

A Handbook for Biology Students

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During a period of five years of teaching secondary biology and currently teaching college biology, I compiled a handbook for biology students, not as a means to an end, but as a useful supplement. The merits of such a handbook become apparent while reviewing the proposed table of contents¹ (Table 1).

The length and material are not rigid factors and both can and must be altered to the individual instructor and school. However, even though teachers, biology students, and teaching situations do differ, I feel that the subjects included in the table of contents can be used in any school system by any instructor. The suggested number of pages simply give an idea of the approximate length of a typical handbook.

I found that if the handbook is carefully written, avoiding current dates (except where necessary), the upgrading of the handbook can be minimized and the majority of the contents can be used year after year. An inexpensive folder can be purchased to bind the handbook, and thus returned at the end of the term, or it can become the personal property of the student, to be written upon and altered as necessary. In the latter case, a nominal fee can be charged to cover printing costs.

No doubt, any instructor will have to alter his original copy. The proposed table of contents should prove to be particularly helpful to the neophyte biology instructor. Not having such a table for a guide, it was only after the fifth year did I find that the contents had finally "reached" a somewhat stable point. Much of the material can be used as part of the daily class discussion; particularly the history of biology, suggested correct study habits for biology students (Table 2), and the laboratory and projects sections. The usefulness of the student

having written instruction becomes obvious when fewer students begin to ask the same question over and over and the remark, "but you didn't tell us or explain how" becomes needless.

Table 1: Proposed Table of Contents for a Handbook for Biology Students¹

<i>Subject</i>	<i>Approximate Number of Pages</i>
I. Forward to Students and Parents.....	1
II. Brief Personal History.....	1
III. Personal Philosophy of Biology.....	1
IV. Brief History of Biology.....	5
V. Scientific Attitudes	1
VI. Explanation of Grading System.....	2
VII. Evaluation of Performance.....	1
VIII. Classroom Rules and Regulations.....	3
IX. Suggested Correct Study Habits for Biology Students ²	1
X. List of Biological Prefixes and Suffixes.....	3
XI. Yearly Biology Syllabus.....	3
A. Lecture and Chapter Number	
B. Laboratory	
C. Field Trips and Specials	
D. Tests	
XII. Laboratory Rules and Regulations.....	1
XIII. To the Student Concerning the Laboratory	2
A. Objectives of Laboratory Work	
B. Characteristics of Good Laboratory Work	
C. Types of Laboratory Work	
D. Safety in the Laboratory	
XIV. Laboratory Drawings	3
XV. Example of a Laboratory Drawing.....	1
XVI. Key for Grading Laboratory Drawings	1
XVII. Student and Lab Assistant Duties for Dissection	1

¹ Copies of the entire handbook can be obtained for a nominal fee.

XVIII. Sample of a Field Note.....	1
XIX. Required Semester Projects.....	2
A. Leaf and Other Collections	
B. Research Project and Paper	
XX. The Scientific Method.....	6
A. The Experiment or Science Day Project	
B. Biology Project Ideas	
C. Suggested Books for Biology Project Ideas	
D. Students Currently Working on Research Projects	
XXI. Some Facts for the Science Day (Fair) Entrant.....	3
XXII. Work Project Schedule and Duties for Entire Class.....	2
	Total 45

Table 2: Suggested Correct Study Habits for Biology Students

1. *Be sure of your assignment.* Refer to the year's syllabus to determine the assignment. The week's assignment will be written on the board either daily or at the beginning of the week.
2. *Read the assignment rapidly the first time.* Read it slowly the second time and comprehend it. Make sure that you understand the meanings of all the words in the assignment. If you do not understand something, jot it down and ask me the following day.
3. *Never neglect an assignment.* Read everyday.

¹With additions or deletions, this handbook can be used for either high school or college biology courses. Further, with the purpose in mind, it seems quite feasible that it could be altered in subject name and used in any of the sciences.

²This entire page can be seen as Table 2.

4. *You have advance notice of your assignment (syllabus), do not wait until the last day to do it.*
5. *Start study sessions in class if time permits.*
6. *Have a time and place habit for studying.* Have a quiet place. No radios or favorite TV show while studying. Plan the time so that it is not when a favorite TV program is in progress. Cokes and coffee with a friend can be interesting and fun but they take up a great deal of time.
7. *Concentrate on study.* Don't allow interruptions. Be sure your study is not interrupted by lunch, household chores, thoughts of friends and so forth. If something occupies your mind no matter what you do, meet it first, then study with a clear mind.
8. *Use reference books found in the library and in the laboratory.*
9. *Use your dictionary for words you don't know.* Use the glossary in the back of your textbook and keep one of your own in a notebook. Learn the prefixes and suffixes provided in this handbook.
10. *Take careful notes in class.* Keep your notes in a regular notebook. I will explain the type in class. Much of the material covered in class will not be in your text, thus the only record is your notes.
11. *Review your class notes before you start studying your new assignment.* Check your material in the text to see whether you have the material recorded correctly. Check your English usage.
12. *Pick out the "meat" or important materials.* An outlining will help your memory.
13. *Pay attention to class discussions.*
14. *When you have a reading assignment for which you are to get definite information or answers to a list of questions, make sure you read the entire assignment before you try to answer the questions.*
15. *Have the right tools.* Have four hard pencils for laboratory, drawing paper, etc.
16. *Most important.* When you are in doubt about anything, ask me.

CO₂ AND MOSQUITOES

Dr. R. H. Wright of the British Columbia Research Council on Canada has discovered that the mosquito is excited by the carbon dioxide exhaled by a human or other mammals. The mosquito flies toward the person in a zig-zag pattern through the stream of air until it is close enough to see the person. If a person is protected by mosquito repellent, the odor may cause the mosquito to veer away from the CO₂ strain.

SHELLS

The most valuable shell in the world is considered to be the cone shell. *Conus*, *Gloria-maris* and the last of these shells sold for \$1,200.00. Many of the cone shells are venomous containing a tiny harpoon that is ejected from the tentacle and stabbed into the victim.

The speed of air moving within a thunderhead has been measured at speeds upward to 5,000 feet per minute.

TEETH AND BARNACLES

The glue produced by barnacles may soon be used for such jobs as gluing fillings into teeth. Barnacles produce a glue in a liquid form that flows out through their antennas, hardens in water in about fifteen minutes, sticks tightly to all surfaces, and is extremely hard to remove. A dentist today has to drill a hole or groove in the healthy part of the tooth to fasten a filling, but with this glue produced by the barnacle a filling could very well be glued into place.

Japanese for several years have been compressing garbage into small bales. These bales are being placed into lowland areas as fill.

The whooping crane population is now nearly seventy.

During the last ice age some of the glaciers were as much as 6,000 feet in depth over North America.