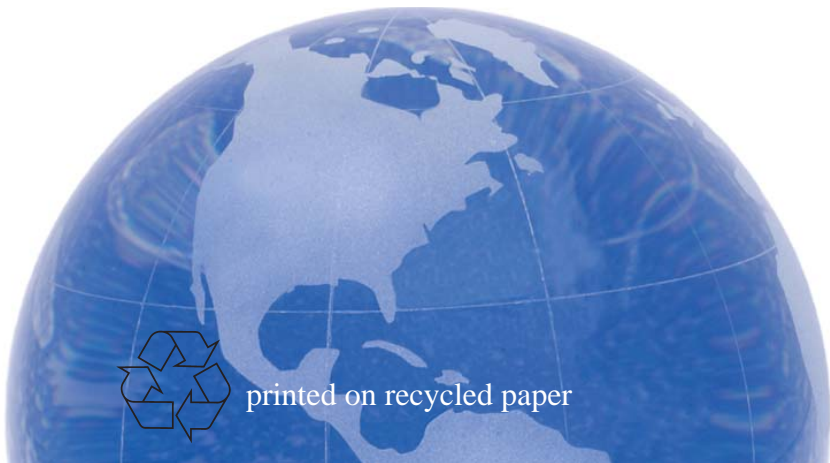
Ideas

Investigation

Innovation

SYEC

For a Better World



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