Cleveland State University
Marsh W. White Award Application

Project Name: Physics Club: Investigating Phases at Campus International School

SPS Chapter: Cleveland State University, 2121 Euclid Avenue, Cleveland, Ohio, 44115

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Amount Requested: $300

Date Submitted: November 15, 2012

Summary:

The Cleveland State University (CSU) SPS chapter would use a Marsh W. White award to continue and expand the Physics Club outreach program begun two years ago. The Physics Club will continue to meet every month for after-school sessions at Cleveland Campus International School.

Physics Club

Beginning in January of 2011, the Cleveland State University (CSU) SPS chapter has used a Marsh White award to lead a very successful outreach program for elementary school students at Campus International School (CIS), a Cleveland public school operated in partnership with the university. Volunteers from our SPS chapter have lead monthly "Physics Club" sessions of fun, engaging physics activities with participants in the students who attend after-school care. In a typical session, eight SPS volunteers lead an average of thirty students in hands-on demonstrations of physics phenomena based on a theme (such as gravity, or the nature of soap films), and provide students with a take-home craft of activity (including sundials and pinhole cameras).

Our activities in the past have dealt with wave phenomena, forces and motion, and elementary space science. Thus far this school year, we have held an October session exploring the phases of the moon, and will soon host an additional session on static electricity (a popular lesson).

Program Expansion

Every year, CIS adds an additional grade level of enrollment. Beginning in September 2012, the school now has students in grades K-4. Many of the fourth-graders are now multi-year veterans of our SPS physics club. While we can continue to share our existing lessons (e.g., the previously-developed lessons on waves and forces) with new students, we plan to develop new activities for the higher grade levels.

Beginning in January of 2013, we would use a Marsh White award to purchase supplies for a new set of six monthly sessions. Consulting with CIS faculty has lead us to choose a theme which matches Ohio's new science standards for grades 2-4: an exploration of the different phases of matter.

Activities

To supplement students' in-classroom education on the nature and behavior of solids, liquids, and gasses, we have selected activities which give students an opportunity to engage in hands-on exploration. We have drawn on activities described in sources such as "The Exploratium Science Snackbook," "Science Shows You How," "Physics Teacher" magazine, and from college-level demonstrations used by CSU faculty.

We have learned from our past Physics Club sessions that it is beneficial for us to have as many "stations" (i.e., copies of the same activity) per session as possible. This arrangement keeps the participating group small, and leads to more interaction between CSU volunteers and CIS students, and less time spent waiting by the elementary students. Given this year's theme, we also anticipate a greater need for clean-up and spill-containment supplies so that we can leave the elementary school's facilities as clean as we found them. For these reasons, we have budgeted an additional $30 for cleaning and organizational supplies, as described in the following budget.

Thank you very much for your consideration!

Budget

$45 - January Session: Where is there air?

Supplies: Balloons, balloon pumps, yardsticks (to be broken), aquarium-sized plastic storage tubs, plastic cups, bicycle pump

$55 - February Session: What about other gases?

Supplies: Gas-collection trough, nylon tubing, plastic barb fittings, baking soda, vinegar, helium tank rental

$35 - March Session: Stepping into liquids

Supplies: Plastic wrap, napkins, food coloring, "molecule" sports balls

$35 - April Session: Hydraulics and water pressure

Supplies: Large-bore plastic syringes, plastic tubing, small-bore plastic syringes

$45 - May Session: Phase changes

Supplies: Ice cube trays, styrofoam coolers, distillation apparatus

$55 - June Session: Dry ice day!

Supplies: Dry ice, dish soap

$30 - Additional materials (cleaning, storage)

Supplies: Water jugs (to transport water to lesson site), plastic drop-sheets, sponges, paper towels, plastic storage tubs, plastic table coverings, masking tape

Total: $300

Additional supplies from CSU physics department:

Youth safety goggles, cryo-safety gloves, additional safety gear as needed.