

UW-Platteville's Annual Girl Scout Science and Technology Day

Participating in this event:
The Society of Physics Students
University of Wisconsin-Platteville

Marsh White Award Final Report
Amount Received: \$200.00

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Abstract:

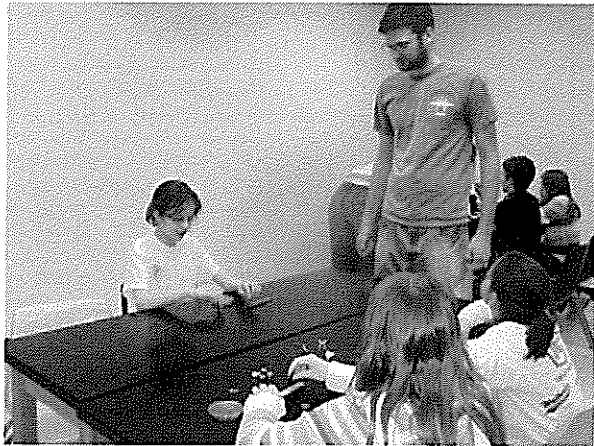
On Saturday, March 7, 2009, the UW-Platteville Society of Physics Students participated in UW-Platteville's annual Girl Scout Science and Technology Day. This is a day where campus organizations prepare hands-on activities for the girls participate in. The girls spent the day rotating through the different activities. This year, with the help of the Marsh White award, we organized an activity around electromagnetism and rotary motion.

Activity Description:

At this year's event, four different groups of girl scouts ages 10-12 took part in our "Fun with Magnets" activity. The total number of participants, girl scouts and parents, was about 60. Each presentation lasted about 50 minutes. Our main project for the girls was the construction of a simple motor using a magnet, D-size battery, wire, and a nail. We made the project a little more crafty by adding a pinwheel, which the girls could color, to the tip of the nail. This accentuated the spinning motion of the motor, and made the project a little more fun. Please refer to workshop photos on the next page.

The motor project itself was not enough to keep 10-12 year old girls occupied for 50 minutes. We also prepared some demonstrations and hands-on activities to do during the presentation to keep the girls busy. Each 50 minute period was scheduled as follows:

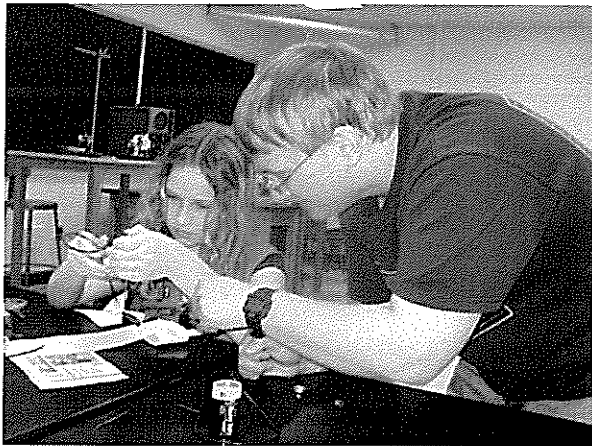
Activity	Duration	Description
Magnetic Materials Demonstration	5 min.	Each table had about 10 different material examples. The girls were given magnets and were told to separate the materials based on magnetism.
Magnetic Field Demo with Compasses	5 min.	Each table had 4 compasses and 4 plastic discs with metal shavings. The girls placed the magnets near the metal shavings to observe the magnetic field lines. We also explained magnetic fields by placing magnets next to small compasses.
Motor Workshop	20 min.	The girls first constructed the pinwheels. We printed templates for the girls to color, cut out, and assemble themselves. They then assembled their motors as per our instructions.
Larger Motor and Oscilloscope Demonstration	10 min.	Oscilloscope used to give visual representation of a magnetic field affecting the travel path of electrons very similar to what happens in a wire. Electrons can get pushed or pulled by a magnetic field. Large motor was used to bring all the concepts of electromagnetism together and how we apply it to make a motor.
Tesla Coil Demonstration	10 min.	We walked the girls into a neighboring room to show them high powered magnetism with the department's Tesla Coil. A great way to end the workshop!



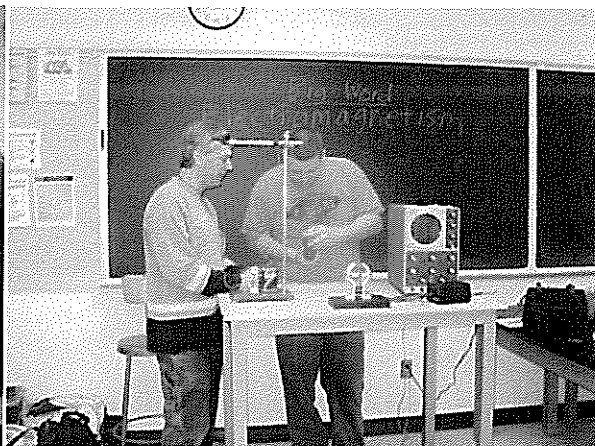
Magnetic Materials Demonstration



A working motor!



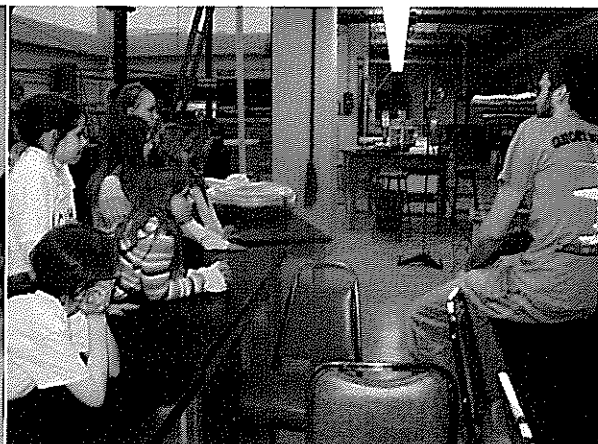
Just have to get a good connection



Motor and Oscilloscope Demonstration



Electromagnetism at work



Tesla Coil Demonstration

Budget:

Our original budget proposal included the purchase of pinwheels for the workshop. We, however, changed our minds and printed pinwheel templates for the girls to decorate and assemble themselves. This required markers and scotch tape, which we already had on hand. With the additional funds from not purchasing pinwheels, we were able to buy better quality batteries to increase the probability of the motors working. We did purchase more supplies than were needed for the numbers of girls we had, but the leftover supplies can be used for future projects. The final budget is shown below.

Budget for "Fun with Magnets" Workshop

Item	Quantity	Total Price
D-Size Battery	120	\$180.00
Disc Magnets	120	\$15.00
Nails	120	\$1.50
20-Gauge Wire	100'	\$15.00
Net:		\$211.50
Awarded:		\$200.00
Spent from SPS Account:		\$11.50

Post Program Evaluation:

Our “Fun with Magnets” theme for the Girl Scout Science and Technology Day was a good choice. The feedback from the troops was all positive. Most girls said that our demonstration and workshop was their favorite of the day as they were leaving. We also received comments after the day from each troop. The surveys showed that Fun with Magnets was a hit with almost every girl.

Our only regret was that we could not allow the girls take home their magnetic motors. The magnets which we bought were much too strong and not safe to give out to young girls. Almost every girl asked if they could take their motors home, and we always had to say no. Ideally, we would research the disc magnet selection better, and choose a weaker magnet that would still work with our motor application.

Overall, the day was a huge success, and we were all glad to shed light on physics to young girls. We chose a project with a very low fail rate, so every girl was able to make a motor work themselves. We could definitely see on their faces how happy they were to make their motors work. For some girls it took a little longer to see the spinning, but they all left happy, and excited to see more science at work.