

Volume 3, Issue 2, March 2014

SLED Perspectives is published with research updates, design activities, and upcoming events.

We want to hear from you! If your class is doing a project that we could highlight, student writing that we could publish, or pictures that show students using science learning in engineering design please email us at wkim@purdue.edu

Enjoyed Musical Sound Instrument

by: Jill Parker

I am a 3rd grade teacher at Wea Ridge Elementary School. I completed the Musical Sound Instrument activity. I felt that the small design teams worked very well in our classrooms. The materials, rubber bands, cardboard, duct tape, balloons, were very easy for the students to manipulate. The design notebooks were a true extension for their design. I also enjoyed the inquiry activities prior to the design activity, tuning forks and Call a Friend.

The students learned how sound waves travel, the difference between pitch and volume, as well as how to create different pitches with the materials available. The students were very busy designing, communicating their individual and team designs with some negotiating, and finally creating their design.

Improvements for this activity could be eliminating the balloons. Students wanted to use blown up balloons to make sound, but their intention was to create strings from them. The cardboard we provided was flimsy, so some designs had trouble attaching the balloons or rubber bands to it.



Looking for more resources for teaching science? Check out:

- siemensscienceday.com and
- siemensstemacademy.com

Of course, don't forget about:

- stemedhub.org
- sledhub.org

THE BEST ACTIVITY, “SLOW BOAT”

by: Ryan Cole

I am a 3rd grade high ability teacher at Edgelea Elementary in Lafayette, IN. This is my ninth year teaching the 3rd grade high ability class, but this is the first year I have implemented the SLED activities in my classroom.

The best activity my students have done this year has been the “Slow Boat” activity focusing on drag force. We did a few activities prior to introducing the design task. The students participated in discussions regarding drag and the effect of aerodynamics on vehicles. They watched a video about the Aptera car that tries to utilize zero drag force. They also created a paper airplane to try and design an aerodynamic airplane. Furthermore, we did a few trial runs pulling an Easter egg through water, with the convex side facing out versus the concave side facing out, to determine which created more drag in water.

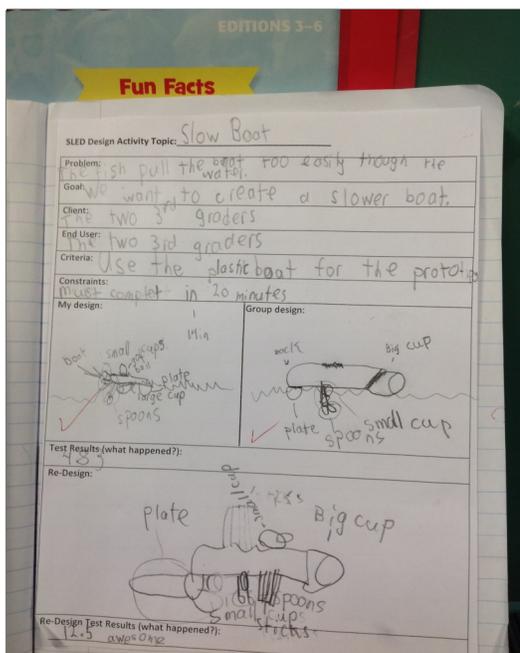
The following day the students were introduced to the “Slow Boat” design activity. The students spent that day creating their individual plans and then collaborating to come up

with a team design.

The next day they implemented their

design to create their “Slow Boat”. The students did an excellent job utilizing the materials they had available to create as much drag on their boats as they could. However, after running three trials, they realized there were some adjustments they could make to improve their boats. On the fourth day the students redesigned their boats and each boat showed improvements. All of their times were slower.

Throughout the lessons my students were thoroughly engaged. They showed a keen interest in the topics we were discussing and were excited to put their ideas to the test. Overall, I think this was a wonderful activity and the topics were age appropriate. I will definitely do this design activity again next year.



WIN-WIN ACTIVITY AT TRITON

by: Cathy Strycker

Currently, I teach third grade at Triton Elementary School with 22 students in my classroom. Triton is a small rural K-6 elementary school in northern Indiana. I have been at Triton for approximately 17 years with 10 of those years being at the third grade level. Students in our classroom have truly loved using the SLED activities this year, and they are always anxious to do science. We have been able to do all of the third grade SLED activities that were presented during the 2013 SLED Summer Institute. I am hopeful to get to some of the other ideas that were presented during the institute, in order to extend the knowledge of our students. I have tried to incorporate SLED design ideas with other science standards covered in third grade. Science is something that I have always enjoyed teaching and each year our classroom demonstrates a high level of understanding on district tests. It was extremely encouraging to compare science scores from last year to this year's student population. I realize that there are many variables involved, but there was a significant increase from last year's performance to this year's performance. Anytime that a teacher can get kids excited about a subject and produce students with increased mastery of content, it is a win-win!

Since it is difficult for me to decide on a favorite activity, I will just share the first SLED unit on sound. The activities that were planned to lead students through content went well. The activities were both enjoyable and allowed for students to gain an understanding of the concepts that we were learning. The hands on activities went pretty smoothly with students largely being on task and following directions. The practice that we did with drawing and labeling science notebooks seemed to be sufficient, since most books were done very well. Student artifacts and presentations went smoothly, and they left students excited about going on to the next task. I am unsure if we had gains between the SLED pre and post-tests, but I would like to hope that we did.



Musical instrument for the Rock Band design

One area that will need adjusting next year is in regards to the tuning fork activity. Some students had a hard time keeping the forks still when it was time to check back for understanding or set up another test activity. It was not bad, but the occasional "ping" could easily become annoying. The design itself went pretty well, but we could benefit by adding some more practice at drawing in the science notebook, just to be sure all students can do a stronger job with this. It was too easy for students to start out building their design and find problems, so kids wanted to change their design from the notebook to the actual product. They often find flaws in what they thought would work and then want to "fix" them in the building process. One last improvement I could personally make would be to improve adding the proper design words and amount of practice that students need to understand the terms "Client," and "End User." I want them to understand these things completely, but some students have confusion with these terms.

My Research in SLED

by: Kevin Kaluf



I am a Ph.D. candidate in the College of Technology in the Engineering/Technology Teacher Education program. I was a high school engineering and technology education teacher for 12 years at Kankakee Valley High School in Wheatfield, IN, before coming to Purdue in 2011. My role the last 2.5 years in SLED has been to schedule and acquire transfer problem videos from students in the SLED classrooms, and to then code those videos, looking at how students “do” design. Within two weeks after a teacher concludes a SLED activity I schedule a transfer problem session with three students from the class where the students do a design task similar to what the activity was in their SLED classroom. After I video them doing the 15-20 minutes design task, I code the video using the Halfin Code, a coding system that breaks down the design process into different stages – design, problem definition, modeling, etc. This allows us researchers to see where the student group spent most of its time in the design process.

My best experiences in SLED have always been working with the students in our design sessions, and being able to meet and work with the grades 3-6 teachers, both in the summer workshop and during the school year. I have missed my years of teaching and working with students, and this has given me the opportunity to still do this in a way. I also have had great opportunities working with Dr. Kelley on writing manuscripts and being able to present with him at conferences on our SLED work. I have learned a great deal about large project research and how to conduct it, and being a part of a project as large as SLED has allowed me to work with a multitude of people from other colleges at Purdue that I wouldn't normally have been able to interact with. My advice to any other graduate students interested in becoming involved in the SLED Project is to be ready for a fast paced assistantship where you are working with a lot of different teachers, schools, and students – you need to be really organized to keep everything straight!!

Upcoming Events

National Science Teachers Association conference SLED session

When: April 4, 2014

Where: Renaissance Boston Waterfront Hotel, Atlantic 2

Understanding the Relationship between Mass, Volume, and Density by Engineering a Prototype of a Prosthetic Limb, Nikki Rumpler, Nancy Tyrie, Chell Nyquist, and Brenda Capobianco

2014 SLED Summer Institute

When: June 9-13 and 16-20, 2014

Where: Purdue University - Hall for Discovery and Learning Research

If you want to attend but have not yet confirmed that you plan to attend the 2014 SLED Summer Institute please contact Chell (nyquist@purdue.edu) as soon as possible.

