Biotechnology – 1 Semester, Bioinformatics Focus, Distance Learning Course Plan

Suggested Lesson Planning Guide

50 min class periods, 5X/week of lectures/discussions/demonstrations/projects meetings X 18 weeks

Week	Lesson Focus	Topic, Activity, Format, Focus	Key Objectives/Activities/Notes
1	Introduction	What the course look like (this semester (distance vs in the lab)	
	Scientific Notebook	Lab 1a Setting up the Scientific Notebook (as a group)	- Start (contract, rules, safety, etc.) and maintain a legal scientific notebook - Students need composition NB, gluestick, black pen, ruler, goggles, scissors and handouts from instructor (printed up 77% size).
	What is Biotech?	Assign e-books and access codes Biotech Live Activity 1.1	- Define Biotech, examples. Work individually, then share with the group. - Work individually, submit (email) to the instructor - Glue sheet(s) in NB
	Getting to Know Your Textbook	Textbook and lab manual survey Getting to know your Textbook and lab manual Activity (www.BiotechEd.com)	- Work individually, submit (email) to the instructor - Glue sheet(s) in NB
	Biotech is Important in so many Ways	1.1 Defining Biotechnology and Figure 1.13 Domains of Biotech (use for Tues'disc.)	- Activity (Using Fig 1.13): '**Biotech Products used by you and your "family**"' - Group reading and discusssion using text figures for discussion, Q/A sheet.
	Biotech Product Study	1.2 Biotechnology Products Table 1.1 Biotech Product Study	- Assign a different product to each student. Ask them to find interesting things about it (use, structure, etc.), make a "Factsheet", share
2	Biotech Product Study	Table 1.1 Biotech Product Study 1.3 Selecting Potential Products	- Student Share of Biotech Factsheet - Group reading and discusssion using text figures for discussion, Q/A sheet. - Biotech Online: Genentech's Product Pipeline

		1.6 Bioethics Ch 1 Animal Use Bioethics (individual) Ch 1 Animal Use Bioethics (group)	- Ch 1 Animal Use Bioethical Dilema, personal positions/policy - Ch 1 Animal Use Bioethical Dilema, group positions/policy
	Biotech Careers	1.5 Biotech Careers, and use Career Focus Employees from each Chapter (except Ch 12)	- Group reading and discusssion using text figures for discussion. Q/A sheet. - Find Job Listings for similar careers.
3	Organisms, Cells, Molecules	2.1 Levels of Organization: Organisms, Cells, Molecules (emphasis on Fig 2.5, and molecules of cells)	- Review of Levels of Biological Organization (atoms, molecules, macromolecules, cells with organelles) - Group reading and discusssion using text figures for discussion. Q/A sheet. - Biotech Online 'Picking the Right Tool for the Job"
	Cells and Cellular Organization	2.2 Cellular Organization and Processes	- Group reading and discusssion using text figures for discussion. Q/A sheet - Biotech Online 'Cell Picture Show" - Biotech Live 2.3 Amer Tissue Culture Collection
	Macromolecules	2.3 Macromolecules of Cells	- Group reading and discusssion using text figures for discussion. Q/A sheet - Biotech Live Activity 2.2 Macromolecules in Food - Biotech Online 'Computer-Generated Models"
	GE Biotech Products and the Applications of Genetic Engineering	2.4 The New Biotechnology	- Group reading and discusssion using text figures for discussion. Q/A sheet - Biotech Online 'Biotech Products Make a Difference" - Ch 2 Bioethics: Stop! You cannot use THOSE cells.
4	Introduction to DNA	4.1 DNA Structure and Function 4.2 Sources of DNA	- Group reading and discusssion using text figures for discussion. Q/A sheet - DNA Model (Activity 4.1) - Group reading and discusssion using text figures for

			discussion. Q/A sheet - Biotech Online 'Know Your Genome" - Biotech Online 'Using Viruses to do Good" - Biotech Live Activity 4.2 *E. coli* Model Organism..
5	Using/Manipulating DNA DNA in the News	4.3 Isolating and Manipulating DNA Biotech Live Activity 1.5 (a current event article about DNA)	- Biotech Online 'Recombinant Pharmaceuticals…" - Biotech Online '2 Therapies are Better than One" - Gene Therapy Bioethics Activity (Ch 4) - Keeping up to date are Biotech applications in the real world - Group Share
6	Researching Biotech Businesses Biotech Company Stock Project = "year" long" project	Biotech Live Activity 1.2 (Syngenta or other "local company) Biotech Live Activity 1.3	- Using Member Directory of Bio.org for TX (or other state) Companies - Stock Project set up (check weekly from here forward)
7	Computer Modeling of DNA Molecules		- Biotech Live Activity 4.4 NCBI and Bioinformatics - Biotech Live Activity 4.5 3-D DNA compter Modeling using Cn3d or Molecule World - **Virtual Field Trip to Biotech Facility and/or Moleuclar Biologist/DNA Scientist Guest Speaker**
8	Protein Structure and Function	5.1 Structure of Proteins with focus on 1°, 2°, 3°, 4° structure	- Group reading and discusssion using text figures for discussion. Q/A sheet - Biotech Online 'What Sound Does Protein Make?" - Biotech Online 'Gluten-free? No Bread for You"
9	Protein Structure and Function (continued)	5.1 Function of Proteins with focus on 9 groups of proteins	- Biotech Live Activity 5.1 Gathering Info on a Protein - Group Share - Biotech Online 'Antibody-Producing Companies"
10	3-D/Computer Modeling of Protein Molecules (Part 1)	5.2 The Production of Proteins	- Group reading and discusssion using text figures for discussion. Q/A sheet - Biotech Live Activity 5.2 Determining the Structure of Insulin (paper) - Biotech Live Activity 5.3 Computer Modeling of

			Insulin
11	Enzymes	5.3 Enzymes: Protein Catalysts 3-D/Computer Modeling of Protein Molecules (Part 2)	- Group reading and discusssion using text figures for discussion. Q/A sheet - Biotech Online 'Enzymes: Catalysts for Better Health" - Biotech Live Activity 6.2 Computer Modeling of Amylase (using Cn3d or Molecule World)
12	Protein Studies Applications	5.5 Applications of Protein Analysis	- Group reading and discusssion using text figures for discussion. Q/A sheet - Biotech Live Activity 5.4: Prions: Enough to Drive You Mad - Ch 5 Bioethics: Who Owns your Protein Patents? - Group Share - **Guest Speaker: Protein Chemist?**
14	Proteins in the News	Biotech Live Activity 1.5 (a current event article about Protein Research or Products) 8-week Stock Project Reports	- Keeping up to date are Biotech applications in the real world - 8-week Stock Project Check and PPT presentations/Reports (to the class) ☺
15	Bioinformatics in Medicine (Week 1)	Use Career Focus Employees from Ch 12 12.5 Recent Advances In Medical Biotechnology	- Use Career Focus Employees from Ch 12 to introduce Genetic Counselors - Sec 12.5 Genetic Testing Section - Group reading and discusssion using text figures for discussion. Q/A sheet (pedigree charts, markers, etc) - Biotech Online 'Diagnosis this Genetic Disorder"
16	Bioinformatics in Medicine (Week 2)		- Biotech Live Activity 12.4: What's the Risk in a Pedigree? - Biotech Live Activity 12.5: Who Passes the BRCA1 Test?" - Biotech Live Activity 12.2: A Lot of Work for Medical Biotechnologists - Ch 12 Bioethics: How DO you Decide Who Lives and Who Dies?
17	**Final**	Product Pipeline Study (week 1)	- Biotech Live Activity 6.5: Product Pipeline Study" -
18	**Final**	Product Pipeline Study (week 2)	- Biotech Live Activity 6.5: Product Pipeline Study"