

## The Place of Projects in High School Chemistry

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A perfect educational process should develop in the boy and girl all the desirable traits which we wish to find in their mental and moral makeup when they are grown. It is impossible to find any one process to meet this demand so that we must resort to a variety of methods in education. One process that has been overlooked more than any other in the past is the use of projects.

The application of this method to science, which is an outcome of the Herbartian school, has been used only sparingly until recently. Widespread increase in its use in this State was encouraged by this academy when it began to sponsor a project contest in the Junior Section. The adoption of this policy was no doubt brought about by the excellent showing a few schools made in the first contest of this sort to be held, which was sponsored by the Illinois State Association of Chemistry Teachers seven years ago at a meeting of this association in Macomb. During this widespread increase many difficulties have been incurred in the application of this method probably due to the small amount of material that is at hand from which the teachers may get their information.

Sometimes the term "project" is misused by being applied too widely to situations that are not projects but only problems. A project is not merely a situation that may be solved by purely mental solution but it requires additional knowledge, understanding, and skill. It is in these last necessities that a great amount of the project's usefulness is founded. I can find no better reason for its use than the encouragement it offers a student in finding and developing these traits while working with a situation that instills into him an interest greater than can be stimulated by any other educational process. In addition to these outstanding achievements, the project method at its best may be credited with the development of more definite concentration of thinking, a greater effort in the use of the subject matter in problem solving and fact finding along with a development of the usage of facts as well as a higher standard of ideals and attitudes.

No educational method is free from errors. Probably one of the greatest handicaps that the project method has to overcome is the fact that so many teachers will allow it to degenerate into a series of poorly

written reports taken from articles or books. Probably this is the reason why projects are often times disregarded in the teaching of science. Certainly projects are not reports culled from magazines and encyclopedias and neither may they be imposed, for as such the spice is lost and with it a great deal of their real worth. Another thing that discourages teachers a great many times in the use of projects is the realization that this method is not easily taught. It demands a great deal of planning, supervision, and encouragement, all of which will demand from the teacher much time and energy as well as resourcefulness.

Since teaching this method is not easy a great many mistakes and failures will attend its use if not handled properly, because students are not able to carry on unaided the problematical work which is demanded. Therefore I must point out that although the project has a definite place in the teaching of chemistry it cannot be classified as chemical education itself.

When introducing projects into Chemistry the first question that arises in the teacher's mind is—"when shall it be taught, how much time shall be allotted to it, and what relation must it bear to the rest of the Chemistry course. These questions cannot be satisfactorily answered with one answer for all schools or situations but must be governed by the characteristics of each class that is to participate in this type of work. However, I might offer some suggestions that I have discovered through the use of this method the past several years. First of all I find that the mere suggestion that some time during the year the members of the class will have an opportunity to work on projects of their own will stimulate an interest within each student in Chemistry from the very first day of the term. It is seldom that I find a student who does not care to originate, plan, execute, and report on a project that he may call his own. Sometimes, however, this does occur and in such a case another kind of work should be provided for the student. This makes more work for the teacher but is necessary, for if the other students received the impression that their projects were forced upon them their interest would die and with it a great many of the valuable benefits. During the time I have carried on projects I have invariably found that they should not be introduced early in the school year since practically each project demands some technique that the new Chemistry student has not yet acquired. Neither can it be expected that he will get the greatest understanding or knowledge from his project until he has attained a background by the use of other educational processes for several months. Projects have done my students more good when they were introduced into the laboratory from the first to the middle of the second semester.

The statement that they are introduced into the laboratory may raise the question as to whether they should be carried on during the regular laboratory time, after school, or at home. To this I reply that the

project method is an accepted educational method, therefore why should it not have a place in the school today together with the other educational methods and processes if it is not allowed to overshadow them.

In Watkin's experiment with controlling classes in Chemistry doing project and nonproject work, the two groups stood about equal by pure factual testing but it must be remembered that a great many of the good points such as resourcefulness, initiative, and interest that we know are developed to a high extent in projects can not be measured by such tests. Neither are they necessarily bounded by the four walls of the class room but may reach to the home community and often farther, working towards ends in which the student can see immediate worth.