

President's Message

Welcome back and best wishes for a successful school year. The section has many events planned for the upcoming academic year and we hope that you will take advantage of them. Be sure to check the events in the newsletter or at our website. We want to provide you with the opportunity to participate in some great workshops that will bring some additional materials to your classroom.

I have encouraged the members of the section to attend the Summer Meeting of the AAPT that was held this August in Salt Lake City, Utah. This meeting is important to us as a section because the Bauder Fund Committee meets and decides on reimbursements for expenses for our activities.

As mentioned in the past, we are in need of additional members to be involved in the conducting of workshops, either as a leader or as an assistant. We have many talented people who possess a wealth of knowledge in teaching physics and could share this with others. It would be a positive if someone from the southern or western part of New Jersey would propose an event. We can supply funding to help with the expenses and it would provide a great service to many teachers.

In conjunction with the statement above, we know that there are many who are teaching physics that may have been assigned the course simply because of their certification. These people need our help to make their jobs easier. We have to remember how difficult it may have been when we first started our careers and maybe we had a good foundation in physics. I personally had only eight credits in physics before beginning my teaching career at Dumont High School. It was because I had a dedicated, veteran teacher who spent the time with me to explain not only physics but also the art of teaching. He encouraged me to join physics associations and to attend workshops. I am forever grateful that my colleague and mentor, Sel Greenzeig, took me under his wing to make the task of teaching easier. It was his enthusiasm that has made it a conscious effort on my part to help other teachers and this ultimately led to the beginning of a sharing session, which began in 1988 and has continued through last year. Don't you have someone who helped you? Can you give something back and help others? If we can't or won't help the new members of the physics teaching community, then who will? I would like to hear thoughts on the subject. Contact me by email at: r7429@optonline.net.

Have a very successful and rewarding school year.

Raymond A. Polomski

Homemade Van de Graaff Generator
Marine Academy of Science and Technology
Andrew Serge (Junior)

My name is Andrew Serge and I am a junior at the Marine Academy of Science and Technology. I am currently taking Physics I. I am not sure whether it was an interest in the subject of electricity or a need for extra credit in my class that pushed me to build a Van de Graaff generator, but the model I built was very simple and can easily be made in the classroom. Below are instructions on how to make the generator and troubleshooting for any problems that may arise.

Materials: The materials needed to build the Van de Graaff generator include:

- 1 empty soda can
- 1 small electric motor (such as one from a hand-held fan)
- A couple feet of thin wire
- An empty water bottle
- A few inches of PVC piping (about 4 cm in diameter)
- 3 batteries (size D work well)
- A plastic Tupperware container (must be large enough to allow the motor to fit inside)
- 1 rubber band (make sure it is not black because it may contain carbon, which will conduct the high voltages produced by the generator)
- Thin plastic stick or wooden skewer (must be round)
- Hot glue gun and glue
- 1 empty CD case
- Scotch tape



Procedure: After you have gathered all of the materials for the generator, the steps to put it together are relatively simple.

1. First, take the Tupperware container and cut a hole in the bottom large enough for the rubber band to be stretched through without being obstructed by the container.
2. Glue the motor down onto the CD case with the motor shaft being in the middle of the case. Place the container over the motor and poke two holes where the terminals for the wires will be. Poke a third hole for the ground wire.
3. Then cut the PVC piping so it is 4 inches long. Next cut the water bottle so it is about 1/2 inch longer than the PVC piping.
4. On the length of PVC, cut two notches on opposite sides of the piping where you will be able to place the



- thin plastic stick.
5. Take about 4 ½ inches of tape. Fold 1 ½ inches over onto itself so half of the tape is non-sticky both sides and half is sticky on one side. Now take the tape and wrap it around the plastic stick so the non-sticky sides are on the inside and the sticky end holds it onto the plastic stick. The small tape roller you have just made should rotate freely around the stick.
 6. Now take the wire and cut it into three strips. Two strips should be about 1-foot long and the third should be about 2-feet long. Stick the two 1-foot pieces into the terminal holes you made in the container and attach them to the motor terminals. Take the last piece of wire and push it through the third hole in the container. Strip about 1 inch of wire and spread the wire out. Glue this down onto the CD case so the end of bare wire just barely touches the motor shaft.
 7. Now place the container back over the motor and make sure that the rubber band hole is directly over the motor shaft. Take the rubber band and put it around the plastic stick. Make sure that the rubber band is on the tape roller. Now take the other end of the rubber band and wrap it around the motor shaft.
 8. While still stretching the rubber band out, slip it through the cut PVC and fit the ends of the plastic stick into the notches cut in the piping. Glue the ends of the stick onto the PVC so it doesn't slide out. Glue the PVC onto the container so it doesn't fall over.
 9. Next, place the cut water bottle over the PVC so that it is centered. Then glue this down to the upside container.
 10. Take the soda can and a small piece of wire about 1 inch long. Strip the wire. Wrap one end of the wire around the can tab and glue it in place.
 11. Finally, place the soda can with the wire onto the water bottle. Position the wire so that it is just barely touching the rubber band. Glue the soda can onto the bottle.
 12. Attach the two motor terminal wires to the three batteries and attach the ground wire to a grounded object.
 13. Make sure that the rubber band belt turns freely and that the wires are as close to the belt as they can be without touching it.

Troubleshooting: Some things occurred while running the generator that caused it to stop working or not functioning correctly. Stated below are some of these problems and their solutions.

1. The generator belt does not run.
 - Check to make sure that the wires are securely connected to the motor and batteries.
 - Check to see that the tape roller is not stuck to the plastic stick.
 - Check to see that the rubber band did not slip off the motor shaft or the tape roller.
2. The generator does not charge up.
 - Check to see that the ground wires are not touching the belt, but at the same time are not too far from the belt either.
 - Check to see that the ground wire is touching a grounded object.
3. The rubber band belt keeps sliding off the motor shaft.
 - Make sure that the plastic stick and the motor shaft are parallel to each other.

4. The motor pops off the CD case.
 - Do not run the generator for too long otherwise the motor will get too hot and melt the hot glue.

Fall Workshops

This fall there are three workshops of interest that you should consider attending:

Sept. 17 – Make n Take – Newton’s Laws & Mechanics – Monmouth Reg. HS – contact Jessie Blair: jblair@monmouthregional.net

Jessie Blair will coordinate this make and take workshop. Walk away with some novel means of introducing and demonstrating the laws of motion and other concepts in mechanics. **EMAIL REGISTRATION BY SEPT. 14**

Oct. 15 - Amusement Park Physics Workshop at Great Adventure – contact: Ray Polomski: r7429@optonline.net

Come to Great Adventure on Saturday, Oct 16 and experience the physics of amusement park rides for yourself. This is meant for new and experienced teachers who want to use the rides at Great Adventure to reinforce the concepts taught in the classroom. Teachers will be able to collect data on rides using the Vernier data collection vest and accelerometers. **YOU MUST BRING A TI 83 CALCULATOR.**

COST: \$20 FOR MEMBERS. REGISTRATION DEADLINE: OCT. 12. \$30 FOR NONMEMBERS (INCLUDES A 1 YEAR MEMBERSHIP).

**REGISTRATION FORMS SHOULD BE SENT TO: RAY POLOMSKI
189 RICHARD DRIVE
RIVER VALE, NJ 07675**

Nov.19 - Edmund’s Scientific Workshop – Anchor Optics – Barrington, NJ – contact: Harry Rheam: hrheam@comcast.net

Always-popular make and take workshop led by Harry Rheam. This workshop will be devoted to **ELECTRICITY AND MAGNETISM. COST: \$20 FOR MEMBERS; \$30 FOR NONMEMBERS (INCLUDES A 1 YEAR MEMBERSHIP).**

**REGISTRATION FORMS SHOULD BE SENT TO: HARRY RHEAM
1122 BEECHWOOD RDIVE
ATCO, NJ 08004**

**CERTIFICATES FOR HOURS OF PARTICIPATION WILL BE AVAILABLE
PLEASE USE THE ENCLOSED REGISTRATION FORM FOR THE OCT. 15 AND NOV. 19 WORKSHOPS.**

Pat Callahan Honored by AAPT Receives Excellence in Pre-College Teaching Award

Pat Callahan, physics teacher at Delaware Valley Regional HS in Frenchtown, was honored by the AAPT at the Summer Meeting in Salt Lake City. Pat's distinguished career has spanned thirty years and including twenty-five years at Catasauqua HS in Eastern PA.

With undergraduate work at Indiana University of PA, Pat was well equipped to handle the concepts of physics, but as he noted, that his student teaching assignment did little to prepare him for his task of teaching ninth grade Physical Science. This awakening to the world of freshman challenged Pat to develop a method of teaching that would capture their attention and foster excitement in the sciences. The approach had an additional advantage by laying the groundwork for increasing the enrollment in the physics classes. Eventually he convinced the administration to offer a two-semester course to all freshmen with one semester being physics, which he taught, and the other semester being chemistry. In Pat's last year's in PA, he introduced the scenario-based modules from the *Active Physics* program to allow his students to relate their studies to real-world applications.

This change of approach reaped benefits not only in the ninth grade but also in the junior/senior level Physics. Pat found that higher achieving students took on the role of assisting less able students understand the concepts studied, thus improving their own understanding. Activities were designed to allow the students to enjoy the learning process and a grading system was developed that allowed Pat to design versatile assessments that would challenge better students yet remain fair to the weaker student. At Delaware Valley HS Pat has continued his tradition of challenging students in the AP and Honors Physics and the General Level Physical Science courses. Using a NJ SSI grant, Pat rewrote the ninth grade science courses to include the methods he used in the past. He was also able to provide training for non-Physics teachers to successfully teach Physics at the ninth grade level. All of this was accomplished while teaching his Physics classes in what at one time was the auto mechanics garage.

Pat somehow has also found time to be a PTRA in 1992 and along with his longtime college friend, Dave McCachren, conducts workshops during the school year. He return to his alma mater in the late 1980's to attend a workshop on ProjectExCELS, which introduced the emerging world of technology of computer interfacing. Then came the Woodrow Wilson Workshop at Princeton University, the National Leadership Institute in Physics at Rutgers University, the Mechanical Universe training sessions at the University of Dallas, and the Physics Courseware Evaluation Project at NC State. Pat has had a very rewarding career filled with the knowledge that he has given his all to make Physics more accessible to the general high school student. His dedication to the Physics teaching community is demonstrated by his continuous involvement in conducting workshops with friends such as Maxine Willis and George Amann

We congratulate Pat Callahan on his selection for the Excellence in Pre-College Teaching Award. **Pat's acceptance speech can be found in its entirety on our website. The information for this article was taken from the speech.**