

Historical Development of Biotech



Introduction

The purpose of this activity is for your students to identify the important milestones in the development of biotechnology. People generally think of biotechnology as being a new phenomenon; however, the use of this technology to alter living things for the benefit of humans is almost as old as the human race itself.



Grade Level: 7-10

Time Needed: 4-5 class periods

Learning Objectives

After completing this lesson, students will be able to:

1. Identify the important milestones in the development of biotechnology
2. Identify problems that have been solved through the use of biotechnology
3. Arrange the information chronologically, starting with the oldest development leading up to present day

Next Generation Science Standards (NGSS)

As a result of activities for grades 7-10, all students will learn content in these areas:

Topics

- **ESS5:** Human Impacts

Performance Expectation

- **HS-ESS3-4:** Evaluate or refine a technological solution that reduces impacts of human activities on natural systems
- **MS-ESS3-4:** Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.

Dimension

Practices:

- Developing & using models
- Engaging in argument from evidence

Disciplinary Core Ideas:

- **ESS3:** Earth & human activity

Cross-Cutting Concepts:

- Patterns
- Cause & Effect



Materials

- Computers with Internet access and printer
- Construction paper
- Scissors
- Glue
- Tape

Instructional Process



Using the Internet, have the students research advances and highlights in the field of biotechnology over its long history.

1. Have the students work in groups of two to create a timeline to put around your classroom. Each group of two students will be assigned a different list of four or five biotech topics from different eras. (A list is provided, but feel free to add or subtract topics.)
2. Each group should research and print the following information:
 - a. Name of technology or scientist (put in a large font that can be easily seen from a distance)
 - b. The year that the technology was first used (again large font)
 - c. A picture that would help illustrate the technology or individual
 - d. A definition of the technology or description of the scientist and their contribution to biotechnology
3. Once everyone has finished and printed their research, arrange the entire class timeline in chronological order and attach their information to pieces of construction paper.
4. When the timeline is complete, hang it up around your room. (I place mine high up on the wall so it can continually go around the room unbroken.)
5. Once up on the wall, have the students complete the conclusion questions independently and then discuss their answers.



Possible topics for the timeline:

Group 1

- Fermentation
- Antibiotics
- Genetics
- DNA molecule

Group 2

- Gene
- Bt Cotton
- Dolly the sheep
- Genetic engineering

Group 3

- Artificial insemination
- Gregor Mendel
- Vaccines
- Yogurt

Group 4

- Gene therapy
- Bread
- Insulin
- James Watson

Group 5

- Francis Crick
- Round up Ready crops
- Cheese
- Plant breeding

Follow-Up Questions

1. What was the earliest biotechnological advancement identified, and when did it occur?
2. What was the most recent?
3. Identify at least 10 problems that were solved through time with the use of biotechnology.
4. Identify five advances that they consider to have had the greatest impact on the human race and explain why.
5. Research the human population for each milestone on the timeline. Explain any correlation to increase in human population to the impact on natural resources, and the need for biotechnology.

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Student Sheet



Introduction

The purpose of this activity is for you to identify the important milestones in the development of biotechnology. People generally think of biotechnology as being a new phenomenon; however, the use of this technology to alter living things for the benefit of humans is almost as old as the human race itself.

Materials

- Computers with Internet access and printer
- Construction paper
- Scissors

Procedure

1. Work in groups of two to help create a class timeline to put around your classroom.
2. Choose a list of biotech topics from different eras.
3. Research and print the following information:
 - a. Name of each technology or scientist (put in a large font that can be easily seen from a distance)
 - b. The year that the technology was first used (again large font)
 - c. A picture that would help illustrate each technology or individual
 - d. A definition of each technology or description of the scientists and their contribution to biotechnology
4. Once everyone has finished, arrange the entire class timeline in chronological order and attach your information to pieces of construction paper.
5. When the timeline is complete, hang it up around your room.
6. Once the timeline is on the wall, complete the conclusion questions independently. When everyone is finished, discuss your answers as a class.



Follow-Up Questions

1. What was the earliest biotechnological advancement identified and when did it occur?
2. What was the most recent?
3. Identify at least 10 problems that were solved through time with the use of biotechnology.
4. Identify five advances that they consider to have had the greatest impact on the human race and explain why.
5. Research the human population for each milestone on the timeline. Explain any correlation to increase in human population to the impact on natural resources, and the need for biotechnology.