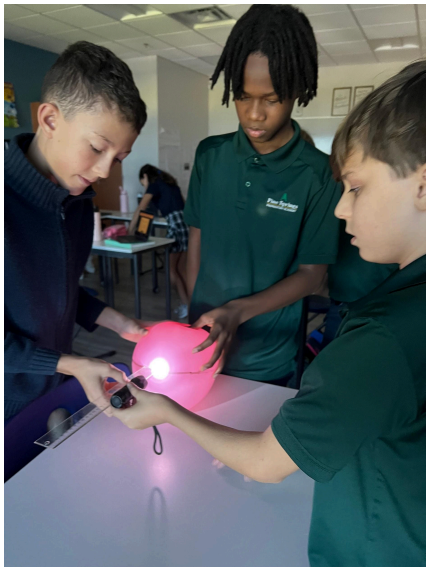

Creating a Classroom Climate for Communication, Collaboration, Creativity and Critical thinking

OVERVIEW

Through these lessons, students will develop team skills with a focus on how to effectively communicate and collaborate and build critical thinking and creativity: The “4 C’s”.

AUTHOR	GRADE LEVEL	CONTENT AREA
Heather Graham	Sixth/Seventh Grade	Project Based Learning/Science

ESSENTIAL QUESTION

How, as educators, can we create a classroom culture that promotes the 4 C’s: collaboration, communication, critical thinking and creativity?

What are biosolutions and what are the ways they impact our daily lives?

What types of jobs are in biotechnology?

TIME NEEDED

Time needed to prepare or gather and set up materials.- 1 -2 days

Time needed to facilitate the activity. 2-3 weeks

Time needed to wrap up/ review activity. 1 week

STANDARDS

The North Carolina Portrait of a Graduate allows for deeper student learning and skill attainment and bridges the gap between K-12 education and workforce readiness.

LS.8.1.1 Construct an explanation to compare the basic characteristics of viruses, bacteria, fungi and parasites relating to the spread, treatment and prevention of disease.

Making **Connections**

In this project, students will work to improve their communication, collaboration, creativity and critical thinking skills while exploring the field of biotechnology. Students will work together to investigate how biosolutions impact our daily lives, and develop an understanding of the different job opportunities available from biosolutions companies. This project enhances students' understanding of how to use critical thinking when evaluating resources, give and receive feedback, and communicate their research findings in a creative way.

Background

To launch this PBL, students will visit a biosolutions company and watch a video to gain a basic understanding of biosolutions. Students will research what biosolutions are and the impacts they have on our daily lives. Students will be grouped to further research a particular biosolution and the companies that manufacture the product, as well as the types of jobs and job skills that are needed to work in this industry.

The **Activity**

Part 1: Launch

- Trip to biotechnology company
- Watch video on a biosolution
  - How Plastic Made With Algae Can Clean Waterways | World Wide Waste

Part 2: Individual Student initial research

- Students will complete a KWHL
  - KWHL Chart
- Students will begin research on biotechnology/biosolutions
  - 10 killer presentation tips for students
  - 14 Dos and Don'ts for an Effective Presentation | Renderforest
- What are Biosolutions Research Form

Part 3: Creating Group Contracts

- Copy of The Good News Project- Group Contract-Specific Jobs
- Dayton-Regional-STEM-School-Collaboration-Log

Part 4: Group Research

- Students share the information from their KWHL charts and research notes with each other to decide on a topic for the presentation.

Part 5: Presentation

- Students will decide how they will present their information, get feedback from peers on their presentation, and practice their presentations.

WRAP UP **AND** ACTION

Informal evaluation will be through meeting with groups and asking them what they have learned and what they found to be most interesting. Formal assessment will include group and self reflections along with feedback forms from peers and the use of a presentation rubric and a collaboration log.

Self, Group, and Project Reflection/Evaluation

Group Evaluation (Google Form)

Presentation Rubric Biotechnology

Dayton-Regional-STEM-School-Collaboration-Log

Extensions

Connecting a biosolutions company with a school to create a curriculum that engages students in biotech processes that could potentially lead to jobs within the company.

About the Author

Heather Graham is a sixth and seventh grade Project-based learning (PBL) teacher at Pine Springs Preparatory Academy, in Holly Springs, NC. In her current position, she works to challenge students to think critically, collaborate, and create solutions.

She has participated in innovative programs that not only include the Kenan Fellows program 2023-2024, but also the “Chicken Nuggets on Mars” project that was offered through the Koci Lab at NC State University. She is looking forward to continuing her work with both the Kenan Fellows and Koci Lab as they work together with Seqirus, a biotechnology company, to develop the PBL curriculum to be implemented by Pine Springs Prep.

As a founding member of Pine Springs Preparatory Academy staff, she has assumed a role on the leadership team, the National Junior Honor Society, and is responsible for starting the Feed the Bin Recycling Program. She was selected as the 2022-2023 Middle School Teacher of the Year by her peers and was recognized by the Holly Springs Chamber of Commerce as the October Educator of the Month 2023.

About the Fellowship

Biogen sponsored this fellowship, but Arlan Peterst from Novozymes was the project mentor. Novozymes is a biotech company that creates biosolutions for consumers, agriculture and industries.

During her time at Novozymes, Graham had the opportunity to meet with and learn about different job opportunities within the company from research and development, and recovery to waste management. The majority of her work was in recovery where employees are tasked with finding out what caused biosolutions to not succeed. She tested a small scale fermentation product to determine the amount of preservative required to keep the product in solution.

Graham also visited the company's labs in RTP where she helped set up an experiment to test the effects of a protein on the growth of a plant similar in makeup to corn.

Student Pages

KWHL Chart

What are Biosolutions Research Form

Self, Group, and Project Reflection/Evaluation

Group Evaluation (Google Form)

Presentation Rubric Biotechnology

Dayton-Regional-STEM-School-Collaboration-Log

Appendix

Product Example