The Development of a Science Program For the Junior High School

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Basis of the Problem

The school to which the writer is assigned was newly organized in 1953. It is located in a rapidly growing area and has almost doubled in enrollment since its beginning. Because of this rather unstable situation, considerable experimentation is not only possible but is almost necessary.

It has been apparent from the beginning that the very forward-looking administration of the school is interested in developing a six-year program which will be so coordinated that it will be working continuously for each individual as a whole. There is to be developed a program which attempts to take full advantage of the capabilities of each student and yet do all possible to make him a well rounded individual who can meet the responsibilities of life with confidence regardless of his field of endeavor. The program will in addition have the general objectives of attempting to meet the needs of students as nearly as those needs can be determined.

The administration and staff of our school are certainly aware of the fact that the accomplishment of the above objectives is not easy. However, in a situation in which the student is under the guidance of one institution for the entire six years of secondary education, it seems that a coordinated effort which attempts to diagnose individual strengths and weaknesses and attempts to take advantage of them is a more likely possibility.

The writer has been cognizant of the attitude of the administration toward the accomplishment of these goals. Since he has so far been responsible for the science program, he has felt the need to develop a plan which will follow the general pattern which the school hopes to eventually evolve.

This paper is merely preliminary speculation with regard to a plan which will no doubt take several years and many mistakes to approach any degree of real satisfaction.

City-wide Conditions

In most schools throughout the Oklahoma City system, there is a general science course offered in the eighth grade. It is required of all students. It is the only organized science course offered in the junior high school curriculum with the exception of an advanced elective course offered in the ninth grade in several schools.

Evidence seems to indicate that the eighth grade course is rather unpopular for both students and teachers. This is substantiated by the fact that there is little demand for the more advanced elective course in schools where it is offered with the exception of some instances in which the teacher's personality and initiative have overcome other obstacles. Indications are that the course has become a more or less stereotyped group of facts which are to be learned by rote by the students. The writer has seen at least one instance (not in his own school) in which a new teacher was given a list of facts which eighth graders should know in order to enter the ninth grade science course. It should be hastily added that this is not general practice.

On the other side of the ledger there has been a good hobby approach to science in many schools through science clubs. Under able leadership from the central office, a science fair has been organized which has become almost nationally known and which has attracted community wide

interest. There were over 200 entries in the junior high division last year and many projects showed a great deal of science talent. However, the percentage of the total number of students in science classes who participated was relatively small. Furthermore, in many instances the impetus may have come from the home and parents rather than from the school and teachers.

The foregoing description is not meant to be a condemnation of the science program in Oklahoma City. On the contrary it is no doubt as good or better than cities of comparable size throughout the nation. However, there is a growing fear that scientific talent is not keeping up with the technological development of the country. Adults often boast that they never did understand science and regard it as a pile of facts to be learned by rote and forgotten. They often consider scientists as mysterious wizards who have little "common sense".

There is a feeling among thinking people that we should depart from the purpose of imparting nothing but factual knowledge. Instead, the fundamental objectives probably should be to develop an understanding and appreciation of science and scientists that can last usefully through later life. This involves a happy acquaintance with science, some knowledge of scientific material, and some understanding of the methods of scientists.

It is our hope that our plan may more nearly reach these objectives and still accomplish the tremendously important goal of discovering and nurturing science talent wherever it may exist.

Proposed Changes

Although the need for change and improvement is obvious, to bring about such changes poses tremendous obstacles. It is not possible for the central office to send out a decree to the effect that the science program is being revised in certain respects and direct that teachers put the revisions into effect. Teachers are the curriculum. They will teach in the way they believe. They will work toward goals and objectives which seem important to them. To change a program involves changing the beliefs and important objectives in the minds of the teachers. This is not easy.

Teachers, like all people, tend to favor the status quo so long as it seems to be resulting in what is desirable. The first problem then, is to devise a means by which the teachers can see that the results are not as good as they could be. This can be shown both objectively and subjectively so far as the science program is concerned. There are numerous studies which point out the shortage of professional scientists. Drop-out studies in one school show that science courses ranked high in the list of subjects which caused children to quit school. The writer listened to a public address by a leading college professor of chemistry in which he deplored the lack of stimulation of persons interested in science in the public schools. Optimum efforts will not change the views or objectives of all of the science teachers. However, there is an awareness on the part of many teachers that there should be some changes made. Just what these changes shall be and how they shall be made is not yet apparent to most. Therefore, we feel that our first job is to have sufficient evidence to convince our science staff that our plan is sound.

After having worked on the problem fairly continuously for several months, we have come to the tentative conclusion that the emphasis on the specific course in general science might be more effective in the ninth grade rather than the eighth. This decision is not based on mere reflection on the part of the writer. A rather crude survey has been made by the writer to determine the thoughts of the science teachers in various meetings of local, state and national scope. This survey tends to substantiate this belief. Further substantiation has come from the study of research which has been done among the high schools throughout the state concerning their science program.

Based on the assumption that the information obtained is fairly valid, one of the first steps in our plan is to make this shift.

We are completely aware of the fact that the mere insertion, removal or changing of a course in the schedule accomplishes practically nothing. We know that to offer the same course with the same methods in the ninth grade will bring about virtually no improvement. Therefore, our immediate aim is the reorganization of this course.

So far as the writer has been able to determine, textbook content for a general science course on the junior high school level has not changed appreciably in many years. Pictures have been changed, make-up has been improved, sections on recent developments have been added, but major changes have not occurred. This is not a direct criticism. Many fundamental principles of science are included and are necessary for a real science background.

Experience has shown, however, that a fairly high percentage of junior high school students cannot intelligently read and absorb materials from such books. Therefore, it is our proposal that these texts be used primarily as reference books rather than being followed day by day. This is not new of course since modern educationalists do not recommend a strictly textbook approach. However, even though most teachers have heard that one ought to do differently, it is the writer's belief that a very significant percentage of science teachers follow the more traditional approach.

It is our belief that the reason for the above approach is that teachers often lack the confidence to depart from it. Therefore, we feel that if they are provided with sufficient in-service encouragement and in particular with specific instructional materials that they will be much more likely to do so. With this in mind we hope to prepare a fairly comprehensive outline of what we feel is a desirable approach. It will be completely general in nature and will attempt to allow the teacher complete latitude to apply it in the way which best fits his needs. It will include many suggestions for both individual and class projects. It will be supplemented by as many resource units as can be prepared and obtained through efforts of the writer and other science teachers in the city system.

It is hoped that this course will enhance scientific interest. We know that interests among this age child are tremendously varied. We are, however, aware that certain interest patterns exist as to sex, family background, intelligence etc. We are considering the possibility of developing classes along interest lines. We would not propose to teach courses in chemistry, astronomy etc. at the junior high level. If, however, these interest patterns can be determined in the first two years of our three year plan, it may be possible to emphasize different phases of science in different classes. There would no doubt be obstacles such as scheduling difficulties with which to contend.

We are not sufficiently along in our plan to intelligently discuss other facets of this climax course in our program. Perhaps the preceding remarks may serve to illustrate what we shall try to accomplish.

We are aware of the fact that elementary schools are doing a good job with science. A great percentage of students coming to us have a desire for further knowledge and investigation in all phases of science. We feel that we are failing in our duty if we do not follow through with that developed interest early in the junior high school program. Therefore, we hope to entwine some sort of science program into the core curriculum now in use in our seventh grade. We know that teachers in this program are already burdened with several subjects for which they have responsibility. We know, too, that many of these teachers feel inadequate so far as science is concerned. For these reasons we hope to

make it as easy as possible. We intend for this program to be almost completely hobby-like in approach. There will be no specific responsibility for particular material such as there is in other seventh grade courses. Again an outline containing as many project suggestions and methods of approach will be provided. A junior high school science club will be sponsored by one of the science teachers for those who are especially interested. A general attitude of "science is fun" will be encouraged at every opportunity. It is difficult to say at this time what the extent of this program shall be. Experience may result in some expansion or contraction.

Since the eighth grade course will be changed to the ninth grade, it will be imperative to work out some sort of activity for the eighth grade. At this time we are not ready to say exactly what this activity shall be. However, it will no doubt be organized on a course basis. It may be in connection witn health and physical education. At any rate, the same principles will be employed with as much specific help being given the teacher as possible.

In our program we hope to alleviate another weakness which we feel typically exists. Repetition is often desirable. However, it often brings about a stifling of interest. The writer has had unpleasant experiences in this regard. For that reason we hope to coordinate this three year program so that repetition will be at a minimum. A close association of teachers of science and considerable time spent in planning together should bring about this goal.

It is apparent that our plan is still in its infancy. We are aware that we are proceeding almost blindly. We do feel, though, that we can bring about some improvement. We have confidence in the fact that teachers want to do the best possible job. We hope that our plan will help them to do it. The writer feels entirely inadequate from the standpoint of experience and otherwise. He is, therefore, inviting any suggestions that anyone can offer.