

Dr. Martin Karp, Member

**SUBJECT: DECLINING FOCUS ON STUDENT-ORIENTED SCIENCE
RESEARCH AND PARTICIPATION IN COMPETITIONS**

**COMMITTEE: INSTRUCTIONAL EXCELLENCE AND COMMUNITY
ENGAGEMENT**

The decline in the number of Miami-Dade County Public Schools students participating in local, state, national and international science, mathematics and engineering competitions is a cause for concern. There are 108,338 senior high school students and 41 senior high schools in Miami-Dade County Public Schools. In the Miami-Dade County Science and Engineering Fair, the number of science fair entries at the senior high school level dropped from 121 students from 16 high schools in 2004-2005 to 51 students from 9 high schools in 2005-2006. Thirty-two high schools did not submit a single entry.

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The low number of students participating in research-based activities is a concern. Only 10 senior high students submitted research papers to the Intel Science Talent Search; seven (7) students participated in the Siemens-Westinghouse competition; approximately 15 students submitted research papers to the University of Florida's Science and Humanities Symposium competition; five (5) students submitted research papers to the Miami-Dade South Florida Science and Engineering Fair; and 12 entries were submitted to the District's bridge building competition. For the past few years, only two (2) high schools have participated in the U.S. FIRST Robotics competition.

On the other hand, there seems to be major growth in student involvement in the Science Engineering, Communications, Mathematics and Engineering (SECME) Program. In 2004-2005, over 600 students were involved in the competition phase of the SECME Program. The Mu Alpha Theta Club sponsors local, national, and international mathematics competitions for high performing grade 9-12 students, and the number of students participating in these competitions continues to increase.

Some reasons for the declining focus on student-oriented science research and participation in competitions may include the following: a decreased budget for academic travel to science, mathematics, and engineering competitions; less school-site laboratories and science demonstration rooms in new and renovated schools; a decrease in the number of laboratory experiences being provided in our high schools; a reduction in district staff to manage all of the science, mathematics, and engineering competition programs; little or no activity to support the Laboratory Research Internship Program; a lack of transportation available for students to travel to the research centers; and no school for high performing students in science that requires assessment for admission.

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Possible solutions to address these concerns include:

1. Establish a school for high performing students interested in science, mathematics, and engineering with an appropriate number of laboratories and require testing for admission to these schools. All students will receive internships at research centers with transportation provided if needed.
2. Review the number and quality of high school science laboratories and demonstration rooms that are being built in new and renovated secondary schools.
3. Create a department at the district level for developing, maintaining, and coordinating research internships at local research facilities and universities.
4. Encourage all schools to provide laboratory experiences. Increased participation in such experiences may ultimately contribute to a greater number of students who consider careers in science, mathematics and engineering.
5. Coordinate outreach efforts to encourage science research from senior high schools to middle and elementary schools within each feeder pattern.
6. Establish regular communications from the district science office directly with guidance counselors and science teachers concerning science competitions.
7. Support and provide incentives to personnel who sponsor clubs/activities that encourage students to pursue a hobby in science and encourage students who are interested in science, mathematics, and engineering.
8. Establish a District Priority budget for science, mathematics, and engineering competitions.
9. Advertise upcoming science, mathematics, and engineering events on the District's website and school websites for teachers, parents, and students.
10. Encourage senior high schools to offer a research course where students are engaged in active research.

**ACTION PROPOSED BY
DR. MARTIN KARP:**

That The School Board of Miami-Dade County, Florida directs the Superintendent to:

1. Examine supporting and providing incentives to school site personnel who encourage students to participate in local, state, national and international science, mathematics and engineering competitions, and to teachers who sponsor clubs/activities that encourage students who are interested in science, mathematics, and engineering;
2. Review the number and quality of high school science laboratories and demonstration rooms that are being built in new and renovated secondary schools and submit a report to the Board no later than August 2006;
3. Review current practices of disseminating information on science, mathematics, and engineering fairs and competitions to school sites and their teachers with an emphasis on encouraging all middle and senior high schools to have entries in the Miami-Dade County Science and Engineering Fair;
4. Explore establishing a school for high performing students interested in science, mathematics and engineering and require testing for admission. The school should include an appropriate number of laboratories, and ensure that students are given an opportunity to receive internships at research centers with transportation provided if needed.
5. Establish a District Priority budget for science, mathematics, and engineering competitions, with the re-establishment of dedicated district staff positions, placed in the appropriate department to oversee competitions, promote research internships, and other outreach efforts.
6. Encourage senior high schools to offer a research course where students are engaged in active research.