

# Project Based Learning & the Bioenergy Summer Bridge



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## What is the Summer Bridge?

### Program Overview

- The Bridge is a two week residential program with STEM focus
- Transitional program for incoming freshman to OSU
- Part of an elementary-school-to-college pipeline program
- Serves 1<sup>st</sup> generation, low income minority students from rural Oregon communities
- Part of **OSU SMILE** (Science and Math Investigative Learning Experience) program
  - SMILE has operated for 27 years
  - 15th year of bridge programs
  - 3rd year of Bioenergy focus

### Program Goals

- Provide students an authentic research experience to mimic the rigors of college life
- Provide opportunities for students to develop a connection to vital campus resources within a supportive academic community
- Develop students' awareness of their academic strengths and weaknesses as they are transitioning to college
- Increase students' interest in Bioenergy and STEM fields

### Current Outcomes of the Bridge

- Students report a significant increase in the importance of time management, planning out daily routines, and maintaining a positive self outlook while engaging with the challenges of college life
- Students report a noticeable *increase* in interest in Bioenergy, Chemistry, Physics, and Biology, but a *decreased* interest in Engineering
- Students report increased awareness of the importance of social support networks and setting time aside to focus on one's self (e.g. church, exercise, spending time with family) while in college
- Due to the social research and presentation components of the Bridge, students became aware of the challenges of communicating science to the general public

"Some challenges are explaining [bioenergy] in scientific terms and translating them in a way the public will fully understand"

- 2013 Bridge Student

## Why Project Based Learning (PBL)?

- Students have high level of choice to increase interest, motivation, and control of where the project goes
- The project provides a context for students to engage with scientific literature, make claims from evidence, and support claims with further evidence
- Allows for students to engage with peers, academic coaches, and mentors as collaborative co-learners
- PBL can model research as a dynamic reiterative process of seeking new information and asking questions, while finding solutions to real world problems



## Bridge PBL Research Project

- Uses local examples of bioenergy for the context for student PBL scenarios:
  - Landfill Waste to Energy
  - Uses of lignin in building materials and fuel
  - GMO Poplars vs. Hybrid Poplars as feedstock
- Scenarios provide students with a deeper "context" - a role to take on while engaging with scientific literature, and an audience to present to that wants specific information
- Students are paired with academic coaches and peer mentors throughout the program to provide timely, helpful, and appropriate feedback

## Example PBL Scenario:

### Coffin Butte Landfill is Bubbling Over!

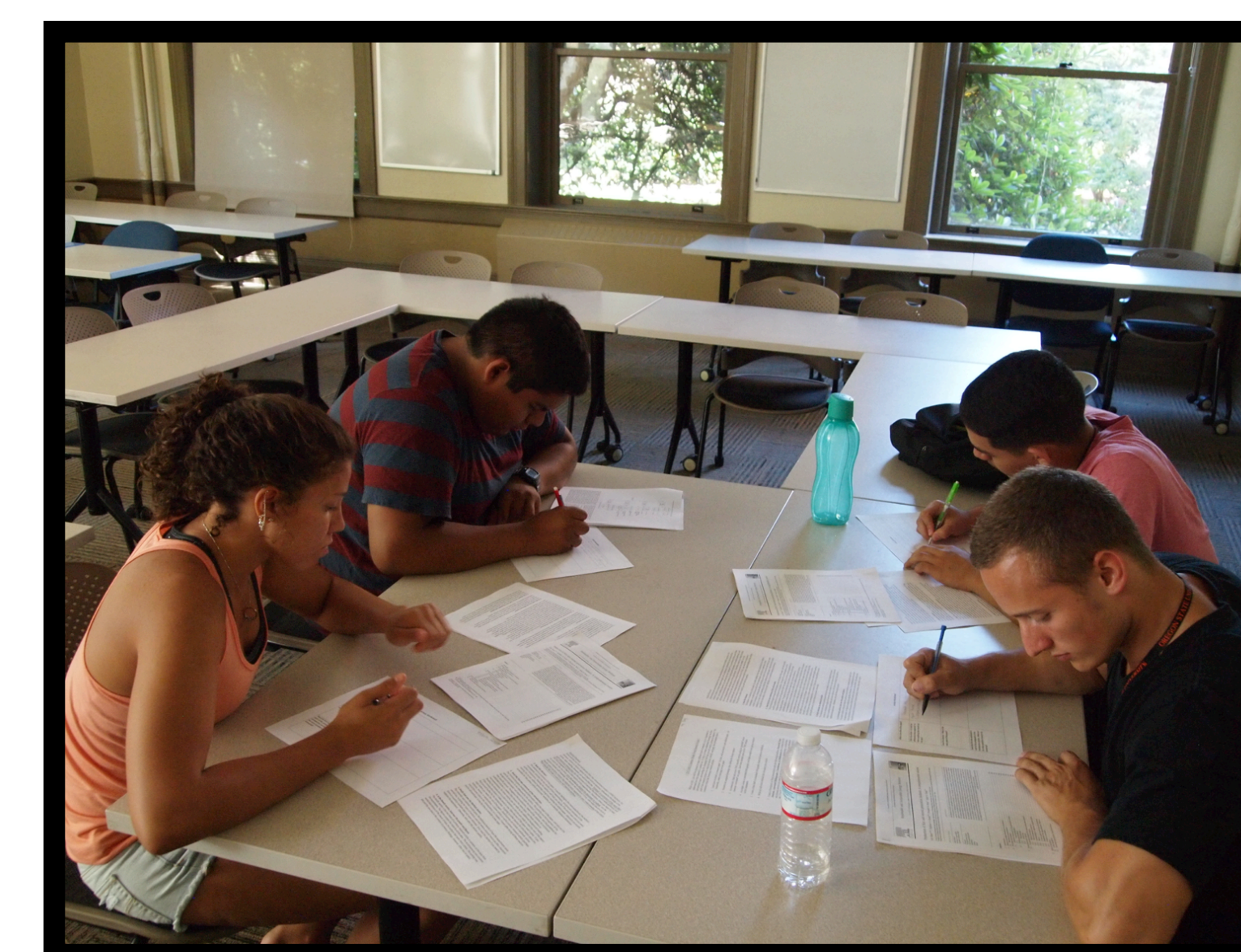
**Problem:** The local landfill will be full in 30 yrs, and one possible solution is to expand their "waste to energy" (WTE) program. The board would like a presentation on possible solutions to expand the program, and information on successful WTE programs in the U.S. and other countries. Furthermore, board members are worried about paying for the additional costs of expanding the WTE program

**Jumping Off Point:** Local news articles written for a "professional" audience

**Presentation Audience:** Republic Services Board Members (operators of Coffin Butte)

**Student Role:** Technical analysts employed by Republic Services

**Social Research Component:** Would taxpayers want to contribute public funds to aid in the expansion of the WTE program?



**Final Presentation:** 12min, using research as evidence to support their solution

**Challenge:** Making the project challenging, rigorous and accessible to *all* students the Bridge targets

