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Bio Lab Basics (Quickstudy: Academic)

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BIO LAB BASICS

Essentials of lab concepts, use & safety—including helpful hints & tips

What is bio lab? Most introductory biology classes have two components, lecture and lab. This guide focuses on the basic concepts demonstrated by the lab aspect of these courses, and also describes basic lab safety procedures.

Essential Methods & Tools

Scientific Method

- The first time a child touches a hot stove and experiences pain, the child makes an observation, that is, he made an observation that a hot stove can cause pain.
- If he then, most likely, speculates that if he touches hot stove again, a burn will ensue.
- Specifically, observe phenomena and formulate testable, falsifiable hypotheses.
- Hypotheses that are un-testable and un-falsifiable are of little use in science.
- Test hypotheses
 - observation** – mostly viewing events, with little direct interference.
 - experimentation** – manipulation of some variables to record differences in outcomes.
 - treatment** – trials where variables are manipulated.
 - control** – trials used for comparison to determine whether there are treatment effects.
- Statistical analyses
- Most types of hypotheses require comparing data statistically for differences between control and treatment groups.
- Methods used to test hypotheses should be explicit enough for independent verification (i.e., so others can repeat the test).

To expose students directly to the scientific method, some introductory biology lab exercises involve doing experiments in which data can be recorded and analyzed.

Microscopy

- Much of life can be observed directly by using our eyes; that is, **macroscopy**.
- Because all organisms are made up of cells and come from cells (cell theory), and some whole organisms are single cells (microscopic), a considerable part of the biological world had to wait until the advent of microscopes to even be discovered!
- Today, microscopes are available not only to scientists, but even to those with just a casual or developing interest.
- Many parents purchase entry-level microscopes for their children, only to find themselves equally fascinated by the multitude of life present in a drop of pond water.
- Today's microscopes can magnify images thousands of times, including some types that are approaching 1 million times magnification; there are two basic varieties of microscopy:
 - electron microscope** – electron beams are used either to beam off surfaces (scanning Electron Microscopy or SEM) or to go through them (Transmission Electron Microscopy or TEM); computers translate the deflected (transmitted) electrons into images.
 - These types of microscopes have the greatest resolution capabilities, but are rarely used in introductory biology labs.

Because of expense and difficulty in preparing materials for observation.

i. light microscopy – Light waves are used to magnify items, because of the physical characteristics of light waves, most of these microscopes have maximum magnification factors of usually about 1,000-2,000x; there are two basic types of light microscopes:

- dissecting (stereoscopic) light microscopes** – minimum resolution <100x, used for relatively large or thick microscopic items.
- compound light microscopes** – wide resolution range 4-100x to 1,000-2,000x, used for many microscopic items.

Almost all introductory biology lab exercises involve microscopy.

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Synopsis

Focusing on safety and ease of laboratory use, this 2-panel guide is a one-stop resource for all biology lab students. It covers everything from dissection to microscopes.

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Customer Reviews

If I could own every one of these charts, I would. They are large [note-paper sized], and packed with information. I am a substitute teacher, and have purchased many of these cards to help in case I am called in to sub for the sciences, communication arts, history, government and computer programming. They have been incredibly valuable for that purpose, as well as in my efforts to brush up on subjects because of my personal interest in continuing my own education.

Quick and easy cheat sheet for bio.

Purchased for my son's first year college Biology class. I am a firm believer in every little bit helps. This fits well in his binder and covers the basics for a nice quick glance/refresher. In the world of Smart phones and tech gadgets this may seem a little old school. It's a great item to have. The guide is laminated, holds up to wear and tear, and is a nice price. I have purchased several of the BarCharts for my medical coding classes, medical terminology, anatomy & physiology, and my sons classes. Great references.

summary fashion - easy for guidance in topics

Just as displayed. Great shipping time.

As described

Great

Great class addition!

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