

GISMO

A PROPOSAL FOR A PROGRAM OF INSTRUCTION IN GENERAL SCIENCE

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The purpose of this document is to solicit funding and other material support for the exploration of an original concept involving the presentation of general science curricula at the elementary and secondary levels of instruction. To this end, the ensuing discussion is a preliminary attempt to explain and justify this instructional methodology. The approach to be outlined interfaces precisely with a surprising number of strands of current educational theory, and may be of significant value in the improvement of education in the areas of science and technology, and in other areas as well.

The concept to be considered has been tentatively referenced by the acronym "GISMO" (pronounced gizmo), for General Integrated Science Museum Operations. GISMO represents a confluence of analyses and ideas directed at solving problems related to the delivery of middle school science curricula in a rural environment, but appears to have far ranging implications. The nucleus of the GISMO concept is a sort of science museum. GISMO has much in common with the best aspects of the rapidly proliferating "hands-on" type of science museums such as San Francisco's Exploratorium, Oregon's OMSI, and Ontario's Toronto Science Museum, to name a few exemplars. It is also capable of generating the shared interest and excitement as well as the possibilities for individual expression which are part of the science fair experience. However, this idea embodies a number of critical distinctions which would appear to render an ideal vehicle for dynamic, effective, and well-rounded education in the sciences.

GISMO is designed, built, maintained, and administered by the students. Initially, teachers, parents, and specialists provide assistance in helping the students acquire and develop the necessary skills, but as their capabilities increase, the students assume commensurate responsibility. The GISMO museum is not something one takes a field trip to experience. The museum is on site, within a short walking distance, or preferably integrated in a common center with classrooms, labs, media and technology areas, workshops, and other related instructional facilities. The museum is not a stimulus, reward, or addition to the curriculum. GISMO is a physical manifestation of the curriculum and the principal focus of learning and evaluation. Students are encouraged to participate in all phases of museum activities. They are actively involved in their own education as well as the education of their peers, students at other grade levels, and members of the community.

Students spend a good deal of their time in producing exhibits and still more time in thoroughly learning the content of exhibits produced by other students. Mastery of a particular exhibit is evidenced by successful performance on student-designed tests or other evaluative instruments, and allows the student to move on to the next. Thus, the curriculum is assimilated by a systematic journey through the museum. Traditional modalities of instruction such as lecturing, demonstrations, labs, AV presentations, written materials, and so on, are used to facilitate and enhance understanding. Instructional time is specifically allocated to producing exhibits. Initially, an entire class may produce a single exhibit using a jigsaw-type approach with highly structured parameters and abundant guidance. Later, small groups and individuals produce products for inclusion in the museum. Exhibits are carefully chosen to delineate a particular area of the curriculum. Students

submit project proposals, gain approval, and receive mini-grants of materials and assistance. All inclusions are designed for safety, hard usage, and are interactive whenever possible. Emphasis is placed on making each exhibit accessible to the widest possible audience. A variety of modalities are utilized in the presentation. Student builders include plans, textbook entries, worksheets and tests in their completed work. All pertinent data is entered in the museum's data base which is available at a number of terminals located throughout the building. More advanced students contribute to the data base, providing tangential exploration and greater depth. Exhibits are not limited to those produced by students and it is expected that GISMO will include items produced by teachers, parents, students in colleges and universities, and professionals in the private and public sectors.

The diversity of areas covered in the museum presents a more realistic picture of the true scope of scientific knowledge than conventional courses can supply. The museum is not defined or limited by its walls but is carefully and systematically integrated into the surrounding natural world through the use of interfacing exhibits and outdoor activities. All students can find something of compelling interest. Students of all levels and abilities are served by the GISMO concept. Student guides or "explainers" are available to younger students or less knowledgeable persons. GISMO retains the interest and accessibility of its museum relatives, but is a more serious and structured learning environment. Students spend more time studying and learning rather than merely extracting the most dramatic elements of the exhibit and then moving on. GISMO is a gigantic interactive science classroom in which the storeroom and the teacher's most interesting demonstrations are continually on view and available. The factor of time does not restrict the learner. Individuals are given the imperative freedom to explore at their own rate. As students develop from the earliest primary grades through high school there is a continuity in their exposure to the museum and its significance changes and deepens in response to their curiosity and intellectual maturity.

The GISMO concept is surprising in its ability to bring a myriad of disparate factors into harmony which have found widespread support in the educational community. The museum also seems tailor-made to address and ameliorate many of the problems now inherent in the school environment. In addition, it provides an intriguing, enduring, and empowering matrix which confers dignity and self-direction to the efforts of students and their instructors, factors significantly absent in many school programs and society at large. GISMO is not only a resource to all of the students in the district, but also to teachers, adults education programs, the community at large, and other school districts and communities. The museum is an ideal catalyst to bring students, parents, education professionals and other parties together in the construction of a tangible and valuable product. GISMO is multi-disciplinary in nature. Students and teachers in other disciplines such as math, history, English, and fine and industrial arts can make important contributions. It is possible to envision integrated programs of instruction based on the GISMO concept. This concept typifies cooperative learning not only in its basic structure but also in the way in which exhibits are produced and studied. It is clearly outcome-based learning as students complete tangible products. GISMO exemplifies the popular "Russian" approach to science learning in which the same subjects are introduced again and again at advancing levels of depth. The museum incorporates the most advanced communications and instructional technologies and promotes and requires their use by the students. GISMO delivers a continuous spectrum of scientific knowledge while allowing creativity in other disciplines. GISMO is flexible, adaptable, and constantly changing and evolving. It is limited only by the imagination, creativity, and dedication of its participants. Students enjoy making valued contributions and can feel their importance in the continuity of this concept. GISMO is more than a museum; it is the method and substance of scientific exploration.