
The National Science Foundation to the Improvement of High School Science and Mathematics Teachers

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The National Science Foundation is a Federal Agency and sponsors activities designed to promote the progress of science. These include, among many others, basic research, conferences and symposia and support to both college and high school teachers of science and mathematics.

This paper deals with support for high school teachers. Such programs are still experimental in character, but are primarily in the content areas of science and mathematics as opposed to applications and methods. The offerings to these teachers should be modern in content and nontraditional in organization, but based on fundamental principles.

This does not mean that the Foundation is uninterested in methods or organization of subject matter for teaching science to high school students. It represents a feeling that a knowledge of content is of great importance for successful teaching and implies that many ideas of method and organization will automatically come from an understanding of basic principles and from the way in which the material is presented to the teacher-participants. Other activities of the Foundation also include the actual reorganization of subject matter and the writing of material for classroom use.

A long range objective of the program for high school science and mathematics teachers is to get the above-mentioned, nontraditional courses especially designed for high school teachers into the college and university curriculum for the pretraining and posttraining of teachers of these subjects.

These programs at the present level of emphasis are significant because they provide a means for practicing high school teachers of science and mathematics to improve their basic knowledge of the subjects they teach and also an opportunity to catch up on some of the developments that have taken place in this field during recent years. The fact that the teachers receive adequate financial support while in school makes it possible for them to get adequate training for the jobs they have to do in a relatively short time. Since the need for well-trained science mathematics teachers is urgent, this is a significant result of these programs.

The need for well-trained teachers in the fields of science and mathematics is stated well by the National Science Foundation in these words:

"Most serious of all is the fact that, of necessity, large numbers of our high school mathematics and science students must be taught by teachers who, through lack of adequate training and in other ways, are not fully qualified for the task which they conscientiously are trying to perform. In the last analysis teachers determine the quality of instruction. Able and dedicated teachers not only impart knowledge—they generate a desire for it. High quality in our future scientists requires high quality teachers. The present short supply of highly capable high school science and mathematics teachers, as well as the certain need for more of them in the near future, constitute the most critical and difficult problem in the effort to maintain an adequate supply of top quality scientists and engineers." (National Science Foundation, Sixth Annual Report, 1956 pp 66-7)

Another need is pointed out by President James R. Killian Jr., of the Massachusetts Institute of Technology:

"We have an acute shortage of scientists whose creative and conceptualizing powers are exceptional. We have, in summary, a shortage more of basically educated, versatile, young talent than of mere numbers of scientists and engineers. There is indeed a shortage of numbers in many but not all fields of science and engineering. We could better cope with such a shortage did we not also have an even more severe shortage of quality, depth, adaptability, and up-to-dateness." (The President's Report, 1955)

The results of the National Science Foundation Institutes for Science and Mathematics Teachers are significant and important. During the summer of 1957 alone more than 4500 teachers received support and training under this program in 95 summer institutes. During the present academic year of 1957-1958 approximately 800 highschool teachers will receive a full academic year of training in science and mathematics courses. In the summer of 1958 and the academic year of 1958-1959 similar numbers will be provided with such training. Of the approximately 100 teachers who participated in the two pilot Academic Year Institutes during 1956-1957 at the Oklahoma State University and the University of Wisconsin 80 per cent are now teaching in high school again. Most of the others are either in graduate school or in some other form of educational work. Only 4 per cent accepted jobs in industry.