

# The Use of Projects in Biology<sup>1</sup>

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Many of you may use projects in your biology teaching. My project method has evolved during a number of years of teaching, and it is my own since I have never had a course in the teaching of biology. Somebody passed around the word in educational circles that I have been somewhat successful in promoting projects in my classes so I have been asked to tell you about it.

My first experience with biology projects came when some of my pupils requested outside work in order to get extra credit, and to make better grades. One pair of students made a rather extensive collection of insects and brought it to class as a surprise. They were asked to make a report on the methods they used and I found that they did not even have an insect-killing bottle but managed to kill a number of insects by smothering them in a small vial.

This set me to thinking that perhaps most of the class members would like to do some individual work and that I should do a better job of directing it. After doing some extensive reading on the subject and thinking it over at length, I decided that some class time should be allotted to projects, and to use pupil-teacher planning. After a unit of work had been completed my pupils and I listed projects related to it on the chalkboard. At first I had to suggest most of the projects, but soon some of the lively members of the class were making suggestions. We then discussed the projects, how they were to be carried out and where to find help. A few were removed from the list when they were thought to be impractical. The pupils then chose their subjects and started to work, individually or in pairs, unless the nature of the project required a larger number of students to carry it out.

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Some projects were very popular and the pupils had to draw straws for these. A few youngsters had no preference and were assigned a subject.

Before this took place, I had explained the nature of our work to the librarian and asked her to assemble materials for us. I also collected materials and had them in readiness. Some pupils quickly made their plans and went to work. Others wanted to discuss their plans with me before they started. Some merely wasted time and had to be pushed into getting started. I found it necessary to budget my time among students in the classroom, laboratory, and library, and be available at all times for those seeking help. I also went on field trips. The original deadline for the completion of the projects had to be extended because we had underestimated the time needed to complete a satisfactory job.

When the work was completed and project reports had been given, we found that many of the students had done a splendid piece of work and had enjoyed doing it; however, some had completed a rather dull and uninteresting piece of work, lacking in originality; and a few had failed to finish their work.

We discussed the reasons for the failures and tried to point out the ways of overcoming difficulties. The general opinion was that we had worked rather blindly, but that we had gained some valuable experience.

During the next unit of work students were constantly asking when we were going to work on other projects. When the time came for project activity connected with this unit, there were many more suggestions by the students. Most of them were anxious to get started. This time every member of the three sections of biology completed their projects. On the whole, much better work was done.

Since that time my pupils have worked on many projects, and I am constantly delighted and astonished at their accomplishments. Projects seem to be the best way to work with a heterogeneous group of boys and girls who show divergent interests and widely separated abilities. The advanced student can put extra hours of preparation into his work and he is not held back by the slower members of the class. Projects well done give the student a sense of personal accomplishment; some pupils who are rather poor at literary work can do a superior piece of work in collecting, building, or identifying. Those with artistic ability can find an outlet for this in biology. Projects are often the means of introducing new interests and new avenues of learning to students. One boy stated that he liked to do projects "because we make better grades on them than we do on other work."

The pitfalls of this method of teaching are many. Pupils who are accustomed to formal discipline by a strict teacher take advantage of the comparative freedom of project work. Many loafers find this an ideal time to continue loafing unless given some incentive to work. It is rather difficult to get pupils to budget their time.

What are some of the projects that high school boys and girls have done? One girl wanted to grow some unusual plants and ended by growing them in a terrarium, building six other terraria, and presenting her exhibit and a paper on them at the Florida Junior Academy of Science. Her paper took first place. Two girls who were interested in blood study asked for help at a hospital, and after they had obtained the information and help they needed, they were offered part-time

jobs which they held for three years. Now both are studying nursing. A boy who decided to study and make a collection of mosses found to his amazement that there were four species in the school yard. Another boy made quite an extensive collection of club mosses. Two girls who worked with molds, unearthed two articles on slime molds, and had the class, teacher, and others interested in biology, searching for slime molds for the next few months. A boy made a comparative study of vertebrate brains. Two girls produced a sort of "peep show" depicting a Carboniferous landscape complete with club mosses, horsetails, fern trees, and dinosaurs. Quite a lot of research and originality went into this project. Four girls who had been "problem children" in the ninth grade built an insect marionette show to present to their class. They wrote the script, original words to familiar tunes, and rehearsed until they were quite deft at making caterpillars undulate across the stage, bees buzz around from flower to flower, and flies flit about. Their show was such a hit that they showed it to all the science classes in school, and finally took it to the Florida Junior Academy of Science, and won a prize. Their pride was as great as if their prize had been a fortune! There were no other marionette shows until the sister of one of the first group reached biology class, and that year six girls teamed together to give another marionette show—a review of the entire phyla of animals beginning with protozoa and ringing down the curtain with ape and man.

Many other successful projects could be mentioned. Skits, dioramas, collections, models, charts, unusual experiments, and an endless variety of projects attract youngsters. One idea often leads to another. Those of you who have never attempted project work with a group of lively youngsters have a delightful experience in store for you. One of the greatest thrills I have had as a teacher is to see these projects materialize and go to successful completion. When a pupil, who has been rather indifferent in class, does an outstanding piece of work, I feel that he is really interested, and I try to find some means of holding that interest. Enthusiasm is contagious and an enthusiastic teacher will stir up enthusiasm among her students.