

An Objective Approach to Biology

CHARLES W. GOUGET

Austin High School, Chicago

In the approach to his subject, a teacher is in much the same position as a salesman trying to sell his product to a customer. A good salesman knows that most people are concerned more with concrete situations than they are with abstract ideas, so usually he will try to demonstrate the thing he has to sell. Display windows are based upon the elemental fact that most human beings are objective minded. We want to see what we are going to buy, and few of us will buy personal articles through a catalogue or advertisement.

In the same way, a student will not buy from a teacher who attempts to sell his subject through the use of a text book. They, as you and I, must see the real thing if they are to be interested. Objective materials stimulate new ideas for further activities, and when a student is able to point with pride and say, "I made that, that is mine!" the laboratory becomes "our" laboratory, and not the teacher's laboratory. Each addition to the classroom, however small, adds to the silent education of those who do not take part, and slow and backward students feel the joy of objective reality.

Young students, for the most part, are both unwilling and unable to deal with abstract ideas, primarily because they have not had enough concrete experiences to make the ideas understandable. Consequently any method that deals with a purely abstract approach is almost certain to produce passive interest. Passive interest will not endure long among high school students unless some thing is done to make it active.

At first, most students approach a new subject with the eagerness of a child for

a new toy. If enthusiasm lags long at the beginning it is very difficult for a teacher to stimulate momentum later by any method. Psychologically, from the standpoint of grasping the immediate interest of the student group, the introduction to the subject matter is probably the most important part of any method. A good beginning may provide the "steam" that may carry a student through the term with interest and enthusiasm.

It is a generally conceded fact that the most direct approach to learning is through the study of the thing itself. This fact has been realized in the teaching of numbers in the primary grades, in which concepts are built up around the concrete things that numbers represent, before any attempt is made to drill on abstract numbers. On the contrary, most medical students will study Comparative Anatomy before they have any very clear generalized concepts of the animals they are studying. To tell such students how different animals chew means little unless they know the animal and the general conditions under which it lives. It is very difficult to get a concept of a cow from a quart of milk.

In the absence of the thing itself, a model may be the next best substitute.



A good model is an exact image of the thing to be studied. Many things are studied in school which cannot be brought into the classroom, as for example, a coal mine or an oil well. For the most part, they must be studied from books, pictures, charts and maps that are available. Our public museums have rendered an excellent service to education by reproducing exact images of living things and natural formations in their natural settings. This particular type of model is known as a diorama. It enables the student to see the relation that exists between the living thing and its environment, a relationship that is not easily obtained through any amount of text book study. Immediately, abstract reading becomes concrete and students who ordinarily obtain little from the printed page begin to understand.

Further, a model or diorama becomes still more instructive, and more objective and understandable if it has been made by the student himself. Such a task requires careful planning and careful observation of details to be able to



complete it according to any pre-conceived ideas. It involves, also, the exercise of a certain amount of judgement, together with artistic and mechanical skills to turn out a worthwhile product. The lasting results of learning acquired in this manner, and the training afforded by the work involved cannot be overestimated.

The tremendous possibilities of plastic clay in producing permanent, miniature dioramas for the classroom has scarcely been touched. A few of these possibilities are shown in the illustrations. Plastic clay will not deteriorate with age, nor melt in warm weather. It can readily be torn down and built over, a fact which is most important in producing good work among high school students. In addition it can be painted with oil paints or poster colors to which no water has been added. When the figures are properly supported, and protected by glass in a diorama case, the exhibit becomes a permanent addition to the classroom. Each new addition creates new interest and spurs group activity towards the completion of a museum as the ultimate goal in the Biology Classroom.

It is not hard to "sell" a subject to a student on an activity basis, if interesting objective results of previous activities can be exhibited by the teacher.

THE GENERAL PLAN OF APPROACH

True interest usually results from individual or group contributions to some general plan laid out by the teacher, in which the most gifted and the least gifted student may contribute according to his or her ability.

A Natural Science Museum in the Biology Classroom can be the ultimate objective of such a plan. Many types of interests may be used in building a museum; in fact the variety may become

so great that almost everyone of an entire class may contribute something to the co-operative plan as a whole. The whole thing tends to focus on things that students like to do, although some of the activities have only a remote connection with the subject matter. To place the work on a committee basis sometimes adds to its importance and makes for better work. The following committees have been found helpful in segregating individual interests, and in focusing action towards the museum plan idea, namely:

Art	Plant Studies
Woodwork	Landscaping
Taxidermy	Pond-life Studies
Preserving	Insect Studies
Aquarium Con- struction	Reptile Studies
Slide Making	Bird Studies
	Correspondence

THE METHOD OF APPROACH

The following introductory method has been found to be successful repeatedly in dealing with students in Biology:

1. An effort is made to get each student to make an early contribution to the laboratory while he is still running on the "steam" of a new situation. Any contribution, however small, makes the laboratory a part of the individual. Abundant suggestions should be offered as "food" for thought.

2. The course is introduced with live material that will captivate interest and promote discussion.

3. Co-operation is emphasized as a means of accomplishing results that could not be acquired by any one individual as, for example:

Co-operative planning.

Co-operative collecting of working materials and Biological Materials.

Co-operative working of special interests as Art and Woodwork to produce a finished product.

4. Emphasis is placed on the various

committees that supply a variety of activity suited to individual needs and interests. Arrangements are made to meet each committee after school so that activity is started as soon as possible. Thus active interest displaces passive interest.

PROBLEMS OVERCOME BY STUDENT ACTIVITY

1. *Live Stock*: Collecting for the classroom museum will supply ample live materials.

2. *Aquariums*: Active interest in stocking aquaria often leads to the construction or repair of additional aquariums for the classroom.

3. *Microscopes*: Photomicrographs made by students interested in photography are very fine substitutes for individual microscopes.

4. *Museum Jars*: Regular museum jars are very expensive. Interested students will bring in hundreds of straight sided pickle jars which are excellent substitutes.

5. *Stuffed Mounts*: Old, stuffed mounts brought in by students can be reconditioned, and over a period of years built up into a large collection.

6. *Wood*: Much good wood can be collected by students in the form of heavy wooden boxes. This wood can be used by the Woodwork Committee to construct various types of display cases.

7. *Glass*: Hundreds of pounds of window glass may be collected during the term. Window glass has a variety of uses in the Biology Classroom.

8. *Marine Life*: Dried specimens brought in by students who have been to the sea shore usually work into a large collection. This fact is especially true of sea shell collections.

These represent a few of the problems that have been solved by student activity. A good museum attracts students from all parts of the school so that interested students as well as interesting biological specimens gravitate towards one's classroom.