

Exploring Careers in Biotechnology

GOAL

Biotechnology is a field that uses life forms or life processes to make a product or solve a problem. This is not a new thing for humankind. Yogurt, wine, cheese, sauerkraut, kimchee, and antibiotics are just a few examples of products made with the help of living things (microbes). The new world of biotechnology promises novel ways for treating and preventing disease, growing food, and many other applications. This unit has been designed to give you an idea of the many possible career tracks in this new world.

OBJECTIVES

1. The student can define biotechnology and give examples of biotechnology products in the marketplace.
2. The student will use resource materials to research and report on biotechnology fields and careers.
3. The student will use different writing styles to communicate about biotechnology.
4. The student will be able to describe several kinds of careers in biotechnology, and the requirements for those careers.
5. The student will be able to describe educational pathways to jobs in bioscience.

ACTIVITY CHECK SHEET

Part 1-Exploring Biotechnology	Assignments to be completed:	Completed
1.	Complete the Biotechnology Attitudes pre-test	
2.	Watch the video provided on the world of biotechnology: Biotechnology – Serving Human Needs. Optional—students may want to define the vocabulary words that are used in the video.	
3.	Complete the Graphic Organizer on the applications of biotechnology, based on the video.	
4.	Choose two biotechnology products or applications, one from Food/Agriculture, one from Human Health, or one from Environmental biotech. OR invent your own biotechnology product.	
5.	Begin your research for the chosen products using a variety of resources. Write news release on one. Write advertisement for second one.	
Part 2 Biotech Careers	Assignments to be completed:	
1.	Select a biotechnology job title.	
2.	List the information you collected about this job.	
3.	Prepare flier that recruits for this job.	
4.	If possible, interview someone who holds this type of job, and report your results to the class.	
Activity 3 Biotech Education	Assignments to be completed:	
1.	Investigate an education program that prepares bioscience technicians and answer the questions about the program.	
Activity 4 Biotech job interviews and resumes	Activities to be completed:	
1.	Write a resume and cover letter to apply for bioscience technician job.	
2.	Discuss how to interview for biotech jobs.	
3.	Stage mock interviews for the biotech job position	
4.	Complete the Biotechnology Attitudes post-test	

Part 1 *The World of Biotechnology, Promises and Challenges*

Biotechnology sounds very exotic, but in fact, many of its products are very familiar and have been around for a long time. What is the meaning and scope of today's biotechnology? What are some of the biotechnology products of today, and what's ahead in the near future?

1. Complete the Biotechnology Attitudes PreTest.
2. View the video from the BIO organization entitled "Biotechnology – Serving Human Needs" to obtain an overview of past and current biotechnology products. A list of biotechnology terms used in the video is provided on worksheet.
3. Use the attached Graphic Organizer to summarize what you learned from the video. Include some of the biotechnology terms on the attached list. You should include the name of the biotechnology product, the benefit of the product (what problem does it solve), and perhaps how this product represents an advantage over prior approaches to solving the problem.
4. Choose two additional biotechnology products or applications, not mentioned in the video, one from Food/Agriculture and one from Human Health, or one from Environmental biotechnology to research for the same kinds of information as above. You may wish to start your research using the internet resources listed below. Present the results of your research in two different ways:
 - A. For one product, use your research results to write a headline and a news release from the biotechnology company announcing their breakthrough product.
 - B. For the other product, create a one-page advertisement to go into a magazine. Your ad should address a potential customer to convince them of the benefits for using the biotechnology product. Feel free to create an eye-catching advertisement that would help make the consumer want your product. The ad can be for print or multimedia.

Web Resources to get you started:

For a list of approved biotechnology drugs (health care), go to <http://www.bio.org/aboutbio/guide2.html>.

For a list of agricultural biotechnology products, go to <http://www.bio.org/food&ag/approvedag98.html>.

For a list of transgenic products on the market, go to http://www.bio.org/food&ag/transgenic_products.html

Video Worksheet

biotechnology

rBST, bovine somatotrophin, bovine growth hormone

DNA

enzymes

genetically-engineered

genetically-modified

human growth hormone

insect-resistant plants

interferon

microbe

monoclonal antibodies

plasmid

recombinant DNA

restriction enzyme

tPA (tissue plasminogen activator)

vector

vaccine

Graphic Organizer

Use this graphic organizer to organize the information from the video into small segments of information, such as name of biotechnology product, benefit of the product (what problem does it address/solve?), and how this product represents an advance over prior approaches to solving the problem.

Name of Product	Problem it addresses	How an Advance?

Part 2: *Biotechnology Careers*

Biotechnology is a large and ever-growing field with a variety of jobs. You should explore careers in biotechnology by using of the options given below.

Option 1 -Go to www.pathwaystotechnology.org/jobs/index.html scroll down to Biotechnology and click on one of three biotech jobs on the list. Look over the job description, view the video of a person holding that type of job,

Option 2 -Students view a biotechnology careers video

Option 3 - Look at the poster “*What can you do with your biotechnology skills?*” and select one job title, then find a job posting on the internet.

Whatever option you choose, collect the following information:

1. job description
2. company and its location (if available)
3. skills needed
4. education required
5. salary range if available
6. what you like about this job
7. what you do not like about this job

Web Resources for biotech jobs/careers:

- For *nationwide view* of biotech careers and entry-level jobs, visit <http://www.bioview.com/channels/mfg/index.html>.
- For industry-wide job information, visit the SciWeb Biotechnology Career Center at www.biocareer.com/index.cfm.
- Another good nationwide site: <http://biotech.deep13.com>
- See also the job outlook in California at <http://www.cccbitech.org> and click on biotech careers on left side menu.
- Go to the Agricultural Career Center at <http://www.ffa.org/careers/index.html>, located within the web site of the National FFA. Scroll down to "scientists, engineers, and related specialists" for biotechnician career information in the field of agriculture.
- Visit the Career page of the North Carolina Biotechnology Center to learn about kinds of jobs and preparation for jobs: <http://www.ncbiotech.org/ncindustry/careers/careers.cfm>
- Visit also the Bio-Link web site for jobs: <http://www.bio-link.org/jobTOC.htm>
On the local level, visit some sites that list jobs in and around the Bay Area and see what sorts of positions are available.

Activity Products: Student now takes the information collected and prepares a one-page flier that recruits for this job. Student fliers are posted around the classroom.

Additional Capstone Activity: teams of students selects one job description, identifies one person working in this job, near or far, plans additional questions and an approach to the worker, obtains teacher approval, makes contact with the worker, and reports back to the class. One group may try to get a local worker to come to talk to the class.

Part 3: *Educational Tracks*

Go to www.pathwaystotechnology.org/colleges/index.html and click on the left menu “learn more about two year technology programs” to find out more about community colleges and technology education.

Answer the following questions:

1. What kinds of math do biotech students take? Am I ready for that math?
2. What kinds of biology do biotech students take?
3. What other science courses do biotech students take?

The class talks about their findings, then generates some additional questions. One team of students contacts a biotech program director (Contra Costa CC, CCSF and Foothill CC all have programs in the Bay Area) and another team interviews a student in the biotech program via email or telephone to obtain answers to class questions.