# HEALTHCARE SCIENCE

PATHWAY:        Biotechnology Research & Development
COURSE:         Applications of Biotechnology
UNIT 12:        Presentations

# INTRODUCTION

**Annotation:**

Students will be able to evaluate a biotechnology company in Georgia.

**Grade(s):**

| | |
|---|---|
|   | 9th |
|   | 10th |
| X | 11th |
| X | 12th |

**Time:**

10 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-ABT-5** **Students will demonstrate an understanding of current trends, ethical, legal, and regulatory issues related to the development of biotechnology products.**

- a) Monitor scientific journals, Internet sources, mass media and industry associations to identify current trends and policy issues in biotechnology.
- b) Distinguish between marketing material and experimentally validated information.
- e) Describe intellectual property rights, technology transfer and how biotechnology is funded.
- g) Describe the role of federal regulatory agencies and the Code of Federal Regulations applicable to biotechnology (*e.g.*, FDA, 21 CFR, EPA, NIH, USDA, etc.) and the relationship to international regulatory systems (*e.g.*, ICH, etc.).
- i) Define the purpose of quality assurance, quality control, method validation, documentation, current Good Manufacturing Practices and Good Laboratory Practices.

**GPS Academic Standards:**

| | |
|---|---|
| **ELA11W3** | The student uses research and technology to support writing. |
| **SCsh1** | Students will evaluate the importance of curiosity, honesty, openness, and skepticism in science. |
| **SSEF4** | The student will compare and contrast different economic systems, and explain how they answer the three basic economic questions of what to produce, how to produce and for whom to produce. |
| **MM1P1** | Students will solve problems (using appropriate technology). |
| **MM1P4** | Students will make connections among mathematical ideas and to other disciplines. |

# ✅ UNDERSTANDINGS & GOALS

**Enduring Understandings:**

- Current trends and issues in biotechnology are developing and changing at an unprecedented rapid rate.
- There is an enormous volume and variety of information sources that provide up to date biotechnology developments including organizations, journals and websites.
- The development of biotechnology companies in Georgia has had a positive economic impact.

**Essential Questions:**

- What are the current trend and issues in biotechnology?
- What are the major sources of information from which current trends in biotechnology can be monitored?
- What is the economic impact of biotechnology companies on quality of life in the areas of environment, agriculture, and medicine?
- What is the overall structure and function of a successful biotechnology company?
- What is the overall structure and function of your ideal biotechnology company?

**Knowledge from this Unit:**

Students will be able to:

- Describe current trends and issues in biotechnology companies
- List biotechnology companies in Georgia
- Explain the economic impact of biotechnology on quality of life

## Skills from this Unit:

Students will be able to:
- Evaluate a biotechnology company based on what it produces, how it produces its products, and for whom the products are produced.
- Develop a budget for a company

# ASSESSMENTS

## Assessment Method Type:

    _____ Pre-test

    _____ Objective assessment - multiple-choice, true- false, etc.
        __ Quizzes/Tests
        __ 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

    _____ Subjective assessment/Informal observations
        __ Essay tests
        __ 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

    _____ Dialogue and Discussion
        __ Student/teacher conferences
        _x_ Partner and small group discussions
        __ Whole group discussions
        _x_ Interaction with/feedback from community members/speakers and business partners

    _____ Constructed Responses
        __ Chart good reading/writing/listening/speaking habits
        __ Application of skills to real-life situations/scenarios

    _____ Post-test

# LESSON PLANS

- **LESSON 1: WHAT AND WHERE ARE THE BIOTECHNOLOGY COMPANIES IN GEORGIA**

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

**HS-ABT-1** **Students will demonstrate the ability to use and apply mathematics and language arts skills.**
    f)   Apply English and language arts standards throughout the course using various forms of written and electronic communications.
    g)   Use biotechnology terminology appropriately.
    h)   Document projects in writing with emphasis on using the scientific format (abstract, introduction, methods, results, discussion, references, tables, and figures) and through oral presentations with electronic support.

**HS-ABT-3** **Students will demonstrate deeper understanding of current trends and issues in biotechnology.**
    a)   Monitor current trends in biotechnology using a variety of information sources-i.e. Scientific American, Wall Street Journal, Discovery magazine, and scientific associations and federal web sites including USDA, NIH, FDA, CDC, NCBI, and BIO.
    b)   Examine the economic impact of biotechnology on quality of life to include the environment, agriculture, and medicine.

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

- What are the current trend and issues in biotechnology?
- What are the major sources of information from which current trends in biotechnology can be monitored?
- What is the economic impact of biotechnology companies on quality of life in the areas of environment, agriculture, and medicine?

3.   Interest approach – Mental set

- Pull up the Georgia Bio website and review some of the biotechnology companies in Georgia.

4.   Lead a discussion with the students about the important components of a biotechnology company, the job positions of the individuals who work there and their salaries, the amount of education required for the different positions,  This is an introduction to an assignment given to the students requiring that they research a biotechnology company in Georgia.

## • LESSON 2:  BIOTECHNOLOGY COMPANY VISIT

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

- What is the overall structure and function of a successful biotechnology company?

2.   Students will participate in choosing a biotechnology company to visit by researching different companies, writing letters to a company requesting a field trip, following up with a phone call and participating with a committee of students to select a company to visit.

3.   Students will help develop the evaluation tool that they will take with them on the field trip to the biotechnology company that they agree upon.

4.   Students, teachers, and other chaperons will visit a biotechnology company in Georgia after sending an outline of the major areas of importance that the students need to learn about.

### • LESSON 3:  SPOTLIGHT ON A BIOTECHNOLOGY COMPANY IN GEORGIA

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

   - What is the overall structure and function of your ideal biotechnology company?

2. Students will develop a PowerPoint presentation representing what they would like in their ideal biotechnology company.

3. Students will present their biotechnology company to the class by following the oral presentation rubric created by the teacher.

4. The presentation will be judged by a committee of teachers, parents, and community business partners.

5. The presentation will be saved on a flash drive as a part of their exit portfolio.

### • ATTACHMENTS FOR LESSON PLANS

**Evaluation of a Biotechnology Company in Metro Atlanta, Georgia**
**Oral Presentation Rubric**

### • NOTES & REFLECTION:

Students will experience a day in the life of an employee at a major biotechnology company in Georgia. This will help to serve as an avenue for students to get to know potential employers as they begin to request an internship for the next school year and/or summer.

# CULMINATING PERFORMANCE TASK

**Culminating Unit Performance Task Title:**
Students will develop a PowerPoint presentation representing what they would like in their ideal biotechnology company.

**Culminating Unit Performance Task Description/Directions/Differentiated Instruction:**
Students will present their biotechnology company to the class by following the oral presentation rubric created by the teacher.

**Attachments for Culminating Performance Task:**
**Oral Presentation Rubric: My Ideal Biotechnology Company**

# UNIT RESOURCES

**Web Resources:**
**www.gabio.org**

**21st Century Technology Used:**

| | | | | | |
|---|---|---|---|---|---|
| ☐ | 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 | | |