

RET Lesson Implementation Report

Lesson Details

Name: *Garth Sommers*

School and grade level: *Barry Goldwater High School*

Lesson Title: *Engineering a Self-Burrowing Robot: An Introduction to the Engineering Design Process*

Implementation Date(s): *9/20/23-9/26/23*

Reflection

Implementation

I began the lesson by giving students a bell work question asking them to brainstorm what a self-burrowing robot could be used for, if it could be developed, then facilitated a class discussion. After that I gave a slide presentation introducing and explaining the steps of the Engineering Design Process and using the prototype self-burrowing robot as an example. To illustrate the testing step, I demonstrated an experimental trial using the robot. When it failed, I tasked students with analyzing and describing why they thought it failed, applying Newton's laws of motion. I then challenged them to propose a design change or improvement to the robot to plan the next iteration of the design process.

I think the lessons went well. I've done similar lessons in the past using hot air balloons and car engines as examples to illustrate laws of motion and connect them to the engineering design process, but those examples represent engineering challenges that had already been solved. The real advantage of using the self-burrowing robot is in that it presents students with previously unsolved problems, challenging them to engage and participate in the problem solving and engineering design process.

Student Outcomes

Students got an overview of the engineering design process, applied their knowledge of the laws of motion, and participated in the process by developing their own original ideas. Several students took the optional additional steps of creating models of their design in Tinkercad. Students prepared short presentations to pitch their design ideas to the class.

Revisions

This was the first presentation assignment of the year and I found that many of the sophomore students had never given a presentation in high school before and struggled with being prepared and speaking to the class. Next time I think I will precede this lesson with a little training and modeling on how to prepare and give a presentation.