

Vitalizing the Classroom

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This article discusses two types of concrete instructional materials: objects and specimens, and models and mock-ups. It gives a brief delimitation of the material, the values to the pupils, and a methodology of procedure for the teacher in effective utilization of the material. Sam S. Blanc is teacher of science, East High School, East Colfax and Elizabeth Streets, Denver 6, Colorado.

OBJECTS AND SPECIMENS

IN CONSIDERING the classifications of instructional materials, objects may be defined as the actual things themselves. A leaf, an insect, or a tool are all examples of the real objects which pupils may handle and study. Specimens are materials, entire or in part, which are prepared and used as examples of objects for study. A piece of wood, a rock, or a mounted bird are all parts of actual objects brought to the classroom for study. The line of demarcation may, at times, not be too clear, and the definition will depend on the conditions surrounding the use of this material. Since there is a great deal of overlapping of these two types of concrete materials, the selection and use of objects and specimens will be considered together.

Although objects and specimens have great value in the field of science teaching, their use is not restricted to that area of instruction. Pestalozzi's revolutionary methods of teaching were based on the use of these materials. And modern teachers in all areas and at all levels of instruction still depend, in a large measure, on the use of objects and specimens in their organization of the learning experiences for their pu-

pils. The selection of this class of instructional materials does not usually require a high degree of technical skill on the part of the teacher. In most cases, the teacher and the pupils will be able to collect and bring into the classroom those materials available in the immediate vicinity. One need only become aware of the possibilities of the use of these teaching aids to see the many possibilities for their acquisition.

The greatest value of this class of instructional materials lies in the fact that they are the most concrete type of learning experience. Objects and specimens, as well as being viewed, may be handled, tasted and even smelled. On the basis of the actual materials with which a pupil comes in contact, his more abstract experiences and verbal concepts are developed. These materials represent tangible experiences, materials which the pupil can get his hands on, or as the saying goes, "something he can sink his teeth into."

In considering the standards for the selection and use of objects and specimens in the classroom, it should be emphasized that the teacher is dealing with one of the most abundant and easily obtainable groups of concrete materials available. Objects and speci-

mens are rarely bought from supply houses. Most teachers will, with the aid of their pupils, collect, classify, mount, and care for those aids which will have a direct application in their class presentation. Their use will depend on the type of instruction which the teacher is using in his work. But, in all cases, the objects and specimens, to be of maximum value, must be organized and classified and kept in such an arrangement that they will be immediately available when needed by the class. To stop the class while the teacher is frantically searching for some particular teaching aid is a needless waste of time.

Aquarium and Terrarium

Special applications of this class of teaching materials for the science teacher are the aquarium and the terrarium. An aquarium is a common sight in almost every science room, and the interest of pupils in this teaching device is exceedingly high. The major difference between these two types of materials is the type of habitat shown in each display. The aquarium contains water—fresh or sea-water—so that animals living in that natural condition may be observed by the pupils. The terrarium contains a simulated life condition suitable for animals living on land. This may vary from a moist, swamp-like condition for frogs to a dry, sandy habitat for horned toads. The preparation of either display is exceedingly simple, and the teaching and motivating value of these materials for the pupils is very high.

Since the application of this class of teaching materials to the field of science has been mentioned, the dis-

cussion of objects and specimens would not be complete without mentioning the applications of the microscope and the microprojector in the use of these materials. The techniques for the use of these two instruments are about the same. However, the microscope is designed as a piece of equipment for individual use by the pupil, whereas the microprojector is designed to be used with the entire class observing the same specimen at one time. Although the use of the microprojector deprives the pupils of the learning experience of individual manipulation in finding and focusing the object on the slide, it is believed that pupils below the secondary school level may profit as much, or more, through the use of the microprojector in a group activity than they would by attempting to use individual microscopes for study.

In the use of these two instruments in science classes below the secondary level, the opinion among people qualified in the field is that the microprojector is a more suitable instrument. It has advantages as a group activity for the class in addition to being less expensive for the average class. At the lower level it also avoids the necessity for technical skill on the part of the pupils in the manipulation of the instrument. For a more complete discussion of the values of microscopic work on the secondary level, the reader is referred to an article written for another publication.¹

MODELS AND MOCK-UPS

THE MODEL AND THE MOCK-UP represent a somewhat different class of

¹ Sam S. Blanc, "A Boy and a Microscope," *Audio-Visual Guide*, 17:32-33, March, 1951.

concrete teaching materials than the object and the specimen. The model and the mock-up are distinguished from these previous materials in that they are one step removed from the actual materials as they exist in nature. They are replicas of objects rather than being the actual objects in themselves. These teaching materials have a definite place in the teacher's approach to a unit of instruction.

It is obvious that in many cases the actual objects could not very well be brought into the classroom, and the class can not be taken into the field where these objects naturally exist. Should the class be studying a unit on transportation, it is seen that the actual machines of transportation, such as ships, planes, trains, etc., could not conveniently be brought into the classroom as actual objects in themselves. However, good teaching will emphasize the value of having pupils prepare or obtain models to show the relationships of these various means of transportation.

A distinction is made between the model and the mock-up in that models are essentially imitations of the real objects in as many respects as possible except in size. A mock-up, however, does not present to the pupil the actual appearance of the object itself. It is usually "laid-out" on a board with each part labeled. It rearranges the parts, disregards their relative size, and emphasizes certain functional relationships instead of being a faithful reproduction of the object as in a model. The model should be used to give the pupil the concept of the whole object as it actually appears. The mock-up is valuable in showing him how the parts

of an object are related to perform some certain operation. If the class is concerned with the external features of a steam locomotive, a model with many accurate external details will supply the pupils with many sensory impressions of the actual locomotive itself. However, if the class is concerned with the operation of a steam locomotive, a mock-up, geared to the instructional level of the pupils, may be used to great advantage to illustrate how the expanding steam operates the pistons to turn the wheels in order to produce the tractive effort of the engine.

Models may be classified into two general types: (a) solid models, and (b) cut-away models. Solid models are of value in studying the external appearance of an object. For example, a class studying the process of cell division might well employ a series of models to illustrate the various stages in this process. To show internal details of an object, cut-away models may be used. These are not to be confused with mock-ups, since they are not used to show a functional operation of an object. They are used to give the pupils a greater insight into the structure of an object. As an illustration, pupils studying the structure of the eye could use a cut-away model to see the internal details not visible from the outside.

Selection of Models and Mock-Ups

No one group of criteria may be set up for the selection of models and mock-ups. Many an ingenious teacher, with the help of his pupils, has been able to construct models and mock-ups to meet some definite need in the teaching situation. More thought along this line would be of value in increasing

the meaning of many a class presentation. However, assuming that the teacher wishes to order certain models for class use, the following points are offered as guides:

- Does the model (or mock-up) present the concepts wanted in such a way that no other type of teaching aid might be used with more effect?
- If the model is an operating device, does it have safety features to prevent accidental injury to the pupils?
- Is the size of the model large enough to be seen from all parts of the room, and do the coloring and detail show the essential parts in a three-dimensional aspect?
- Does the model represent the object accurately, and if dissectable, are the parts securely attached and interchangeable with replacement parts?

• Is the model durably constructed, dirt- and scratch-proof and washable?

The techniques of utilization of this class of materials may be summarized by saying that, as with any other types of teaching aids, the teacher must first prepare himself thoroughly in knowing what the model or mock-up represents, how it works, and how it may most effectively be brought into the class situation. Any difficulties which the pupils may have in interpretation of the device should be noted beforehand, and should be discussed with the class as the aid is introduced. The pupils should know why this particular teaching aid is being used, and they must be instructed as to what definite features they are to observe and compare. Individual handling and manipulation of these materials should be encouraged.

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April, 1952

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