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## Introducing the Biology Course in the Classroom

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## INTRODUCING THE BIOLOGY COURSE IN THE CLASSROOM

### Biology

The success of any course in high school science often depends upon the interest aroused in it during the first days of its presentation. This interest is particularly easy to arouse in biology, chiefly, I suppose, because people are always interested in living things, or things that have been alive. Moreover, though he does not recognize it as such, nearly every pupil has considerable biological knowledge when he first comes to class, and it is this preliminary knowledge which can be made a strong entering wedge into his interest in the subject.

I usually begin the first day's discussion in biology by asking the pupils to name some common animals and plants. I prepare for the discussion by placing on my desk beforehand, a number of familiar biological objects, such as an ear of corn, a live frog, a clam shell, an egg, a potato, a fish, and perhaps a stuffed bird. A big chart of common animals and plants is very helpful also. I then have the pupils identify as many of the these specimens as possible, and tell me what they are used for, where they are found, what they feed on, and any other information that they can give about them.

After this discussion, I point out to the pupils that they already know considerable biology, for biology is simply the science which deals with animals and plants. They may use the last half of the preceding sentence as a definition of biology. From this point, the teacher may develop the subject by raising a series of questions, the discussion of which will bring out the variety, the uses,

the methods, and the importance of the study of biology. From this point, the following is given only as a suggested procedure.

### What is there to study about animals and plants?

The very things which were discussed at the beginning of the lesson. The teacher may now make this concrete by taking some common animal, as the frog, and briefly discuss it as to structure, functions, habits, place of abode, enemies, reproduction, economic importance, etc. The same may be done with the corn plant.

### What value has biology?

Discuss here the importance of corn and hogs in Iowa. Four hundred millions of bushels of corn in one year! Give some figures for other products if possible. Inquire as to the use of horses, milk, etc. Bring out that we learn to enjoy the things that we know most about; that some knowledge brings a desire for more; and that we like to protect and improve the things we are interested in.

Protection of useful things may mean the destruction of certain harmful things such as bad weeds, poisonous snakes, house rats, great horned owls, and disease germs. The teacher may emphasize here the folly of killing such harmless animals as toads, frogs, birds, and most snakes; and that biology teaches us to save rather than to destroy. Emphasize the conservation idea.

### How do we study biology?

By observation, description, comparison and experiment, and by reading what others have written. Have a pupil describe a robin or an oak tree. This is descriptive biology. Have him compare a robin with a crow, or an elm tree with an apple tree. This is comparative study.

Have him take a cat into a dark closet and observe whether or not its eyes shine in the dark. Offer an earthworm to a hungry frog. Does it eat earthworms? These are examples of experiment in biology. Ask if the pupils have read any books about animals or plants. Refer them to John Burroughs, Chas. G. D. Roberts, Hal G. Evarts, and other writers. This is the method of gaining information from others.

**How do animals and plants affect us?**

Some furnish us with food. Require the pupils to name the various foods upon their home table, and then inquire the source of these foods—beef, milk, butter, eggs, canned salmon, jelly, potatoes, coffee. Bring out our dependence upon animals and plants for foods.

Refer here to various harmful plants as disease producers, resulting in influenza, pneumonia and tuberculosis. Mention a few harmful animal forms, as malaria, sleeping sickness parasite, tapeworm, bed-bugs, and lice. Show some harmful animals which affect our domestic animals and plants — biting flies, fleas, ticks, mosquitoes, corn-borer, squash bug and cut-worm.

Many animals and plants furnish us diversion and interest during our leisure time. Use birds as examples of these. Some people spend all their spare time studying birds, their songs, nests and migrations. Any animal becomes interesting if we study it enough.

**How may biology affect our vocation in life?**

Here is a good chance to show the pupils how a course in biology may awaken their interest in some particular line of future activity, that is, may help them in choosing a vocation.

Point out to them — it may be brought out by questioning — how various professions have their basis in biology, for example, medicine, dentistry, nursing, sanitation.

As was said above, this article is purely suggestive. Any wide-awake teacher may modify or develop the procedure according to circumstances. The material here given may occupy two class periods.

ROY L. ABBOTT

## THE STRUCTURE OF MATTER

### Physics

At the present time, physical science recognizes the following divisions of matter: masses, molecules, atoms, electrons and protons. Matter appeals to us directly in the form of masses. We can readily sense a mass of water, a mass of air or a mass of iron; but it is quite different with the other divisions of matter. Molecules are so small that it takes about seventy billion billion of them laid side by side to extend through the length of one inch. No microscope is powerful enough to discern even the larger molecules, such as those constituting a mass of sugar. For a long time molecules existed only in theory but at the present time there is abundant experimental evidence to vouch for their reality. Metallic elements, like mercury, are monatomic, which means that their molecule is composed of one atom. X-ray photographs of some crystals have revealed that the atom makes up the basic physical structure of the mass, but the molecular structures of most masses are complexes of combined atoms.

For many years atoms, according to the theory originated by Dalton, were supposed to be indivisible units of matter. At present, however, we know from a wealth of experimental data, that they consist of minute particles of negative and positive electricity, called electrons and protons, respectively. Every atom, regardless of the nature of the substance of which it is a component, consists of negative electrons and positive protons. The number of electrons in each neutral atom is exactly equal to its protons. A hydrogen atom, the lightest of all atoms has one proton and one electron. The uranium atom, which is the heaviest of the ninety-two elements, has two hundred forty-eight each of protons and electrons. The protons are massed together by the attractive force of part of the electrons to form the nucleus of the atom. The rest of the electrons are assumed, according to a theory originated by the Danish physicist Bohr, to be revolving around the nucleus in a manner similar to the motion of planets around a sun.

L. BEGEMAN