GEORGIA | PEACH STATE PATHWAYS

Career, Technical, & Agricultural Education

HEALTHCARE SCIENCE

PATHWAY: Biotechnology Research & Development

COURSE: Introduction to Biotechnology

UNIT 11: Legal, Ethical, and Social Issues

INTRODUCTION

Annotation:

This unit includes lessons on differentiating moral, ethical and legal biotechnology issues, comparing and contrasting attitudes about the use of biotechnology, researching specific bioethical issues, and identifying regulatory policies impacting the field of biotechnology.

Grade(s):

X	9th
X	10th
X	11th
X	12th

Time:

15 hours

Author:

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Students with Disabilities:

For students with disabilities, the instructor should refer to the student's IEP to be sure that the accommodations specified are being provided. Instructors should also familiarize themselves with the provisions of Behavior Intervention Plans that may be part of a student's IEP. Frequent consultation with a student's special education instructor will be beneficial in providing appropriate differentiation.

FOCUS STANDARDS

GPS Focus Standards:

HS-IBT-7 **Students will analyze economic, social, ethical, and legal issues related to the use of biotechnology.**

a) Differentiate between moral, ethical, and legal biotechnology issues.
b) Research ethical issues presented by evolving science, including genetically modified foods, cloning, bioterrorism, gene therapy, and stem cells.
c) Compare and contrast attitudes about the use of biotechnology regionally, nationally, and internationally.
d) Evaluate the regulatory policies impacting biotechnology research - *e.g.,* use of animals in research and applications of recombinant DNA.

GPS Academic Standards:

ELA10RC2 The student participates in discussions related to curricular learning in all subject areas. The student

c) Relates messages and themes from one subject area to those in another area.

ELA10RL4 The student employs a variety of writing genres to demonstrate a comprehensive grasp of significant ideas in selected literary works. The student composes essays, narratives, poems, or technical documents. The student

d) Includes a formal works cited or bibliography when applicable.

UNDERSTANDINGS & GOALS

Enduring Understandings:

- Success in the field of biotechnology requires knowledge and demonstration of the ethical, social, and legal responsibilities. A biotechnology employee must be consistent with their practices and aware of the consequences a breach might pose.

Essential Questions:

- Why is it important to understand the differences between moral, ethical, and legal biotechnology issues?
- What does it mean to practice ethical and legal responsibilities?
- How can failure to practice ethical and legal responsibilities impact me and the biotechnology field?
- How do differences in attitudes impact evolving science and the biotech field?

Knowledge from this Unit:

Students will be able to:

- Differentiate between moral, ethical, and legal biotechnology issues.
- Discuss attitudes about the use of biotechnology.
- List the regulatory agencies and discuss policies affecting biotech research and development.

Skills from this Unit:

Students will:

- Utilize research and problem solving skills with bioethical issues.
- Demonstrate ethical, legal, and socially responsible decision making skills.

ASSESSMENTS

Assessment Method Type:

_____ Pre-test
X Objective assessment - multiple-choice, true- false, etc.
__ Quizzes/Tests
_X_ Unit test
X Group project
X Individual project
_____ Self-assessment - May include practice quizzes, games, simulations, checklists, etc.
__ Self-check rubrics
__ Self-check during writing/planning process
__ Journal reflections on concepts, personal experiences and impact on one's life
__ Reflect on evaluations of work from teachers, business partners, and competition judges
__ Academic prompts
__ Practice quizzes/tests
X Subjective assessment/Informal observations
__ Essay tests
_X Observe students working with partners
__ Observe students role playing
_____ Peer-assessment
__ Peer editing & commentary of products/projects/presentations using rubrics
__ Peer editing and/or critiquing
X Dialogue and Discussion
__ Student/teacher conferences
_X_ Partner and small group discussions
_X_ Whole group discussions
__ Interaction with/feedback from community members/speakers and business partners
_____ Constructed Responses
__ Chart good reading/writing/listening/speaking habits
_X_ Application of skills to real-life situations/scenarios
X Post-test

Assessment Attachments and / or Directions:

Exam Legal, Ethics **(Post Test)**

LESSON PLANS

• LESSON 1: Introduction to Legal/ Ethical/Social Issues

1. Identify the standards. Standards should be posted in the classroom.

   HS-IBT-3 **Students will understand the basis for biotechnology products and how such products affect the quality of life.**
   d) Review current trends in the biotechnology industry.

   HS-IHS-9 **Students will analyze economic, social, and ethical issues related to the use of biotechnology.**
   a) Differentiate between moral, ethical, and legal biotechnology issues.
   d. Contrast personal, professional, and organizational ethics.

2. Review Essential Question(s). Post Essential Questions in the classroom.

   •Why is it important to understand the differences between moral, ethical, and legal biotechnology issues?
   •What does it mean to practice ethical and legal responsibilities?

3. Identify and review the unit vocabulary. Terms may be posted on word wall.

Ethics	Bioethics	Code of Ethics
Legal	Morals	Illegal
Social		

4. Interest approach – Mental set
   Ask students what the terms above mean to them. Ask them what might make a situation ethical or unethical, moral or immoral, legal or illegal, etc. Submit additional examples as students interact in the discussion with own ideas.

5. Distribute activity – **Morals Activity** – "Doing the Right Thing". Allow students to complete the activity, and discuss the correct response as a class. Emphasize the importance of always trying to do the right thing in every situation.

6. Display the **Bioethics** Power Point and give examples as you view each slide.

7. Distribute the worksheet **Biotechnology – Legal Ethical Social Issues** and have students complete the activity during the power point presentation or after the presentation it can serve as a review.

• LESSON 2: Bioethical Considerations

1. Review Essential Questions. Post Essential Questions in the classroom.

   •What does it mean to practice ethical and legal responsibilities?
   •How can failure to practice ethical and legal responsibilities impact me and the biotechnology field?
   •How do differences in attitudes impact evolving science and the biotech field?

2. Explain to the students there are guidelines which we must follow so as to make good ethical, legal and socially responsible decisions. Give a few examples as you begin the discuss ion.

3. Distribute copies of **Bioethical Considerations** and have students participate in groups (3-4 per group) to complete the discussion on each scenario. Discuss the group responses after they have completed the activity. Discuss the difficulties they may have encountered answering some of the questions. Explain that ethical considerations do not always have an easy solution.

• LESSON 3: Bioethical Research

1. Review Essential Questions. Post Essential Questions in the classroom.

    •How can failure to practice ethical and legal responsibilities impact me and the biotechnology field?
    •How do differences in attitudes impact evolving science and the biotech field?
    •Students will develop researching skills and problem solving skills with bioethical issues.

2. Explain to the students that bioethical issues in biotechnology need to be researched to determine if the technology employed and the results will be ethical, legal, and socially accepted. Also, financing and expenses may need to be considered with new scientific advances. Give examples of some of the costs involved with certain technological discoveries.

3. Distribute copies of **Bioethical Research Issues** and the **Bioethical Research Grade Sheet.** Give instructions for the assignment and answer questions. Assist students in their research and with locating specific websites to gather information. Give students sufficient direction so as to complete the assignment successfully. Discuss and summarize the information students learned as a result of completing this research project.

• LESSON 4: Biotechnology Regulations

1. Review Essential Questions. Post Essential Questions in the classroom.

    •How can failure to practice ethical and legal responsibilities impact me and the biotechnology field?
    •How do differences in attitudes impact evolving science and the biotech field?
    •What regulations and regulatory agencies exist in the field of biotechnology?

2. Explain to the students that regulations are important in all fields of science as well as life. Give some examples and how we are all impacted by regulations in our daily lives.

3. Review the regulatory agencies and their regulatory roles as previously discussed in the power point (Bioethics) in lesson 1. List the agencies on the board or review this section on the power point again.

4. Distribute copies of **Biotechnology Regulations Brochure** assignment sheet to the students. Discuss the guidelines for making the brochure as well as the **Biotech Regulations Brochure Grade Sheet**. Assist the students in choosing a topic and researching the regulatory agencies responsible for monitoring them.

• ATTACHMENTS FOR LESSON PLANS

- **Exam Legal, Ethics**

- **Exam Legal, Ethics- Key**
- **Bioethics**
- **Morals Activity** – "Doing The Right Thing"
- **Morals Activity Key**
- **Bioethics** Power Point
- **Biotechnology – Legal Ethical Social Issues**
- **Biotechnology – Legal Ethical Social Issues – Key**
- **Bioethical Considerations**
- **Bioethical Research**
- **Bioethical Research Grade Sheet**
- **Biotechnology Regulations Brochure**
- **Biotechnology Regulations Grade Sheet**
- **Bioethical Problem Solving**
- **Bioethical Problem Solving Grade Sheet**

• NOTES & REFLECTION:

One of the most important factors in this unit is that the teacher is prepared; they have previously researched and gathered good examples of ethical/ unethical and bioethical situations that can be conveyed to students throughout the discussions. In addition, they have prepared a list of websites they want the students to use to research the assignments, and they are prepared to aid the students in that research. Variations of this unit can be made by setting up scenarios involving ethical and bioethical issues. Also, you might consider showing clips from some of the bioethical related TV programs or specific biotechnology web sites.

CULMINATING PERFORMANCE TASK

Culminating Unit Performance Task Title:

Students will demonstrate ethical, legal, and socially responsible decision making skills.

Culminating Unit Performance Task Description/Directions/Differentiated Instruction:

Students will write a paper on the bioethical question of "**Animal Use In Research**". They will research the material sufficiently and use the **Bioethical Problem Solving** guidelines to complete the assignment as outlined.

Attachments for Culminating Performance Task:

Bioethical Problem Solving

UNIT RESOURCES

Web Resources:

- www.bio.org

- www.bioethics.com

Materials & Equipment:

- Computer / Internet access
- Multimedia presentation projector
- Worksheets / grade sheets

21st Century Technology Used:

x	Slide Show Software		Graphing Software		Audio File(s)
	Interactive Whiteboard		Calculator		Graphic Organizer
	Student Response System		Desktop Publishing		Image File(s)
	Web Design Software		Blog		Video
	Animation Software		Wiki		Electronic Game or Puzzle Maker
	Email	x	Website		