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The Multi-Media Approach to Biology

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"If at first you don't succeed, you are just about average." This flippant statement of a common experience has led to the multi-media approach in an attempt to make the learning of biology for the average sixteen year old who scores between 35 to 89 on the comprehensive test of the ITED more meaningful and successful.

Mrs. Keithahn

Students really do like to learn. They don't like to fail because failure is hard to take. The average student seems to fail because he is either afraid, bored, confused, or has failed in the past. He finds it difficult to find a connection between the real world of his senses and experience and what he is studying for biology.

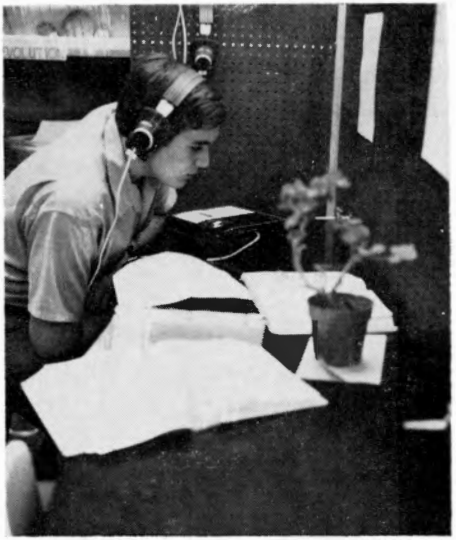
How can failure be lessened and a sense of achievement come more often? Perhaps by varying the patterns and styles of learning to include the world of the visual, aural, and physical—seeing, hearing, doing, feeling, smelling, counting, and making things—success will come in some measure to each of the average students. What are some useful tools for visual learning?

Textbooks, a multitude of texts, but one basic copy for each student to call his own. A classroom set of old traditional texts, a set of books written for the slow learner, a set of another BSCS version—all these will be helpful in saying the same thing in another way and will lessen the tendency to depend completely on what "the book" says.

Supplemental reading of every level, a set of encyclopedias—old discards or on loan from area library, college textbooks, paperback books of science, reprints of original works of merit—*Plant Hybridisation* by Gregor Mendel, *Origin of Species* by Charles Darwin will challenge the more sophisticated child.

A library reference cart, books which change with the unit studied, will bring the school library to the reluctant reader. On rare occasions bring the class to the library. Arrange for this event as carefully as for a field trip so that the librarian demonstrates the use of the vertical file, the card catalogue, and the *Reader's Guide*. Maybe students had failed to realize that there was a real world of books for biology on the day that the English classes went to the library.

The filmstrip projector is always available in the classroom for individual student use.



This study carrel is equipped for the audio-tutorial approach. The taped lesson sequence is on flowering plants.

The browsing corner of magazines and newspapers–*Science Digest, Senior Science, Science News, Life, New York Sunday Times, Natural History, National Geographic, Scientific American, Iowa Conservationist,* and *American Biology Teacher*–will have considerable use by students who finish early or have some extra time. The *Scientific American* lends itself to a special quiet reading session if the teacher will arrange to check out a year or two of back issues from the high school and public library so that there is more than enough copies for the class size. Articles on abortion, drugs, heredity, migration, and learning have been often selected and discussed by students who seldom read.

The bulletin board of selected topics prepared by volunteers and laboratory assistants affords a quick way for the student to grasp the big idea of the unit. Large letter, bright colors, and catchy phrases are a must for this tool.

The film loop and projector is one of the most useful tools for instruction in biology. The short single concept loop can be played over and over almost anywhere by anyone. In a dark room the film loop can be used for large group (one hundred or more students) instruction with the teacher providing the commentary. In a darkened classroom the film loop is especially helpful for explaining rarely observed events such as how animals breathe. In a brightly lighted fully occupied laboratory, a student can inspect a loop and view it on the inside of a cardboard box–following the action by reading the script on the plastic containers without disturbing his fellow class-

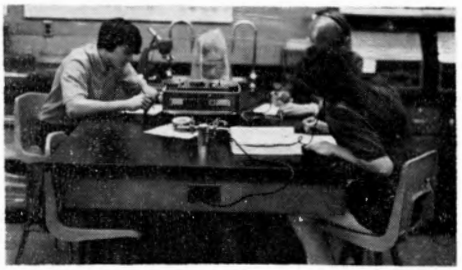
mates. This allows the student to make up missed work, to reinforce material covered previously, or to explore new fields and techniques on his own for independent study. This low cost projector should be in every classroom for it is one way to help the student learn when he wants to learn.

Models of all types, commercial or homemade, large or small, help a student see and feel what the living object is really like. Beans, milk cartons, poppit beads, plaster of paris, molds, pipe cleaner, dice, clay, and styrofoam balls are just a few household articles that make excellent models useful in teaching concepts of biochemistry and genetics.

Filmstrips have a place for both classroom and individual learning. A projector plus a large piece of white construction paper taped up to a wall will provide a quiet corner for the student who wishes to take an extra look at just how pollen grains should appear. Filmstrips can go as fast or as slow as the operator wishes. One can even have one frame projected on the wall for an entire class session to emphasize an objective.

Technique films planned for particular exercises can be used as pre-planning for class work or for just one or two students. A piece of construction paper taped to the back of a door, a sixteen millimeter projector on a cart will enable a student to view a film missed or one that he wishes to see if he is doing some independent study work.

Two students assemble molecular models as they pair up for learning.



The tape recorder is used by students at the listening center to correct their own test papers. The listening center will accommodate eight students at one time.

What are some helps for aural learning? A listening center of a tape recorder with a set of eight head phones plus a liberal supply of tapes will prove to be a most useful aural library. This listening center makes it possible for small groups, especially students who have been absent, to listen to lab directions, to correct their own tests and to hear short lectures on very difficult material. Large group lectures may be taped for a future tie-in use at the end of a unit as well as for introduction. Transparencies may be made to go along with the lecture to add another dimension of learning.

Video tapes of a guest lecturer, of a special talk by an instructor in another

department, or by a speaker at a student club may be played for an entire class at a later more convenient time.

Paired learning of peers make an exceptionally workable audio approach. A student can often give more meaningful explanation to a new concept such as photosynthesis than can the instructor. The teacher just might have forgotten how difficult the big idea is to comprehend.

What are some useful tools for physical learning, the learning by doing? This is an area where biology has all the favorable chances for success.

The classroom and laboratory should be filled with life of every kind. Plants from every phyla, algae, mosses, ferns, flowering plants, donated plants of every kind will show better than pictures what life is all about. Animals will require much core but will prove to be essential for studies in growth, behavior, and reproduction. Frogs, turtles, toads, snakes, crayfish, clams, fish, protozoa, worms, fruit flies, hamsters, gerbils, guinea pigs, and mice are all available in Iowa and will not take too much of the teacher's time to make a daily animal check.

The actual laboratory exercise of learning by really doing will be meaningful for many students who do not respond to textbook reading. The laboratory experience will take more time but for many it is a valuable way. Usually understanding comes along after learning. The idea of cells dividing by mitosis will be understood better after several tries at a squash technique exercise.

Counting fruit flies even for the first filial generation will make the students appreciate the patience and accuracy of Mendel with his peas.

Independent study problems will give the students a chance to try out some of his own special ideas. He will also learn that in science there is not always a right answer and not always sure success. Radishes grown and watched from seed sowing to flower to seed harvest will explain a plant life cycle better than any chart however graphic. A mouse who eats half of her own litter will impress a student far more than reading about the possibility of cannibalism. Not all students will be creative in this area but even the effort of thinking of a problem will produce some learning.

A field trip, however short, even a walk around the same school path at regular quarterly intervals will give some students a chance to become physically aware of life. Maybe he will learn that although life seems to remain the same it constantly changes.

The most important multi-media tool still is the teacher. A skillful and enthusiastic teacher is of prime importance. The teacher must provide the best of all learning conditions and then hope for good consequences so that the student has a lasting interest in biology and in life itself.

There is no real answer as to how students go about learning anything—even bio'ogy. Some of these media mentioned plus countless other methods will make it possible for us to conclude that it is not quite so important what a child learns as the way he goes about learning it. If the student leaves the

biology class at the year's end with a critical mind and intellectual curiosity maybe we have all had success and no failure.

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NSF Announces Grants for Inservice Institutes

The National Science Foundation announces the award of 121 grants, totaling $2,184,700, to support inservice institutes that will be conducted by universities and colleges.

The grants are made at this time as a result of money that was recently made available to the program. They were made either to institutions that received a statement of intent to renew along with grants made to them for 1970-71, or that have been especially distinguished by a long history of successful operation.

The grants will enable more than 7,600 secondary school teachers and supervisors of science and mathematics to obtain supplemental training during the 1971-72 school year. Additional grants will be made in this program in the course of the regular competition, and will be announced in March, 1971.

The institutes offer part-time instruction in science and mathematics during the academic year, at times so chosen that teachers may participate in them without it interfering with their regular classroom duties.

Participants in the institutes may receive an allowance for travel and books, and they pay no tuition or fees. They will be selected by staff of the participating institutions, not by the National Science Foundation. Inquiries and requests for applications for participation should be addressed to the directors of the institutes.

Following is a list of institutes in Iowa:

Institution	*Director*	*Subj.*	*No. of Participants*
Drake University	E. Canfield	Biology	25
The University of Iowa	R. Yager	Earth Science	20
The University of Iowa	R. Yager	Multiple	40