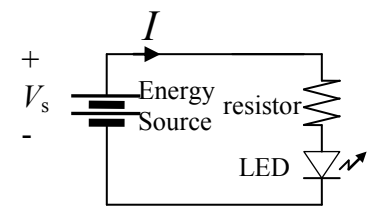
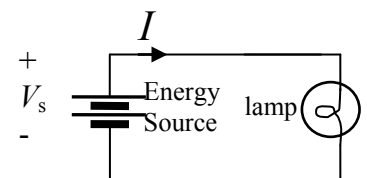
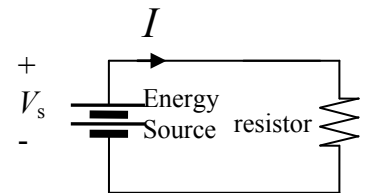
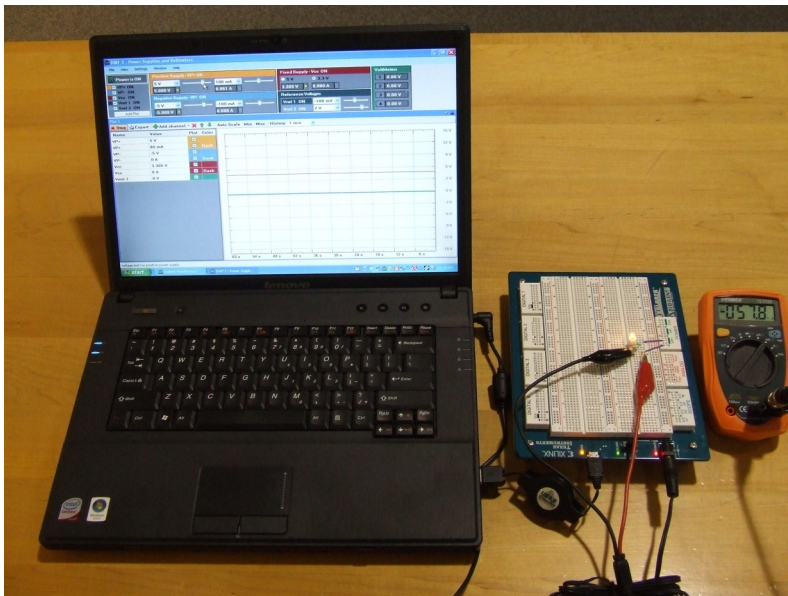


Teaching High-School Physics Using Hands-On Electrical Experiments

A Classroom Enhancement Opportunity
for High-School AP Physics Teachers
June 4-5, 2012 at Rose-Hulman



Due to a generous grant from the Tellabs Foundation to Rose-Hulman Institute of Technology, 4-5 School Corporations will receive 15 lab stations as shown in the image above. These lab stations provide students with active-learning experiences for concepts in electricity, magnetism, wave propagation, transformation of energy, algebraic mathematics, differential equations, and many other subjects. During the 2011-2012 academic year, Dr. Simoni from Rose-Hulman has been working with Vigo County physical science teachers: Glen Cook, Steve Beeler, Alusta Tapy, Lelslee Bryant, and Andrew Mathis. Lesson plans are being developed for this equipment at all levels of the high-school physics curriculum and tested in the classroom with positive results. There is now an opportunity for other schools to become involved in this project in order to develop a broader community of teachers. This community will take the lead in developing novel pedagogy for physics education at the high-school level that has been only recently enabled due to improvements in technology. A similar example would be the *NASA Threads* program at Louisiana Tech.

Dr. Simoni and the Vigo County teachers will provide a 1.5 day workshop on the Rose-Hulman Campus on June 4-5, 2012. For those teachers selected to attend, the workshop will introduce and familiarize the teachers with the equipment, introduce some sample lessons plans, provide the technical background for the lessons, and challenge the attendees to create their own lesson plan using the equipment. Because this is still an early phase of the program, we are encouraging only the AP Physics teachers to attend, but the equipment will belong to the school and school district. All attendees will be required to contribute to and participate in the program during the 2012-2013 academic year and encouraged to get other teachers in their school district involved. Attendees will receive a stipend and be reimbursed for travel expenses.

Interested parties should complete the following application and email (simoni@rose-hulman.edu) or fax (812-877-8895) it back to Dr. Simoni. Those selected to attend will be notified by Monday, May 14.

A sample exercise that maps to science standards 6.1.7, 7.4.3, ICP 4.3, and ICP 4.4: Using the LED circuit, describe how energy is transformed as it moves through the circuit. Chemical energy is converted into electrical energy by the battery. Electrical energy is converted into light by the diode and heat by the resistor. Light is created when electrons change from higher to lower energy states in the diode. The energy that they lose is given off by photons of a specific wavelength, which is determined by the amount of energy lost by the electron. The type of elements in the diode determine the change in energy, which is why different types of diodes are required to make different color LEDs. LEDs are more efficient than lamps because more of the energy is converted to light instead of heat and light.

Application for Summer Workshop

Name of Teacher Attending:

School Where Teacher Works:

School District:

Position of Teacher:

Number of Years Teaching Experience:

Number of Students in all physics courses per year at school of interest:

Phone:

Email:

City:

State:

Zip:

Signatures

Teacher:

School Principal:

Please fill out the information above and return by mail, fax, or email before May 7, 2012 to

Dr. Mario Simoni
Rose-Hulman Institute of Tehnology, CM126
5500 Wabash Ave
Terre Haute, IN 47805
Ph: (812) 877-8341
Fax: (812) 877-8895
simoni@rose-hulman.edu

Each school that is selected to attend the workshop will receive approximately 15 stations of equipment, each of which includes:

- 1- Laptop running Win7
- 1- Equivalent of a Digilent Analog Discovery Board (<http://www.digilentinc.com/>)
- 1- DMM
- 1- Parts Kit

The attending teacher will receive this equipment at the workshop and will be responsible for transporting it back to his/her school. The net value of all equipment is approximately \$15000, and once the equipment leaves Rose-Hulman it becomes the property and responsibility of the school district. By signing above the teacher and school are promising to actively participate in this project during the 2012-2013 academic year. The participating teacher is required to:

- Attend monthly online meetings
- Generate lesson plans and other materials using the equipment
- Contribute those materials to the PRISM site for this project (<http://www.rose-prism.org/moodle/course/view.php?id=3850>)