Future Faces of Physics Report

Stephen F. Austin State University
SPS Chapter 6874
24 May 2013

Project Outline

Our proposal was to perform a monthly lecture and demonstration session at the local solid foundation, an after school program for underprivileged students. After communicating further with the solid foundation we discovered that they needed volunteers for two thirty minute sessions on Mondays from 5:00 p.m. to 6:00 p.m. Unfortunately, we weren't able to have presentations ready every Monday, but we did decide to commit to both sessions every other Monday. Due to the time period a lot of our chapter members were unable to actually present at the solid foundation, but we still had a good sized team that would help prepare the demonstrations.

After our first presentation we realized that our original plan would not be the most effective way to reach the students. Instead of simply performing demonstrations for the students, we had to find ways to get the students involved and interested in physics. We were largely successful in this – especially in our final presentation.

Our chapter greatly enjoyed the challenge of reaching out to these students and is looking forward to future opportunities.

Presentation 1

Our first presentation introduced the topics of sound and light waves and how they are different from one another. This presentation was a major learning experience for our group. We had prepared a powerpoint lecture to be followed by demonstrations with springs, an Airshot and boomwhackers. The attention span of the students was for shorter than we had expected and the powerpoint was not very effective so we decided to abandon it for our remaining presentations. The kids respond to interaction. They want to get up and get involved and we involved them as much as possible in all of our presentations.

Pictures:

Jessica Casas and Cassandra Lindsey demonstrating longitudinal waves with the Airshot

Thomas Frenzel and volunteers demonstrating waves.

Cassandra Lindsey conducting a boomwhacker ensemble.

Presentation 2

For the next presentation, we chose to show the children about emission spectra and how they are used to identify elements as an "atomic fingerprint." We gave out diffraction grading glasses and showed them five sources, Neon, Argon, Helium, Fluorescent, and Incandescent. To get the students involved we had them take their own fingerprints with pencils and tape to help them relate spectra to a common identification method.

Jeffin James and Collin Timmons demonstrating how the diffraction gradings work by showing a lazer diffraction pattern on the ceiling.

Collin Timmons showing the Neon source to the students

Collin Timmons and Jeffin James demonstrating how to take a fingerprint while Ali Piran (chapter advisor) assists the students.

Presentation 3

Keeping with the theme of light, we decided to demonstrate color addition for our third demonstration. To teach the students about what color addition is, we brought three strong flash lights and red, blue, and green color filters. Overlapping the colored beams on a white projector screen, we were able to show them cyan, magenta, and yellow light. The students spent the remainder of the period constructing pre-made colorwheel kits. The colorwheels consisted of a two-inch radius cardboard circle, two paper cutouts for each side of the cardboard, and a string. Multiple colors are put on the paper via colored pencils. Two holes were poked through the cardboard by us for the string to be put through. Once the sting is tied in a circle it can be twisted to spin the cardboard at high speeds, blending the colors with color addition.

Pictures:

The students working diligently on their colorwheels.

Presentation 4

Moving away from light and waves, we decided to do a presentation on static electricity. We discussed with them concepts of charge, electrostatic forces, and polarization. Then we passed out balloons and performed the common stick the balloons to the wall demonstration. After the demo, we had a questions session where the students could win candy for correct answers over what we had discussed that day.

Pictures:

Thomas Frenzel and Jessica Casas discussing static electricity with the students.

Cassandra Lindsey and Jessica Casas asking questions and giving our rewards.

Presentation 5

For our final presentation, we wanted to do something special. We designed and constructed a water rocket launcher that could launch empty two liter soda bottles. We collected several empty bottles, got some foam board cut outs for wings and brought it all on down to the solid foundation. The topic of our presentation was pressure and how it can be used to lift objects (like rockets). The students had an absolute blast, so much in fact that Jessica Casas, Cassandra Lindsey, and I (Thomas Frenzel) could barely keep them under control, which is why unfortunately we do not have pictures of the launching. We did however get a picture of our launcher with the students' imaginative rocket designs. After launching rockets for thirty minutes with each group, we took the students inside for their meal. I asked them what they learned about today and was answered by a unanimous roar: *Pressure!*

Pictures:

Our rocket launcher with the students' rocket designs.

John (The director of the solid foundation) and a soaked Thomas Frenzel after an awesome evening of water rocket launches at the solid foundation.

Expense Report

Supplier	Item	Presentation Number	Quantity	Price
Educational Innovations	Plastic Mirror (5" x 7")	2	10	$35.00
	SLIDES Single Axis Dif. Grating	2	30	$17.75
	+6' Helical Wave Modeling Spring	1	1	$17.95
	Basic Boomwhacker Set 8/pk	1	1	$24.95
	Sound Tube	1	4	$11.80
			Item Totals:	$107.45
			Tax:	$8.86
			Total:	**$116.31**
Lowes	Oatey 8-OZ All Purpose Cement	5	1	$6.38
	Oatey 8-OZ NSF Purple Primer	5	1	$5.38
	½-IN SCH40 TEE	5	3	$1.38
	1-IN SCH40 COUPLING	5	1	$0.46
	½-IN SCH40 TEE	5	1	$0.66
	½-IN SCH40 PLUG	5	1	$0.87
	½-IN x 10-FT SCH-40 PIPE	5	1	$1.76
	½-IN SCH40 ELBOW	5	1	$1.12
	8" MAT CABLE TIES 20 BAG	5	1	$2.03
	#15 O-RING 10/CL.PACK	5	1	$2.37
	1-1/4-IN SCH40 COUP	5	1	$0.66
			Subtotal:	$23.07
			Tax:	$1.90
			Total:	**$24.97**
Kroger	NSTL MINIS (Candy)	All	1	$10.99
			Subtotal:	$10.99
			Tax:	$0.91
			Total:	**$11.90**

Staples	ROSEART 12CT COLOR	3	1	$1.00
	ROSEART 12CT COLOR	3	1	$1.00
	ROSEART 12CT COLOR	3	13	$13.00
			Subtotal:	$15.00
			Tax:	$1.24
			Total:	**$16.24**
Walgreens	EVERYDAY LED 6V LANTERN	3	2	$16.98
			Subtotal:	$16.98
			Tax:	$1.40
			Total:	**$18.38**
Walmart	Dr. Pepper (Rocket)	5	1	$1.38
	Foamboard	5	1	$2.88
	WINDSTORMPUMP	5	1	$14.96
	DUCK TAPE	5	1	$4.77
	VALVE STEM	5	1	$2.97
	NEON RNDS	5	1	$1.68
	DUCK TAPE	5	1	$2.50
	FOAMBOARD	5	1	$1.47
	FOAMBOARD	5	1	$1.47
	CON PAD 9x12	5	1	$1.82
	WATER	5	1	$1.00
	WATER	5	1	$1.00
	GAT 2OZ FRP	5	1	$1.58
	GLUESTICK	3	5	$10.83
	STIRNG	3	1	$1.20
			Subtotal:	$51.51
			Tax:	$4.25
			Total:	**$55.76**
Chevron	UNLEAD REG	All	15.017G	$51.94
			Subtotal:	$51.94
			Tax:	$0.00
			Total:	**$51.94**
			Total:	**$295.50**