

SLED PERSPECTIVES

SLED Partnership Newsletter

Volume 4, Issue 2

Spring 2015

2015 Summer Institute

Planning for the 2015 SLED Summer Institute has been underway for many months, and we look forward to welcoming many new schools and teachers as well as old familiar faces to the SLED project this June. Nearly 120 teachers are expected to participate in this summer's institute. The 2015 SLED Summer Institute will be a one-week teacher professional development experience (not two weeks as in previous years) held in the Hall for Discovery and Learning Research on the campus of Purdue University in West Lafayette. The week you attend will be based on the grade level that you will teach during the 2015-16 school year:

- Grade 3-4: June 8-12, 2015
- Grade 5-6: June 15-19, 2015

The goal of the Summer Institute is to help participating teachers develop understanding of the engineering design process, science content knowledge, and pedagogies needed to teach science through authentic, inquiry-based, design units. The experiences will prepare you to integrate engineering design-based curricular units in your own classroom to meet Indiana academic standards. Experienced SLED teachers (like you!) will have a chance to interact with those new to the project, share your experiences and insights about teaching through design, and plan for new/ revised implementation activities going forward. We may ask you to share a bit about design activities that you've done in your classroom, and we may ask you to help lead mini-workshops to help the teachers new to SLED get up to speed with this approach. We are happy to welcome back those of you who will be attending this summer. For everyone else, please continue to keep in touch!



Design Fun at the SLED Summer Institute

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Building door alarms at NSTA

Door Alarms at NSTA

Aaron Hamilton and Colleen Cooper

Our classes experienced such great learning about electricity with the Door Alarm task, that we shared the challenge in a small workshop at the National Science Teachers Association (NSTA) Conference in Chicago on March 13, 2015. After a brief overview of the design process model by Chell Nyquist, we described the sequence of inquiry activities our students completed before implementing the design task.

At that point, the session became much more demanding for the participants. They received the printed task description with its criteria and constraints, and the basic building materials. The teams used about 20 minutes to construct a Door Alarm with plenty of encouragement and coaching from Chell and us. The teams had about a 50% success rate in creating a complete circuit that buzzed when the door was opened. That was pretty impressive in that limited time.

The participants openly discussed several elements of this design task. Cooperation, communication, and motivating team participation were important goals all the teachers had for their learners. They also gained an understanding of their students' perspectives from the stresses they encountered when building a design. We heard feedback that open-ended nature of the task was appealing to allow differentiated instruction and creativity. Teachers from Michigan, Minnesota, Illinois, and Arkansas planned to use this particular task to help teach electricity. They were also eager to access the SLEDhub website to add to their repertoire of science education materials.

Research Participation

As the school year nears its end, the SLED team will be wrapping up our research on the project. Be sure to administer the knowledge tests for any SLED activities you've implemented. If you have not already done so, please work with Brenda to schedule your final interview. Finally complete any electronic surveys that come your way. In addition to the partnership survey, which was sent out a couple of weeks ago, you'll be receiving a survey from the project evaluators shortly. Please do your best to answer the surveys as quickly and completely as you can. Thank you for helping us figure out what works!

SLED
Science Learning through
Engineering Design



A door alarm design

Save the Wolf!

Terri Fisher

I am a 3rd grade teacher at Burnett Creek Elementary School. My class participated in four Design Challenges this year. If you were to ask the students which was their favorite, it would be difficult for them to pick just one, however the “Save the Wolf!” challenge was extremely popular. This design challenge required the students to utilize simple machines in the solution to a “real world” problem. The problem: A lone wolf has wandered into a construction zone at Purdue University and must be safely trapped and relocated to Wolf Park in Battle Ground, Indiana. The students must design and construct a compound machine that can safely trap and contain the wolf. The design must be large enough to hold the wolf and prevent him from escaping. The students must use at least two different simple machines. The materials provided were: cardstock, index cards, cardboard tubes, wooden craft sticks, various sizes of cardboard boxes, wooden spools, string, construction paper, paper and assorted cups, paper clips, binder clips, and straws.

As the students began working through the steps in the Engineering Design Process, they identified all parts of the design brief (problem, goal, constraints, criteria, end user, and client). They then worked to share and develop a plan. Each student developed an individual design then shared it with his/her team. Each team then worked together to develop a group design. The next step was to create and test. The teams constructed their designs and presented their results to the class. Groups were then able to redesign and retest.

I have been impressed all year with how well the students have worked together. Each member of the teams has been committed to making the team design a success. The students’ knowledge of the engineering design process has grown with each challenge. I felt that this challenge was the most difficult, but also one of the most valuable.



A student team's design to save the wolf

Spreading the Word about SLED

In addition to presentations at the National Science Teachers Association (NSTA) conference (see the story on p. 2) and the Hoosier Association of Science Teachers, Inc. (HASTI) this year, members of the SLED team presented at conferences including the Association of Science Teacher Educators, National Association for Research in Science Teaching, and American Educational Research Association.

Recent publications from the project include:

- Merwade, V., Eichinger, D., Harrigar, B., Doherty, E., & Habben, R. (2014). Understanding sound through engineering design. *Science and Children*, 51(6), 30-36.
- Dankenbring, C., Capobianco, B., and Eichinger, D. (2014). Engineering encounters: How to develop an engineering design task. *Science and Children*, 52(2), 70-75.
- Capobianco, B. & Rupp, M. (2014). STEM teachers' planned and enacted attempts at implementing engineering design-based instruction. *School Science and Mathematics*, 114(6), 258-270.
- Lehman, J., Kim, W., & Harris, C. (2014). Collaborations in a community of practice working to integrate engineering design in elementary science education. *Journal of STEM Education: Innovations and Research*, 15(3), 21-28.
- Rupp, M. & O'Shaughnessey, L. (2014). Tracking science: Following the STEM trend. *Science Scope*, 37(6), 54-62.

More About Engineering Design

While we like to talk about SLED and the resources on SLEDhub.org, you can also find great engineering design lesson resources at these popular sites:

- <http://www.eie.org/>
- <https://www.teachengineering.org/>
- <http://tryengineering.org/>
- <http://teachers.egfi-k12.org/>
- http://www.ieee.org/education_careers/education/preuniversity/tispt/tispt_lesson.html

