

Spokane Youth Environmental Conference



2009 Journal of Projects



Printed on recycled paper



A note from the organizers about this journal....

This journal is a compilation of student projects that received a “superior” designation at the Spokane Youth Environmental Conference held on April 28, 2009.

The goal of the journal is two-fold: we want to acknowledge the efforts made by students receiving “superior” designations and at the same time continue to inspire teachers and students to be involved in future conferences. We also hope that some students will go on to explore careers in the field of environmental science.

Included in the journal are limericks and raps that were shared with the group during our lunchtime Limerick Smackdown. This year’s theme was “Go Green.”

Enjoy the journal!

About the Organizers

Educational Service District 101 (ESD 101) promotes education excellence by delivering essential, cooperative services to schools and other learning communities. ESD 101 provides services to 59 public school districts and 45 state-approved private schools in seven counties of Eastern Washington—Adams, Ferry, Lincoln, Pend Oreille, Spokane, Stevens and Whitman. www.esd101.net

National Weather Service (NWS) provides weather, hydrologic and climate forecasts and warnings for the protection of life and property, and the enhancement of the national economy. NWS is dedicated to community outreach and education to improve weather awareness and preparedness. www.wrh.noaa.gov/otx/

Spokane County Water Resources participates in studies and planning efforts for the protection and use of surface and ground water resources in Spokane County. www.spokanecounty.org/wqmp

Spokane Regional Clean Air Agency works to ensure that we all have clean air to breathe. We inform the public about clean air issues and encourage them to make clean air choices. In addition, the agency is responsible for enforcing federal, state, and local air quality laws. www.spokanecleanair.org

Spokane Regional Solid Waste System operates the region’s waste handling systems and provides education on waste reduction, recycling, handling hazardous wastes and composting. www.solidwaste.org

Spokane River Forum serves as an information clearinghouse for all things Spokane River. Our non-profit organization promotes regional dialogs for sustaining a healthy river system while meeting the needs of a growing population. www.spokaneriver.net/

Washington State Department of Ecology is Washington’s principal environmental management agency charged with protecting, preserving and enhancing Washington’s environment while promoting the wise management of our air, land and water. www.ecy.wa.gov

West Valley Outdoor Learning Center gives teachers and students an opportunity to experience the outdoors while instilling an appreciation for wildlife and natural resources. All activities are tied to the Washington State Essential Academic Learning Requirements. www.wvolc.org

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Sponsorship

Thank you to our 2009 sponsors! These donations covered the gift cards given to students with “superior” ratings, as well as the cash donation given to each attending school for the school’s science department. This year, gift cards were purchased from Auntie’s Bookstore located in downtown Spokane. Auntie’s offered a discount on the purchase of the cards.

- ◆ Altek
- ◆ Auntie’s Bookstore
- ◆ Big Horn Foundation
- ◆ Budinger & Associates
- ◆ CH2Mhill
- ◆ GeoEngineers
- ◆ Hollister-Stier Laboratories
- ◆ Rings & Things
- ◆ Spokane Aquifer Joint Board
- ◆ Spokane County Conservation District
- ◆ TransCanada
- ◆ Washington State Employee Credit Union
- ◆ Wells Fargo

A Special Thanks

Thank you to Bea Lackaff and Tonilee Hanson for photographing our superiors and the event!



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2009 Conference and Student Project Information

The 12th annual Spokane Youth Environmental Conference (SYEC) was held on April 28, 2009 at Spokane Community College. The 2009 conference theme was “Go Green.”

Superior Project Designation

Each student project included in this journal was evaluated by local area scientists, environmental educators and/or communications specialists. Considerations included 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 exhibited the greatest combination of the above skills were given the “superior” designation. Students received a blue ribbon and a gift card to Auntie’s Bookstore. This year, five presentations (11 students) and two poster exhibits (3 students) were recognized as “superior.”

2009 Participating Schools and Teachers

Central Valley High School--Lori Buratt
Freeman Middle School--Mindy Poindexter and Donna Prebl
M.E.A.D. Alternative High School--Curtis Barville and Brooke Matso
Tekoa Elementary School--Tammy Mendoz
West Valley City School--Matthew Phillipy and Steven Scheiber

Organizations on Planning Committee:

Educational Services District #101
National Weather Service
Spokane County Water Resources
Spokane Regional Clean Air Agency
Spokane Regional Solid Waste System
Spokane River Forum
West Valley Outdoor Learning Center
WA State Department of Ecology

Additional Photographs*

**From the Tekoa presentation, Limerick Smackdown, and The Green School Challenge. We hope to start including photographs on our website—we’ll keep you posted!*



Limerick/RAP Smackdown

(generated during the lunch hour)

Lettuce is very green
It goes with this whole scene
So eat a lot,
cultivate your plot
And drink from a metal canteen
~M.E.A.D. Alternative School

There was a young farmer named Ty,
Who let the redworms starve and die
What was the boy thinkin'
The compost is now stinkin'
And the plants and soil are all dry!
~West Valley City School

We're city school students and you can observe,
in everything we do we try to conserve.
Hybrid, organic—it's not that problematic,
We love to renew, we're thinking systematic.
YO!
We're going efficient,
So you better listen,
Don't be a sucker,
Yo motha NATURE!

~West Valley City School

There once was a soapful of *P*
That made the river ickey
We took the *P* out
And so we can shout
The river is now very pretty!
~Tom Brattebo, evaluator

Go green
Green as a bean
Blue is not new
But green is peachy keen
~Tekoa Elementary School

Row, row, row your boat gently down the green
Merrily, merrily, merrily, merrily, life's about recycling
~Tekoa Elementary School

The Presentations...

Alien Invasion

Ben Carasco and Rob Smoot
Freeman Middle School, Grade 8

Project Overview

Investigative project on invasive species.

Hypothesis

Invasive species are animals that jeopardize the environment, killing off native species. They enter their non-native ecosystem from people smuggling fruit or other illegal imports.

Experiment

We divided our research into seven parts:

Definition of what they are; What makes them invasive; Where they are located; What is their local impact; Can we stop them; Examples of invasive species; Questions about adaptation and control.

Key Findings

Invasive species are species that are introduced to an area that is not their native ecosystem. They cause both economical and environmental harm. Invasive species are one of three types of introduced species. The other types are ferals and pests. The location of invasives is determined by climate, habitat and land cover. They enter their non-native environment through transportation, smuggling, and trade imports. Although we have been able to have some control of them, they are still managing to increase around the world. They have cost the United States billions of dollars to control. They disrupt the natural food chain and could potentially alter our daily lives.

Recommendations

- ◆ We recommend that everyone becomes more informed about invasive species.
- ◆ Avoid buying plants without checking beforehand if they are known for invasive activity.
- ◆ Avoid bringing fruit from or taking fruit to any place you travel in the United States as well as other countries.



Elastomer Powered Vehicle

Drew Brown and David Ross
Central Valley High School, Grade 9

Project Overview

We investigated the elastic property of rubberbands to design a potentially beneficial and advantageous vehicle powered by this elastomer substance.

Hypothesis

We identified three ways a rubberband can store and release energy: through elasticity, contraction, and its torque properties (ability to twist or rotate). We predicted the following: For elasticity, the hot rubberband would stretch the farthest. In terms of contraction, the cold rubberband would shoot the projectile the farthest. And with regards to torque properties, the cold rubberband would propel the car the farthest.

Experiment

We performed different tests with our rubberbands, always comparing them at varying temperatures: room temperature, hot (100 degrees F), and cold (0 degrees F).

1. We hung six un-opened pop cans on rubberbands to test the elasticity properties of the rubberbands.
2. We shot a projectile from a rubberband-powered catapult using different rubberbands.
3. We designed a simple rubberband-powered car and tested the torque properties of the rubberbands by winding them up and seeing how far they propelled the car.

Key Findings

We learned that our predictions for elasticity and contraction were correct, but we were wrong about the effect of torque. The hot rubberband propelled the car the farthest. Overall, we learned that the warm rubberband (at room temperature) is the most effective.

Recommendations

If an elastomer-powered vehicle were designed, we recommend that temperatures should be controlled for maximum effectiveness.



Strengthening Concrete Infrastructure

Rahmi Nemri and Dallin Squires
Central Valley High School, Grade 9

Project Overview

Our concrete infrastructure is crumbling and in need of repairs, but due to lack of funding, these repairs are not happening. We think it is possible to make concrete stronger from the start, therefore requiring fewer repairs.

Hypothesis

We believe that if we add strengtheners to concrete, we can improve the longevity and durability of it. Most concrete structures contain iron reinforcement called “rebar,” and although it is strong, it is brittle and easily corrodes.

Experiment

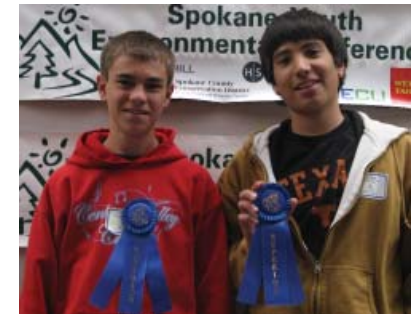
We tested strengtheners that could be added to concrete yet keep it flexible. We created concrete “bricks,” some with steel wool or coiled wire, and some left plain without strengtheners. One by one, we froze, heated, and put 10 pounds of weight on each brick. If the bricks didn’t break, we repeated the experiment in a pan of water to further weaken the concrete. If they still didn’t break, we dropped them from 9 ½ feet. Lastly, we used rubbing alcohol instead of water to mix the concrete.

Key Findings

The alcohol-based concrete did not work--concrete must be made using water. Although steel wool strengthens the concrete, it corroded too quickly to be used commercially. The coiled wire however, did not corrode. It strengthened the concrete and still allowed it to be flexible. The freezing and heating did not affect the concrete significantly. After all the tests, we looked at which bricks had the largest remaining pieces. The coiled wire pieces were 84.1% of their original size, the steel wool 83.2%, and the plain concrete 65.4%.

Recommendations

Heavy-gauge steel would be better inside of concrete than rebar. The steel is more supple and not subject to deterioration.



The Poster Exhibits....

Reduce, Reuse, and Recycle:

Can one family make a difference?

Claire Hulse

Freeman Middle School, Grade 8

Project Overview

Recycling is easy and effective. By not recycling, we create more pollution and contribute to global warming. It's also killing our animals.

Hypothesis

To explore whether one family can make a difference by recycling.



Experiment

I got a list of all the things we could recycle from www.solidwaste.org. I recycled for four weeks and then didn't recycle for four weeks, and compared the difference by counting how many bags of garbage we created.

Key Findings

I was surprised how much is recyclable. It is clear that one family can make a difference—you just need to decide to do it and set it up. It doesn't take much. We simply marked bags for each item, such as plastic and cans. The math results alone shows that it's hard to ignore. During the time we recycled, we put out nearly half the amount of trash than normal. In other words, per week, we used two less bags. If we did this for a whole year, that would be 104 bags of garbage we didn't create!

Recommendations

Remember that every time you throw something out, no matter what it is, it has to go somewhere. I'd prefer to live where there are fewer garbage dumps around us, wouldn't you?

Seth Woodard Recycling

Joe Crowe and Connor Macklin

West Valley City School, Grade 8

Project Overview

During the winter of 2008, we helped the Seth Woodard Elementary School set up a recycling program to address their solid waste needs.

Hypothesis

We believed that if we set up a paper recycling program at Seth Woodard in the same style as our school, we could help them reduce the amount of paper in trash bins, thus reducing waste, saving the school money on waste removal, and reducing the school's impact on forest habitat.



Experiment

We conducted a pre- and post-waste audit with Jim Haynes of Spokane Regional Solid Waste, to determine how much paper was being thrown in the trash. After the pre-audit, we gave an educational seminar to 4th and 5th grade classes to teach them why it is important to recycle and how they can recycle. We then installed paper recycling receptacles in the classrooms and waited a month to conduct a post-audit.

Key Findings

We found that our program worked, but we would need more time to continue educating the teachers and students to have a greater rate of success. It takes a long time to break wasteful habits! We also found that teachers know less about recycling than kids do. This is unfortunate because if the teachers can't teach us to recycle, then who will? The answer is other kids.

Recommendations

Recycling paper is effective. Most of all, kids need to be the leaders in recycling and teach other kids about it.

Vertical Farming

Madison Hilpert and Kelsey Solberg
Central Valley High School, Grade 11

Project Overview

We researched the potential of vertical farming.

Hypothesis

By converting to vertical farming, we would be able to feed the growing population more efficiently, decrease pollution, and preserve land.

Experiment

We did research based on Dickson Despommier's investigations and findings and created a powerpoint presentation about vertical farming.

Key Findings

We learned that 30 acres of land outdoors produces the same amount of crops as one acre of agricultural skyscrapers indoors in a vertical farm. If our population continues, we will need 20% more land than is represented by Brazil to feed the estimated population in 2050. Vertical farming is expensive, but alternatives continue to be discovered to help reduce the cost.

Recommendations

Vertical farming should be started now to produce crops more efficiently and preserve land to avoid conflict over natural resources in the future.



We've Got Worms

Annalee Foster, Ty Laboy and Mackenzie Pierce
West Valley City School, Grade 7

Project Overview

To create a worm composting program at West Valley City School to see if composting can reduce the amount of food waste going into landfills and incinerators.

Hypothesis

We believed that if we begin a composting system at our school, we could reduce the amount of food waste thrown in the trash and also have organic fertilizer for our school's greenhouse.

Experiment

We set up a composting program in the school's cafeteria where food waste would be transferred to the worm bins. We evaluated it after one week.

Key Findings

In just one week, 2475 grams of food waste was composted by the redworms so we learned that it is possible to reduce the amount of food waste going into landfills and incinerators by composting. We also discovered that we could save the school money using the composted material (worm castings) as fertilizer instead of buying fertilizers.

Worm composting is fun and easy. Making a worm bin from a plastic rubbermaid bin and PVC piping is easy and could be profitable to sell to the public. We will be making them and selling them at the Millwood Farmer's Market. We also learned that there was a lot of training required for staff and students on how to use the worm bins and how to care for them so they wouldn't have fruit flies or odors.

Recommendations

Start worm composting at your school or at home and use the compost as fertilizer. Every little bit will help our world!

