STUDENT LABORATORY GUIDE

BIOLOGICAL SCIENCE

AN INQUIRY INTO LIFE

BIOLOGICAL SCIENCES CURRICULUM STUDY

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Contents

The *Student Laboratory Guide* contains 89 inquiries. Each presents different content and strates different aspects of an investigation or a concept. Many involve different equipment l techniques. Some are graded in terms of open-endedness, with earlier inquiries more highly uctured than later ones. This variety in the inquiries increases the flexibility within the class- om and laboratory environments and necessarily involves the teacher in decisions between ferent inquiries as basic or supplementary.

A decision to use all the inquiries involves assigning different teams of students different in- uiries at least some of the time. Whether this is feasible depends not only upon the necessary boratory facilities and supplies but upon the degree of independence students are to have in their boratory work. If all students are to undertake the same inquiries, some—perhaps many—of the nquiries will not be assigned, but students of high initiative will want to undertake certain optional nquiries on their own.

One suggested organization of the 89 inquiries into basic and optional categories is given in his table of contents, with optional inquiries indented. The decision of which inquiries to use, owever, remains the teacher's.

INQUIRY 3–2 **Cells of Living Plants**

An optional inquiry if plant cells are introduced in Inqu
living plant tissues are to be used for an introduction to
this inquiry can be made basic, and Inquiry 3–1 can becom

INQUIRY 3–3 **Cells from You and Frogs**

A basic inquiry into several types of animal cells and their contrasts with o
and with the cells of Inquiry 3–1 or 3–2.

INQUIRY 4–1 **A Chemical Reaction of Living Systems**

A classical investigation of the first-discovered enzyme—linking events in l
chemistry with events in living cells.

INQUIRY 5–1 **An Enzyme in Plant and Animal Tissues**

An inquiry again involving an enzyme, but investigating i
and action in tissue samples rather than in its extracted,
trated form. A simple calorimeter is used to help gather evi
whether enzyme-controlled reactions are taking place.

INQUIRY 5–2 **Food Energy**

A slightly more refined calorimeter is designed and constru
measure energy equivalents of common foodstuffs.

INQUIRY 5–3 **Compounds of Living Organisms**

An inquiry introducing the need for, and use of, simple tes
help distinguish one compound from another in plant and
tissues.

INQUIRY 5–4 **Oxidation-Reduction in Living Cells**

A basic inquiry into a significant pattern of chemical reactions in living systems, in
gated first in a model and then in living microorganisms.

INQUIRY 6–1 **Acids, Bases, and Cells**

An investigation into one of the ways cells maintain their narrow range of living co
tions despite a wide range of chemical changes. A basic inquiry, involving pH and buf
in tissue extracts.

INQUIRY 6–2 **Amino Acid Composition of an Unknown**

An inquiry into the identification of compounds for which the sim
tests of Inquiry 5–3 are not adequate. Paper chromatography is
troduced in an analysis for amino acids.

INQUIRY 10–1 **Distribution of Microorganisms**

Where around us are microorganisms found? A basic inquiry into a surprising domain.

INQUIRY 10–2 **Staining and Observing Bacterial Cells**

The Gram stain technique and its use in microscopic bacteria.

INQUIRY 11–1 **Descendants of a Single Cell**

An investigation showing how to keep track of reproducing microorganisms obtain pure cultures.

INQUIRY 11–2 **War on Bacteria**

An opportunity to test the relative effectiveness of know bacteria.

INQUIRY 11–3 **The Environment of a Microorganism**

An optional inquiry related to Inquiry 6–3, replacing with microorganisms in a study of interaction with the en The use of an ultraviolet light source requires special p

INQUIRY 11–4 **Discriminating Microorganisms**

An investigation of differences in the metabolism of sever microorganisms—specifically in their utilization of sugars.

INQUIRY 12–1 **A Plant-Animal?**

A basic inquiry into the value of a questioning attitude instead of rigid conc ganisms as "plants" or "animals."

INQUIRY 12–2 **Fungus Among Us**

An optional investigation of types of fungi.

INQUIRY 13–1 **Comparison of Plants—Simple or Complex?**

The basis for plant classification, and an introduction to plant phylogeny.

INQUIRY 13–2 **Green Algae—Simple and Complex**

A search for reasons why green algae are central to consid of the evolution of green land plants.

INQUIRY 14–1 **Alternation of Generations**

An investigation of a prominent pattern in the life cycles of both green algae an land plants. Mosses are the laboratory example.