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01.2 STATEMENT ON STUDENT ASSESSMENT AND SCIENCE

(Adopted by Council, April 27, 2001)

Science must be included in any mandated program of educational assessment. Science, well learned, is a requirement for the workforce of the 21st Century as well as for informed citizenship. Further, it is well documented that assessment influences what is taught, both in terms of hours spent and in the nature of classroom activity.

Any testing or assessment should be designed so that it not only encourages time spent on science but also motivates teaching methods that recognize that science is more than a body of facts. Students must also learn the methods of observation and experimentation and the modes of thinking that are used to discover and test scientific knowledge.

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83.3 GENERAL STATEMENT OF PRINCIPLE ON EDUCATIONAL PROGRAM IN SCIENCE AND MATHEMATICS

(Adopted by Council - 20 November 1983)

A strong educational program in Science and Mathematics is crucial for our national well-being. The graduates of our educational system contribute to the nation's economic vitality through the technical innovations and increased productivity which results from research and development. Science literacy for all citizens is necessary to ensure full participation in the society of the future. For example, societal issues, ranging from the environment to arms control hinge on a proper appreciation of technical questions.

The change to high technology in our industries requires extensive technical preparation for a wider range of initial career options and a greater flexibility of individuals throughout their working lifetimes. In light of these considerations, we are concerned at the decline in student preparation and proficiency in science and mathematics. We are particularly distressed at the loss of primary and secondary teachers of science and mathematics to other, more economically attractive professions.

In response to these concerns, we recognize the need for more extensive science and mathematics requirements for all students at the primary and secondary level, coupled with higher college admission standards in these areas. We advocate a salary structure, working conditions and educational programs that will allow schools to compete successfully for qualified science and mathematics teachers. We also encourage curriculum improvements which make the courses more interesting to students and establish the connections between science and technology. We welcome emphasis on education in the federal, state and local budgets and advocate continuing stable support in the future. We offer our assistance in the definition of federal, state and local programs. We intend to collaborate with other technical and educational societies in addressing these problems.

We urge local involvement in the educational process by individual American Physical Society members and will continue our efforts to

facilitate such activities.

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99.1 AIP-MEMBER SOCIETY STATEMENT ON THE EDUCATION OF FUTURE TEACHERS

(Adopted by the Council, 21 May 1999)

The scientific societies listed below urge the physics community, specifically physical science and engineering departments and their faculty members, to take an active role in improving the pre-service training of K-12 physics/science teachers. Improving teacher training involves building cooperative working relationships between physicists in universities and colleges and the individuals and groups involved in teaching physics to K- 12 students. Strengthening the science education of future teachers addresses the pressing national need for improving K-12 physics education and recognizes that these teachers play a critical education role as the first and often-times last physics teacher for most students. While this responsibility can be manifested in many ways, research indicates that effective pre-service teacher education involves hands-on, laboratory-based learning. Good science and mathematics education will help create a scientifically literate public, capable of making informed decisions on public policy involving scientific matters. A strong K-12 physics education is also the first step in producing the next generation of researchers, innovators, and technical workers.

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99.2 RESEARCH IN PHYSICS EDUCATION

(Adopted by the Council, 21 May 1999)

In recent years, physics education research has emerged as a topic of research within physics departments. This type of research is pursued in physics departments at several leading graduate and research institutions, it has attracted funding from major governmental agencies, it is both objective and experimental, it is developing and has developed publication and dissemination mechanisms, and Ph.D. students trained in the area are recruited to establish new programs. Physics education research can and should be subject to the same criteria for evaluation (papers published, grants, etc.) as research in other fields of physics. The outcome of this research will improve the methodology of teaching and teaching evaluation.

The APS applauds and supports the acceptance in physics departments of research in physics education. Much of the work done in this field is very specific to the teaching of physics and deals with the unique needs and demands of particular physics courses and the appropriate use of technology in those courses. The successful adaptation of physics education research to improve the state of teaching in any physics department requires close contact between the physics education researchers and the more traditional researchers who are also teachers. The APS recognizes that the success and usefulness of physics education research is greatly enhanced by its presence in the physics department.

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00.5 STATEMENT ON K-12 EDUCATION

(Adopted by the Council, 19 November 2000)

POLICY STATEMENT ON K-12 SCIENCE AND MATHEMATICS EDUCATION

In an age of rapid technological advances, a strong educational program in science and mathematics is essential for the United States. Despite the heroic efforts of many teachers and the large investments of school districts, in too many places we currently fail to provide it. Too many citizens leave school without the scientific literacy necessary to deal with new technologies and their far-reaching societal implications. Our country is not educating enough technologically skilled and knowledgeable workers, a situation that will compromise our competitive advantage in an increasingly global economy. Particularly in the physical sciences, too many students receive instruction from teachers insecure in their subject area knowledge.

Some progress is being made. The efforts of experts in science, mathematics, and education have yielded appropriate learning standards that are being increasingly adopted by teachers and school districts around the country as a first step toward improvement. Yet, further steps are necessary. To support a vision of science and mathematics education that ensures that all students receive high quality instruction, APS recommends that policy makers:

- Enhance support for the preparation of prospective science and mathematics teachers, particularly those programs that involve collaborative efforts of college or university departments of science and mathematics with their departments of education.
- Recognize the critical importance of professional development activities for science and mathematics teachers, particularly by increasing investment in sustained in-service programs.
- Support sustained efforts to develop and implement high quality instructional materials for science and mathematics.
- Increase research on how students learn science and mathematics, and develop and disseminate strategies and conditions that promote effective teaching, learning and appropriate assessment.
- Provide increased resources and incentives to enhance science

and mathematics teacher recruitment, retention and professional status.

- Support efforts to increase the participation and achievement of underrepresented groups in the sciences, mathematics and engineering to foster a strong, diverse workforce.
- Provide incentives for partnerships among the private sector, universities/colleges and school systems to develop quality educational programs.
- Support specific, targeted funding of national programs to improve the quality of science and mathematics teaching, such as the Eisenhower Professional Development Program.
- Encourage coordination of efforts among federal agencies that provide support for K-12 science and mathematics education.

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