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STIMULATING INTEREST IN IOWA SECONDARY SCHOOL SCIENCE

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"Science is an attempt to help explain the world of which we are a part. It is both an investigatory process and a body of knowledge readily subjected to investigation and verification."

Iowa Council of Science Supervisors (CS²)

Introduction

America, today, is a highly technological society, based heavily upon knowledge of scientific concepts and principles. Without knowledge in basic science, and its processes, living with and understanding technology cannot be accomplished. More specifically, alienation of the lay public from the scientific community and scientific endeavors may result.

A study reported in *Science News*, July 1978, entitled *High School Students Lag in Science*, stated that the number of students taking science courses had dropped from 18% in the late 1960's to less than 10% in 1977(1). Arthur Livermore, Director of the Office of Science Education for the American Association for the Advancement of Science (AAAS) reported that "for 17 year-olds anyway . . . the steep decline in physical science achievement (nationally) is related to decreasing enrollments in high school physics and chemistry courses. In fact, less than half the schools in the country even have physics courses(2)."

According to a Department of Public Instruction (DPI) study, it appears that Iowa appears to be more successful in science than national trends would indicate(3). Constant effort must be exerted to avert complacency and keep science a viable and essential component of *all* levels of instruction in Iowa. Accordingly the Iowa Council of Science Supervisors has recommended that all students receive an appropriate education in science in order to develop intellectual skills that are basic to critical thinking, problem-solving and decision-making.

In an effort to add relevance, practicality, and applicability to science concepts presented to students in science classes, the Iowa Junior

Academy of Science, in conjunction with the Iowa Department of Public Instruction, AEA's, and Iowa Council of Science Supervisors, is attempting to implement a diversity of stimulus events.

Annual State Science Olympics

The Annual State Science Olympics is a series of competitive events for teams and individual junior and senior high school students, organized like a track and field meet but involving contests based on science concepts and skills.

The basic unit of competition is the school team, composed of 4-10 students. Awards recognize outstanding individual students as well as determining team winners. Teachers are encouraged to conduct contests at their school so that students are familiar with the various contests and competitions. Teachers are encouraged to enter the spirit of the competition by developing a "Team Uniform" and bringing some "Cheerleaders."

Following competitions within Area Education Agencies (AEA's) a team of from 2-8 students is selected representing that area. Two teams from each area are then invited to the state competition.

The series of competitive science events are organized loosely around several areas of competition. Although the Olympics will eventually encompass all areas of science, the first state event will focus upon physics. Among the events featured are the following:

1. *Slow bicycle race:*

Two members of each team individually attempt to maneuver a bicycle, which may be modified, along a 20 meter course in the greatest amount of time. The course may be slightly sloped and will be one meter wide.

2. *Egg drop:*

Two members from each team each design and construct a package that will allow an egg to be dropped from a specified height without breaking. The time of fall will be measured electrically with the high score going to the shortest fall time for an unbroken egg.

3. *Paper Airplane:*

Two members of each team each design and construct paper airplanes prior to the Olympics. Each participant will launch his plane(s) in two events: Distance and Time of Flight. The competition will take place in a gymnasium and launches will be from a standing position on the floor.

4. *Bridge Building:*

Each team supplies two bridges to be tested for strength. The bridges will be built of balsa wood and the exact method of testing will be specified.

5. *Mystery Chemical Identification:*

Each team of two students selects one problem from each of three groups and determines the answer.

Each event is scored separately with a winner and runner-up each receiving an award. Individual event scores determine a team score and the highest scoring team is declared Science Olympics State Champion and awarded a trophy.

A book of rules and a separate booklet of competition instructions has been prepared for distribution by Iowa Junior Academy of Science. Teachers are encouraged to contact the science consultant in their AEA for information and competition dates.

Other Activities

The Iowa Junior Academy of Science provides another stimulus which teachers can utilize to encourage students to enroll in science programs. Membership in the IJAS includes both individual and school memberships. Members can participate in field trips, conferences, symposia, and research projects. Members are eligible for special research grants and have the opportunity to present papers in competition for financial awards. This year IJAS is sponsoring two new programs:

- A) The IJAS Fall Conference for students to be held in conjunction with the Iowa Science Teachers Section of the Iowa Academy of Science Fall Conference.
- B) The IJAS invitational seminars for teachers and students which will focus upon developing research skills and topics.

IJAS will continue to encourage teachers and students to become involved in the following activities:

- A) Regional Science Fairs
- B) Westinghouse Science Talent Search
- C) Governor's Youth Talent Search
- D) Summer Research Programs
- E) Summer Field Experiences
- F) Symposia

The National Youth Science Camp originated in 1963 as a part of West Virginia's Centennial Celebration. NYSC *annually* hosts 100 highly talented science students, two from each state in the nation. These students become guests of the state of West Virginia for an all expense paid trip to West Virginia to participate in the three week camp.

It is the vision of the Camp's founders to arouse in these young people an awareness of the complexities facing our modern world and to instill in them a desire to achieve humanitarian approaches to these problems. The Camp offers them opportunities for study, contemplation, recreation and interaction with their peers. The Camp is located in the forested mountains of eastern West Virginia, not far from the National Radio Astronomy Observatory.

The foundation of the Camp's program is its lecture series, devoted to exposing the students to a wide variety of new and unusual subjects in science. Scientists from around the nation travel to the Camp to share knowledge with the campers.

Iowa high school principals are asked, each year, to nominate an outstanding senior student from their schools. These nominations are then critiqued by a committee of teachers, administrators and scientists who select two candidates and two alternates.

The Science Talent Search was the pioneering endeavor to discover at the high school senior year level those who have the potentialities to become the research scientist and engineers of the future. It has fulfilled this function far beyond the hopes entertained when this educational project was conceived. Many millions of dollars in scholarships in colleges and universities throughout the nation, supplementing the Westinghouse Science Scholarships, have been given to those who have thus been discovered to have high science talent. This selection of students with research ability in science and engineering has become an institution and tradition due to approval from the academic community and the creditable records of winners in colleges, universities and professional positions.

In a real sense the annual Science Talent Search is more than a scholarship contest. It is a major step toward making scientific and engineering talent available for important tasks in our civilization.

The achieving of Honors in the Science Talent Search is an evidence of ability and interest in science and engineering which can be taken into consideration by colleges and universities in admissions granting of scholarships. For this reason this Honors List is distributed to all universities and colleges of the United States utilizing a list furnished by the American Council on Education.

All students awarded Honors in the Science Talent Search are considered so outstanding that any institution of higher learning will be justified in considering their abilities carefully. In past years members of the Honors Group have made creditable records in the colleges and universities to which they have been admitted.

Conclusion

Education is responsible for increasing student awareness and comprehension of his/her environment. As that environment becomes more scientific and technological, education must develop methods for increasing cognizance of science and technology(4). Science instruction, its implications and ramifications, must become so personally applicable to students, as members of society, that they demand more.

In addition to these programs, there are many other science stimulation events in which Iowa students may become involved. Among the more notable programs are:

University of Iowa Secondary Student Training Programs (SSTP)
University of Iowa Cancer Scholarship Program
Hawkeye Science Fair
Iowa Science Engineering and Humanities Symposium
Quint City Science/Engineering Fair
Eastern Iowa Science/Engineering Fair
Northeast Iowa Science/Engineering Fair
University of Northern Iowa Science Symposium
University of Northern Iowa Chemistry Olympics
Tests of Engineering Aptitude, Math and Science, TEAMS
Drake University Physics Prize
Roswell Park Memorial Institute Research Participation Program in Science (National Cancer Institute)
Junior Engineering Technical Society (JETS)

For additional information, contact Dr. Joe Moore, Science Consultant, Keystone Area Education Agency 1, P.O. Box 430, Elkader, Iowa 52043, or Dr. Jack A. Gerlovich, Science Consultant, Iowa Department of Public Instruction, Grimes State Office Building, Des Moines, Iowa 50319.

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