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THE OVERHEAD PROJECTOR IN BSCS BIOLOGY

SISTER MARY EDITH,
R.S.M.

The overhead projector in a sophomore BSCS Blue Version biology class?



Sister Mary Edith

In the teaching of the physiological function and the inter-relationships of the different chemicals involved, I feel the transparencies are a big help. While the class is working out the concept

of the function, I draw the diagram on the acetate role. After we have the process developed, I use the prepared transparency to unify and clarify the whole.

When using the prepared transparencies, colored markings clarify ideas while adding variety and interest. I make these colored additions with the transparent colored markers or transparent inks. The transparent color markers are a felt pen type of ink good to use as paint in filling in an area or to distinguish one structure from another during class. Used with a No. 2 pen point, the transparent inks are excellent for fine lines to underline or print in labels or explanations. Acetone cleaner or water will remove both types of ink. To make transparencies permanent spray them with Clear-a-slide, marketed by Besler Company, East Orange, N. J.

Sister Mary Edith, R.S.M. is a member of the Sisters of Mercy at Cedra Rapids. She received a BS degree from Creighton, and her MS from the University of Iowa. Sister Mary Edith has been especially active in conducting in-service workshops in science.



Student entering pertinent information of folder before adding to the file, the transparency made.

An Example—The Photosynthetic Process

Light Reaction:

1. One photon of red light is absorbed by the chlorophyll molecule.
2. An electron spins off the chlorophyll molecule, is passed from electron acceptor to electron acceptor producing ATP molecules.
3. Some of this energy is used to break apart the water molecule into electrons, hydrogen ions and oxygen atoms (forms oxygen gas).
4. The hydrogen ions and the electrons from the chlorophyll atoms join to form hydrogen atoms ready for the Dark Reaction.
5. Some of the energy trapped by hydrogen transfer is also used in the Dark Reaction.

Dark Reaction:

1. Carbon dioxide molecules join with the five-carbon molecules, ribulose

diphosphate (RDP) to form six-carbon molecules.

2. The six carbon molecules split into two three-carbon molecules, phosphoglyceraldehyde (PGAL). Water is produced here, also.
3. For every six PGAL molecules, one represents the net end product of photosynthesis (two of these forming one glucose molecule) and the other five form one fifteen-carbon intermediate compound which in turn splits up into three five-carbon molecules, the original RDP.

Obviously this is not all covered in one lesson. Light Reaction is one lesson: Carbon Synthesis another.

After the students have studied about photosynthesis in their textbook, and begin in class to tell how the whole process starts when one photon of red light is absorbed by the chlorophyll molecule, exciting an electron that spins off the molecule, I draw this on the acetate role. We will go back over this taking turns explaining it—the student with a pencil at the overhead projector. When we have finished class, I make a copy of this on a sheet of typing paper and have copies of it prepared, on the duplicator for the class and on a transparency for me.

In the Dark Reaction there are many relationships to perceive. My class this year seemed concerned over balancing the number of atoms going

into and the number of atoms in the compounds resulting from the reaction. Therefore we balanced the whole to show the production of one PGAL molecule.



Students preparing a set of transparencies to use to show the rest of their class the results of their portion of the study of plant growth.

Photosynthesis is a source of oxygen gas. Late when respiration is studied, this transparency can be used again to show that respiration and fermentation are exact reversals of photosynthesis.

Colored inks in this transparency? They could be used to underline the answer to the question under discussion. For example, if the formula for photosynthesis was being discussed,

News of the Pennsylvania Science Teachers Association . . .

In a publication recently received, the PSTA announced a 4-day workshop, which was held at Edinboro State College, Edinboro, Pennsylvania. Among those on the program were teachers from elementary and secondary schools, and college instructors. A number of interesting field trips were indicated, including visits to natural habitats and industrial tours.

one color would be used to underline the compounds that go into the system and another for those which result from the system. If the class is discussing how water and carbon dioxide go through the system, carbon dioxide and all compounds that contain any of its components could be one color and water and all components that receive oxygen or hydrogen atoms from it could be another color. As noted earlier these colors are very easy to wipe off.

I would like to emphasize that it seldom seems advisable to label transparencies very extensively as they are very valuable for unit reviews, semester reviews, and for testing purposes.

Other Uses of The Overhead Projector

Pop quizzes can be prepared with the special carbon paper on the acetate sheet or with the grease pencil directly on the acetate role. Answers for objective tests are available for all in a quick, efficient manner in the same way.

The students can also use the overhead when they are leading discus-

ther this report be given as part of a discussion on a class laboratory investigation, at a seminar, science club or paper section of a science fair or at



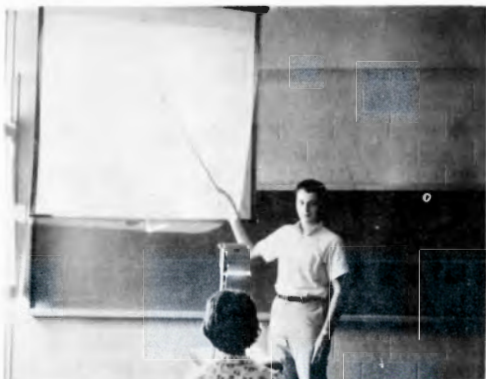
Student shows the transparency which she will use in giving an oral report on an article in *Scientific American*.

the Junior Academy of Science, overhead projection will clarify the student report and add interest to it. It might be noted that this is much simpler for the student than trying to make large posters, and more versatile, as he can write on it, add to it, color in areas, etc., as he talks. The transparencies used in student reports can be washed and the acetate sheet used again. If the teacher feels the materials might be helpful for further reference they can be sprayed and filed.

I also decided to use transparencies to inspire interest in current science reading to help students become aware of current research problems and contemporary scientists. Any diagram, chart, simple line drawing, or thought-provoking question taken from materials discussed in a *Current Science*, *Science World*, or *Scientific American* or similar magazine or paper is stimulating and leads to later discussion of this topic.

Student and Teacher Evaluation

Knowing that evaluation of one's own teaching methods is often misleading, I asked the students to write an evaluation of the use of the over-



Steven Stodola, junior, practices his paper for the Jr. Academy of Science.

sions or giving reports. Transparencies giving the background information for student research, and/or charts and graphs constructed showing results of the group or individual investigation can be projected. Whe-

head projector as it had been used in class.

In general, the students seemed to like its use. "It is a great improvement over using the blackboard or the wall charts. One can see things develop much better through the use of the projector. You can not see this on the blackboard because the teacher is in the way while she is writing". "With the overhead one picture at a time can be seen, while with a blackboard you have a cluttered bunch of drawings, word, etc., and your attention is not focused on one thing very easily". "It is like starting on a clean blackboard each time you turn that deal you write on." "It is in a position that everyone may see and is clearer to read as it doesn't tend to reflect light from the windows." "We can hear you better when you face us". "It is nice to just turn the crank and get the whole picture like a movie. On a blackboard you don't get this continuity."

"The transparent ink helps especially if it is applied during class". "Micrographs are easier to see and understand with the use of inks." "The transparent ink helps me understand cycles much better than if they were just explained without drawings or in one-color drawings" "The use of colored ink helps to unify a chart and show relationships".

"The whole lesson can be written on the transparent paper before

class." "I like to have a copy of the diagram you are using to write on and keep."

"It is much clearer when we are telling each other about our experiments when we can use the overhead projector to show the rest of the class our charts."

Personally, I like to use the overhead projector. I can watch the students reaction so much better than when I was illustrating on the blackboard or using the wall chart. I find it takes less time and energy to draw small diagrams on the acetate roll. It helps to arrange illustrations in an orderly sequence and to keep the entire series until the topic is completed. It is easy to refer back to material just discussed.

A Word of Caution

The machine need not be used all the time every day. A good picture is worth one hundred words but words that do not clarify the topic under discussion merely confuse. Its over-use could make a very teacher-dominated class. In other words, it should not be used just for the sake of use, but only as a teacher-student helper.

Bibliography

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CONFERENCE ON ARTICULATION IN THE SCIENCES Between Junior Colleges and 4-Year Institutions

A 1½-day conference on the articulation of science teaching points up the increased activity of the ISTS and the Iowa Academy of Science. This joint effort to sponsor a conference devoted to some of the problems of science teaching in Iowa's colleges and universities was coordinated by Dr. Robert Yager, Iowa City, and Dr. Leland Johnson, Drake University, Des Moines. The National Science Teachers Association gave support to the Conference and took the responsibility for publishing Proceedings of the Conference.