

## Testing for Organizing Ability in Biology

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One of the important aims in teaching biology in the public schools is to develop the ability of students to organize their materials into some reasonable form. Many teachers apparently assume that pupils automatically do this. Only a casual observation of the results of much of our school work will be necessary to convince one that such is not the case. The now popular objective test gives the teacher information concerning the ability of students to memorize but suggests little about their ability to organize.

Organization consists of three important factors, the gathering of data or facts, putting them together in a logical relationship and emphasizing the items that need special attention. Most teaching work stops with the first step. If there is anything done about the other two, the teacher carries through in his own mind, but not many of the pupils follow. Merely memorizing a few facts is a convenient place to stop. Besides encouraging pupils to organize their materials by means of assignments, recitations, etc., the instructor should set up a definite plan to test the organization work of the class and let it be understood just what the program is to be.

The old essay type of examination, which is almost a relic at the present time, can be used here to a very good advantage. In order to make a worth while project of the plan, it is necessary that the teacher work the questions out carefully and in detail. Questions should cover work that has been gone over in class, but not in just the same way. They should be long enough to permit of a reasonable organization, but not so long that there will be too great a body of facts involved. Questions requiring from ten to fifteen facts for a complete answer are very convenient. These facts should be clearly laid out in the teacher's mind before giving the test to the student. The questions should also admit of more than one type of organization. This makes the task heavier for the teacher but gives the pupils opportunity for self-expression and removes some chances of their memorizing the organization along with the facts.

This study was made with a class of twenty college freshmen in a course of general biology. The range in ability was from just passing up to the A grade. Five different tests were given during the term, one was wholly essay, the others, combinations of essay and objective. In each case only one essay question was considered. The pupils knew beforehand the type of test to be given and that the essay questions were given to see what they were doing with organization. The answers were graded on both the number of correct facts and the type of organization. There are many weak points in this procedure, but at the same time it is much more reliable and suggestive than the old way of doing the work or than relying upon the objective test only for grading. There may be some objections to the use of the essay test for organization, but it will not be necessary to go through many examinations to discover that the students will try to use some logic in their putting facts together when they know that they are being checked on that phase.

The results of these tests showed very clearly that students will try to organize their work when there is a definite emphasis being placed upon that factor. No two organizations are likely to be alike, and a few pupils will not seem to have any. Incorrect statements appear and must be considered as weak points in the organization or against the grade on facts.

The teacher must be careful not to base the grade entirely on the number and correctness of facts. If these features are to be the purpose of the test, the objective type is much superior to the essay.

This study leads to the following suggestions:

1. That there needs to be a definite effort on the part of biology teachers to encourage students to use their organizing abilities.
2. That the ordinary classroom activities do not go far enough to help students in this type of work.
3. That there should be a definite program for testing organizing ability. The objective test as it stands at present does not do this, but the essay type can be manipulated so as to be very useful.
4. There must be a differentiation by the teacher between memorizing individual facts and groups of facts by students and the actual organizing processes that reflect the work of the person himself.
5. That further work along this line needs to be done to develop better means for both training and testing organizing ability.