

HOW TO USE BIOLOGY INVESTIGATIONS

The Investigations in BIOLOGY INVESTIGATIONS are numbered to correspond to the chapters in MODERN BIOLOGY. This allows the students to correlate their laboratory experience with what they learn from their textbooks. In this way, biology is presented as a dynamic laboratory science.

The Teacher's Edition of BIOLOGY INVESTIGATIONS is annotated in color. The annotations provide the teacher with information on preparation, helpful hints, teaching approaches, and recommended laboratory techniques. The questions to be answered by the students are also answered in the Teacher's Edition in color.

The title of each Investigation is given in the form of a question. This allows for several interesting approaches. The teacher may emphasize the inquiry approach, for instance, and use the question to guide the students in *their discovery* of some biological principle. When presented with proper enthusiasm, the investigative nature of this approach can be an exciting motivating force.

The *Objectives* at the beginning of each Investigation help the students to understand what is to be learned. Most of the Investigations are divided into several Parts. In general, Part 1 represents the most basic procedure and offers background for the subsequent Parts. The *Pacing Guide* for BIOLOGY INVESTIGATIONS (pages T.5-T.7) offers suggested levels of difficulty and sophistication for the Investigations. It is recommended that teachers consult the *Pacing Guide* in developing a laboratory program that suits their particular circumstances. Time limitations, facilities, materials, and course level should all be taken into account when considering which Investigations, or Parts, are to be covered.

The first annotation of each Investigation gives an estimated time required for a class to perform an Investigation. The time will vary with each teacher and each class, but the recommended time does provide a basis for estimation.

Materials needed are listed in a box at the beginning of each Investigation. If materials are to be used only in certain Parts of the Investigation, it is so indicated. A total list of the materials and supplies needed for the course is on pages T.9-T.12.

The *Procedure and Observations* section is designed to guide the students through the laboratory procedure by asking questions which direct them in making observations and collecting data. Specific directions are given where necessary. The students should be prepared to use their textbooks and other resource materials (outside references, anatomical charts, etc.) to help them answer some of the questions. This helps the students develop proper research habits. By questioning what is being done, the students develop a better *understanding* of what they are doing.

Students should be encouraged to complete all data-gathering items. Charts, graphs, and illustrations are vital to the interpretation of data and the development of conclusions which respond to the title question. In addition to developing the proper interpretation of data, the *Summary* section allows the students to test what they have learned. Various forms of test questions are found in these sections throughout BIOLOGY INVESTIGATIONS. In some cases, students may be asked to match organ names with respective functions. In other Investigations, there may be essay questions to answer or illustrations to label. In each case, the answers may be found in the Teacher's Edition.

The *Investigations on Your Own* following the *Summary* offers alternative or advanced Investigations. Some of these are open-ended in nature, while most give directions for a particular laboratory exercise or field research. Students in an advanced course should be encouraged to develop their own laboratory reports using selected *Investigations on Your Own*. A suggested laboratory format is outlined in the section entitled "Working As a Biologist" on pages 1-2. The *Investigations on Your Own* may also be used for independent research or extra-credit projects.

A biology laboratory course can be as unique as the teacher developing it. By being aware of the tools offered in BIOLOGY INVESTIGATIONS, the teacher can best develop the potential of a particular approach.