Introduction to Biotechnology

One Semester 4-Unit Survey Course Plan

Suggested Lesson Planning Guide
16 weeks, three 1-hour non-lab class lecture-discussion meetings/weeks and one 2-hour lab period (must be early in the week)

The corresponding section of the text should be assigned as reading either before or after the class meeting, as determined by the instructor

Week	Text Chapter Section	Lesson Objective	Key Concepts in Lecture/Discussion/Lesson	Lab Lesson Plan/Activity
1	1.1 1.2	Defining Biotechnology Biotechnology Products	- Biotechnology definition/description/domains - Examples of products and companies - Genetically engineered products	- Lab 1a Scientific Notebook - Lab 1b Lab Safety
2	1.3	Selecting Potential Products	- Product Development Plan - Research and Development, manufacturing - Testing/clinical trials, regulation	- Lab 1c Cheese Production
3	1.5	Biotech Careers	- Types of Jobs/Careers - Educational Requirements	- Lab 3a Pipeting
4	1.6	Bioethics	- Morals and ethics - Values Clarification Model for Decision-making	- Lab 3b Micropipeting
5	2.1 2.2	Organisms and their Parts Cellular Organization	- Levels of biological organization - Prokaryotic versus eukaryotic cells - Model organisms and product manufacture - Cell structure and role in biotech	- Review of Solution Preparation parts of Lab 3e Mass/Volume Solutions, Lab 3f % Mass/Volume Solutions, Lab 3g Molar Solutions, Lab 3h Dilutions
6	2.3	Molecules of Cells	- Survey of carbohydrates, lipids, proteins, and nucleic acids	- Lab 4a/4b DNA Isolation from Solutions
7	2.4	The New Biotechnology	- Central Dogma of Biology - Recombinant DNA - Synthesis of genetically engineered products	- Lab 4e Media Preparation

8		Midterms	- Speakers - Testing	- Lab 4f/4g Sterile Technique and Bacterial Cell Culture
9	4.1	DNA Structure and Function	- Double helix of nucleotide chains - Nitrogenous bases and base pairing - Semi-conservative replication - Protein synthesis	- Lab 4h DNA Extraction from Bacteria
10	4.2 4.3	Sources of DNA Isolating DNA	- Prokaryotic, eukaryotic, viral DNA - Gene expression - Media prep, bacterial cell culture, sterile technique - Vectors and rDNA technology - Transformation	- Lab 4i Making Agarose Gels
11	4.4	Studying DNA using Gel Electrophoresis	- How a gel box separates molecules - Agarose gel electrophoresis - Data from agarose gels	- Lab 4j DNA Gel Electrophoresis Part 1
12	5.1	Protein Structure Protein Function	- Protein functions - Importance of antibodies and enzymes	- Lab 4j DNA Gel Electrophoresis Part 2
13	5.2	Protein Production	- Protein synthesis - Transcription, Translation	- Lab 5a Antibody Simulation
14	5.3	Enzymes	- Enzyme activity	- Lab 5b Action of Different Enzymes
15	5.4 5.5	Studying Proteins Applications of Protein Analysis	- Polyacrylamide gel electrophoresis - Protein Indicators - Data from PAGE gels	- Lab 5e/Lab 5f Characterizing Proteins by PAGE Part 1
16		Finals	- Lab Cleanup - Testing	- Lab 5f Characterizing Proteins by PAGE Part 2