I also did the test on seventy-nine Biology classmates age fifteen to sixteen. The results were as follows:

Girls	Per cent	Boys	Per cent
2	90%	4	95%
1	87%	9	90%
14	85%	13	85%
17	80%	5	80%
6	75%	1	75%
1	60%		

These results show a decided tendency toward a slight anemia in more than half of the sophomores tested during the winter months.

We used the Tallquis Hemoglobin test which may be bought at any pharmacy or drug store for one dollar.

When taking this test I sometimes had difficulty of getting a good size drop of blood. I also found that I needed plenty of light to make an accurate reading.

Olga Jiroutek,
Roosevelt High School,
Cedar Rapids, Iowa

Misses Sorenson, Herrbach and Jiroutek are pupils of S. M. Pattee, Roosevelt High School biology teacher, who has made frequent contributions to *The American Biology Teacher.*

The Conservation Project of The National Association of Biology Teachers

Richard L. Weaver, Project Leader
School of Natural Resources, University of Michigan, Ann Arbor

The National Conservation Project launched last year by The National Association of Biology Teachers has received the wholehearted support of all the people who have considered it and over thirty national conservation organizations have endorsed it and their representatives are serving on the Advisory Committee for the Project.

There are two distinct objectives to the project: (1) to encourage as many biology teachers as possible to engage in some conservation teaching, and (2) to obtain descriptions of the outstanding techniques used, for publication in a series of leaflets on conservation teaching.

In order to help biology teachers understand the type of activities deemed most helpful in teaching conservation, a set of criteria with illustrated examples has been prepared in a series of national and state meetings. These Criteria have been published and distributed, and are printed below. Anyone interested in helping with the project can obtain copies from the project leader.

Meetings of state and other groups will be held as frequently as necessary, and wherever feasible to assist in the development of plans and the promotion of the project. The grant-in-aid of $10,000 made by The American Nature Association, is being used to underwrite the expenses of state committee work, regional and national meetings and work conferences. Several states, including Indiana, North Carolina and Tennessee, have received additional grants from the National Wildlife Federation, which will facilitate their state plans.

National Association of Biology Teachers CONSERVATION PROJECT

To help increase the effectiveness of conservation and resource-use teaching by biology teachers

The three-year conservation project has been developed by the National Association of Biology Teachers, with the help of a grant-in-aid from the American Nature Association. The project is designed to develop and promote the acceptance of a set of criteria or objectives, which can be documented by actual illustrations of good teaching techniques particularly by biology teachers, and which can be used to stimulate many more teachers to increase the emphasis on conservation.

Committees are organized in each state to activate and conduct the project. State committee meetings, and state and regional work conferences will be organized in cooperation and in conjunction with meetings of other professional groups to prepare plans, screen and edit materials and to initiate new activities. All biology teachers and others interested in helping with the project are urged to contact the Project Leader, or the state and regional chairmen, or members of the Executive Committee, listed on the back of this letter.

References

We recommend the use of four specific new yearbooks and manuals, along with the numerous national texts and references on conservation listed in their bibliographies, to state committees and schools desirous of establishing sound definitions and programs in conservation education. They are:

1. **Conservation Education in American Schools** by the American Association of School Administrators, 1201 16th Street, N.W., Washington 6, D. C. 1951. 527 pages. $4.00. See pages 61–74 Guides for School Programs in Conservation Education. Pages 229–252 Administrative Leadership.
2. **Large Was Our Bounty,** Natural Resources and the Schools, by the Association for Supervision and Curriculum Development, 1948 Yearbook, 1201 16th Street, N.W., Washington 6, D. C. 216 pages, $2.50. See pages 44–68 What Principles Shall Guide Us.
3. **Learning by Living,** Education for Wise Use of Resources, by Southern States Work Conference and Committee on Southern Regional Studies and Education. (Order from State Department of Education, Tallahassee, Florida.) 1950, 122 pages, 50¢.
4. **Guide to Resource-Use Education Workshops,** American Council on Education and Committee on Southern Regional Studies on Education, 1785 Mass. Avenue, N.W., Washington 6, D. C. 1951. 50¢.

Use of Criteria

We recommend the following criteria as guides in:

- Locating outstanding conservation teaching by **biology teachers.**
- Securing examples of techniques and good teaching practices which will illustrate one or more of the criteria.
- Preparing descriptions of the examples suggested or of comparable ones, to publish and share with other interested teachers.
- Stimulating greater emphasis on conservation in biology programs.

If you have completed one or more examples which will illustrate any of the criteria, prepare your description as indicated in the following instructions. If you have not as yet completed any conservation activities but would like to do so, we suggest that you experiment with one or more

of the projects or techniques suggested and report your results to the committee for possible publication. Send such descriptions to your state chairmen or to **RICHARD L. WEAVER, Project Leader, School of Natural Resources, University of Michigan, Ann Arbor.**

Criteria for Conservation Teaching in Biology

prepared for use in the

Conservation Project of the National Association of Biology Teachers

A. Conservation Education includes and shows the relationships of the natural, human, social and economic resources. The biology teacher is particularly responsible for instruction in techniques and information related to the wise use of the natural resources.

1. The biology class arranged a panel of representatives of resource agencies to show how each agency was concerned with the problem of stream pollution in a city.
2. Data were obtained by the biology classes resulting from soil tests and observations of animals showing results of mineral deficiencies in the soils of a county.
3. Biology students compared an area reforested and planted with wildlife cover with one not improved to record the increase in wildlife and the decrease in soil erosion.
4. Data were obtained which showed the detrimental effects of too much drainage on wildlife populations and on the lowering of the water table in certain parts of the state.
5. The biology students compared the land use practices and the population changes in their county with another dissimilar county in the state to show the value of good conservation farming.
6. The biology students studied the subdivision of the city in which they lived to see if the space was being used most efficiently, if the various wastes were disposed properly, if blighted areas could be reclaimed and if soils need special treatment for vegetables and flowers.

B. Conservation Education is an integral part of the curriculum. The biology teacher shares responsibility for a large part of the conservation emphasis and seeks to integrate biological information with the activities of other subjects and appropriate extra-class activities.

1. The biology and vocational agriculture classes cooperated in planting a windbreak around the school grounds.
2. The biology and home economics classes developed a rooting bed for shrubs and flowers to be used in landscaping the school and the homes of interested students.
3. The biology classes assisted the Junior Bird Club in the Fifth Grade in establishing a wildlife sanctuary near the school.
4. The biology club set up a wildlife display in the Science Fair at school and at the county fair.
5. The biology class cooperated with the history class in developing a local history of the way the natural resources had been used in the area since its settlement.

C. Conservation Education is fitted to the experiences, needs, and interests of the pupils. Biological interests which are stimulated by out-of-school activities are used in the school program and the conservation activities within the school are directed so as to carry over into out-of-school activities.

1. Pupils designed specific methods for the control of insects in their own gardens.
2. Pupils demonstrated approved methods of trapping, fishing, hunting, and camping.
3. Pupils were assisted by the biology teacher in preparing for the conservation merit badge in Scouting, as a part of the biology course.
4. Biology pupils in the photography club prepared an exhibit for the school on plants attractive to birds in their locality.
5. Pupils organized themselves into small groups to work on units in conservation of their own choice and shared their findings with the other groups.

D. Conservation education develops proper attitudes toward the wisest use of all resources. Correct conservation attitudes are incorporated and allied with other character-building and citizenship efforts.

1. Members of the biology class were instrumental in getting a number of boys to stop shooting song birds with BB guns, by interesting them in "shooting them" with cameras.
2. The biology class organized a forestry patrol for planting trees and putting out forest fires in the area.

3. The biology class worked with the student council in maintaining attractively landscaped schoolgrounds, encouraging plantings, and protecting trees and shrubs.
4. The biology students participated with students in social studies in a series of symposia and discussions on private enterprise vs. public interest in resource development.
5. The biology class provided the necessary biological information to help the civics class in making a safety map and plan for the city, which was accepted and used by the student council.

E. Conservation education provides pupils with information about careers in conservation and provides stimulating work experiences and contacts with professional conservationists.

1. The biology class regularly visits farms, state parks, forests and fish hatcheries, to study the conservation practices and to assist locally in tree planting, fish stocking, or running lines for terraces.
2. The biology classes spent a week at a school camp in a state park, studied and worked with professional conservationists on conservation projects.
3. The biology students cooperated in planning and conducting a career day sponsored by the guidance office.
4. The county forester, soil conservationist, wildlife technician and a local nurseryman were used as consultants in developing plans for making the schoolgrounds an outdoor teaching laboratory.
5. Students made a survey of the professional opportunities in teaching conservation, in nature writing and photography, and in school or private camp work.

F. Conservation education is a cooperative enterprise between school and community, bringing about a better understanding of resource problems and developing plans for the solution of them.

1. The biology class assisted the health department in a survey and control of mosquito breeding areas, in and near the city.
2. The biology class worked with the health classes in a survey of hook worm infestation in the county and helped the health department in its educational program on elimination of the causes.
3. The biology class gathered all available information on the best agricultural practices for the county and dramatized the effects of one-crop farming and the need for diversification and soil conservation at a series of community gatherings.
4. The biology students developed a testing service for seed germination and soil acidity for the families served by the school.
5. The biology classes helped the state conservation officials locate abandoned mines which needed sealing to protect the local streams.
6. The biology class assisted town officials in developing an area for a community park, a nature trail, a wildlife sanctuary.
7. The biology class studied stream pollution and solicited the interest of the community in control measures to make the stream fit for recreational use.
8. The biology class demonstrated on the school property how to utilize leaves from city streets, garden wastes and garbage from the cafeteria in making mulch.
9. The biology students made block surveys in the city to determine the shade tree needs and assisted town officials in planting suitable varieties.

G. Conservation education is well-balanced with respect to content. It embraces a broad consideration of the biological interrelations which exist among wildlife, water, forests, grasslands, wastelands, soil, minerals and people.

1. The biology classes developed and used a portion of the school ground or a school or town forest as an area to observe ecological succession in nature, and to determine the types of management practices needed to conserve certain aspects of the environment. They developed a nature trail in it for the use of all students and parents.
2. The biology students prepared maps, pictures, and models illustrating good and poor conservation practices in the county and displayed them for civic groups, clubs and P.T.A.'s.
3. The pupils prepared graphs and charts to show the good and bad effects of local industries in the area.
4. The biology class made a comparison of self-sufficient farming versus commercial or one-crop farming.
5. The biology class developed plans for reclaiming blighted areas nearby.

H. Conservation is taught as a science and biological research provides the data for development of conservation plans and procedures. This scientific information is translated into social action, as good conservation is improved behavior.

1. Biology students helped identify local conservation problems, determined the causes scientifically and through controlled experiments developed suitable plans for their solution.
2. Soil tests, population counts of plants and animals were made on areas under different management plans to show the effects of over-grazing, one-crop farming, improper forest cutting as contrasted to the best practices.
3. The students grew seedlings in soil or water of different mineral deficiencies and then compared their results with soil tests of neighborhood soils.
4. The biology class experimented with earthworm cultures and compared their results with population counts of earthworms in local soils.

I. Conservation education begins at home but eventually includes the problems, the developmental plans and proper attitudes and habits applicable to the county, state region, nation and the world.

1. The students traced the historical, agricultural, and industrial development of the county and state and correlated those with the reduction or proper maintenance of the natural resources.
2. The biology class cooperated with the social study classes in providing information as to the contributions of biology in the Point Four program.
3. The biology students arranged for panels and discussion groups of representatives of different countries to gain a better understanding of the mutual resource problems.
4. The biology students analyzed the causes of the dust bowl, the effects of the cotton and tobacco economy in the South, and the values of the national parks.

J. The best existing textbooks, pamphlets, films, recordings and other instructional aids are utilized but an attempt is also made to develop materials that are adapted to the communities own environment and resources.

1. A series of slides and movies were developed which illustrated the most important local resource problems and showed suggested solutions.
2. Arrangements were made and a list compiled of places to go in the county where different things could be studied and photographed, and where field trips could be conducted.

K. Conservation applies to all people, rural and urban and to be most effective a common viewpoint with respect to resource use should be established which shows the interdependence of all groups.

1. The biology classes worked with the agricultural classes and FFA clubs in dramatizing the close relationship of rural and urban development to better roads, more markets, more employment, better health and better schools.
2. The biology class sponsored a conservation fair which was participated in by all the schools in the city and county showing the results of conservation projects and activities in all the schools.
3. The biology class found suitable plots in the city where experimental work on vegetables, flowers, and shrubs could be conducted and proper uses demonstrated for various fertilizers, insecticides, and weed killers.
4. The biology class conducted a metal scrap recovery project to help raise funds for a community center.
5. The biology students made a study of the money spent in cities by rural people and the money invested and spent in the county by city people, to show the interdependence of rural and urban areas.
6. The biology students interviewed bank officials and farm loan agencies to see how improved land use practices are encouraged by loans.
7. A wildlife club was organized in the city to assist farmers in the area with wildlife improvements and proper hunting practices.

Instructions to Teachers for Preparing Descriptions of Techniques

Some teachers and schools will have conducted more than one project or activity. However it will be helpful to the editing committees if each project, activity or technique is described separately. In these descriptions, the following things should be included.

1. With which group, in which school and during what period of time was it used?
2. How the particular activity, project or technique originated and the part the students, parents, and community leaders had in planning it?
3. How the work was organized, the people who assisted in the execution of it, and the way the students and other classes shared in it?
4. Which particular resource problem or conservation attitudes were stressed in the development of the work?

5. How the work was evaluated and what tangible results could be observed or recorded?
6. Other things which you consider important.
7. Pictures and charts or graphs should be included with the description wherever possible.

Send the descriptions to the state chairman. A list of these was published in the May issue (page 115) and a revised list will be printed in an early issue.

AN APOLOGY is in order, to the Project Leader and others in charge of the Conservation Project, for the failure of *The American Biology Teacher* to print the foregoing in the October Issue. By one of those switches explainable only as some sort of lapse, the material was filed in the November folder instead of the October and discovered too late to make the correction. It should by all means have appeared as near as possible to the beginning of the school year.

JOHN BREUKELMAN

What to Look for in a Science Teacher

B. H. CARLETON
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Our publications are so well supplied with articles on science teaching that nothing further would seem possible on the subject. Strangely enough, almost nothing has been written on the real reasons why administrators choose teachers; no one, apparently, has cared to write much about the actual reasons for failure and success in science teaching.

The question "What is a good teacher?" when asked over forty years ago in Oregon, gradually developed one of the first rural-school standardization programs in the United States, conducted at the outset by H. C. Seymour with the cooperation of J. H. Ackerman, Oregon Normal School's President at that time.

It would seem profitable, therefore, to inquire as to the nature of successful science teaching, if for no other reason than to advise prospective science teachers.

"Other things being equal, character is decisive," one eminently successful scientist and science teacher has observed.

The type of person suitable for science teaching cannot be described by a list of desirable attributes because it is conceivable that the list could be fulfilled by a person entirely unsuited to the endeavor. Certain minima are taken for granted, such as knowledge of the subject, technical ability to teach effectively, and a suitable personality. None of these three needs further belaboring. It is presumed that no one with serious defects, such as dishonesty, lack of personal integrity, or antagonism toward students, could obtain sufficient recommendations for serious consideration by any administrator.

Someone should, however, advise prospective teachers of the real problems they will meet, and perhaps indicate how administrators would like to have them solved. In the first place, the welfare and good of the entire school must be placed foremost. It is not enough that a teacher develops his own students, conducts his classes well, or makes a fine impression at meetings with parents. Schools and universities are similar to delicate flowers—they can grow and bloom with careful attention, or they can wilt and sour from neglect or dissension.

The teacher who merely attempts to demonstrate his own knowledge and political wisdom for his own advancement distresses his administrator, since integration is hampered.

There are marks and signs of the amateur science teacher well known in the field of science. Such a beginner is