

SOME SUGGESTED PROJECTS FOR THE SUPERIOR "PROBLEM CHILD" IN HIGH SCHOOL BIOLOGY

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The project method of teaching biology is accepted today in most schools of progressive education. However, as practiced in the majority of the high schools of Oklahoma, it consists of insect collections, leaf prints, and similar individual "busy work."

Because many former students, now out teaching, have made inquiry about ways of interesting and utilizing the student with the superior abilities, the following suggestions have been compiled. No attempt is made to outline any project in detail but rather to present what the author thinks are worthwhile principles to be kept in mind when formulating such a program.

These fundamentals may be summarized as follows: High School Biology should deal with living forms and with basic concepts. The problems selected should involve an introduction to the methods of research and should develop, on the part of the student, an experimental or questioning attitude. The topics chosen should be cumulative so that the combined observations of different pupils and classes over a period of years might result in scientific data worthy of study and analysis by more advanced students. Specialization within narrow fields, in which the individual feels he or she will eventually seek a vocation, should be avoided in High School Biology. Technical vocational training should not be included as an objective of the Biology course. The project should have some other basic purpose to motivate it.

With the above principles in mind it would seem that suitable projects might be grouped under these heads. First, simple research on everyday problems in which the child might be interested, that is problems growing out of simple curiosity. Second, the accumulation of data and materials which may have some scientific significance. Local natural history records and taxonomic studies are necessary and of importance to all biologists. Third, the improvement of school property both from the community standpoint and from the viewpoint of biology classes. Fourth, the development of the individual as a citizen in cultivating his appreciation of art, music, and the rights of others.

An example of a project growing out of simple curiosity and one dealing with research that might be undertaken by a high school student is the following: Some weeks ago, while at the dining table, which was adjacent to an open window, I noticed a bee buzzing vigorously about outside the screen. Its antics aroused my interest and more careful observation indicated that some odor from the table was the stimulus. The bee was definitely trying to project its mouth parts through the screen as though to take up food. A few experiments demonstrated that the juice of some canned prunes was the attraction. When a spoonful of the juice was offered the insect, it absorbed its fill and flew away. Within a few minutes, there were three bees outside the window asking for a free handout. How could the bee smell those prunes and how did it communicate with the other bees? That bees are angered by odors has been known for centuries. Aristotle reports the effects of perfumes on these insects. Some people seem to offend bees by their B. O. A few years ago a young lady was

forced to walk several blocks out of her way when going to and from the dormitory at Manhattan, Kansas, because the bees at the apiary, near the path, objected to her presence.

The influence of odors on insects and the organs used in sensing them are relatively unknown. What an interesting and inexpensive project for a bright student who is finding his books too dull.

Such experiments can not only satisfy a pupil's curiosity but they may also produce data of distinct scientific import. Other projects built around the accumulation of information of value to scientists might be: Observations of the dates of the occurrence of periodical events in the life cycles of plants and animals. The breeding and feeding habits of many common amphibia, reptiles, fish, etc., are unknown. The life history of such a well-known insect as the "Silver Fish" or "Slicker" is still a mystery. The food of birds is still a relatively untouched field. Ecological and taxonomic studies on local fauna and flora are of great value. Bird, insect and plant censuses are interesting. The early embryology and development of common snails, fish, etc., are instructive. Parasitological relationships may also be easily studied by the high school student.

If on the other hand, the student has some leadership and organizing ability it might be advisable to direct his activities toward a community or school project. Individual and class undertakings, such as lily ponds, museums, botanical gardens, zoos and nature trails are well worth while. Properly handled, they not only provide improved biological facilities but they form a closer bond between the school and the community.

In case laboratory technique is the type of study desired, culture methods for forms used in the laboratory or the construction and care of equipment such as aquaria may be useful. Experiments in the use of common household materials in the preparation of slides might be productive of valuable information. Karo and nail polish can be used as mounting media and India ink will stain bacteria. Rubbing alcohol is a fair preservative. Other common materials may have useful properties not now recognized.

Perhaps a more desirable project is one which develops a hobby or interest that can be carried on into adult life. Photography, art and music may serve as examples. Proper decoration and arrangement of the class room for the artistic effect is of value to both teacher and pupil. Cultivation of artistic ability, either manual or vocal, can be done most effectively in the biology course. Imitation of animal sounds is a hobby that is entertaining and appreciated by all. The recognition and the cultivation of beauty in nature makes for better citizenship.

In summary, may I suggest that we bear in mind two tendencies that are detrimental to our high school program today, one, the tendency to over and too early specialization and the other, an inclination to make Biology a laboratory science instead of the study of life. With these things in mind, the teacher should organize his projects so that they will be productive not only of training in the fundamentals of biology but also of research data, equipment, supplies or personal hobbies.

It is hoped that these few suggestions may help in providing for the individuals who need such recognition. For those interested in detailed outlines, the symposium of the Michigan Schoolmaster's Club on "the Opportunity for Investigation in Natural History by High School Teachers" published by the University of Michigan Press, and Miller and Blaydes—"Methods and Materials for Teaching Biological Sciences" published by McGraw-Hill will be found helpful.