

Metabolism Engineering Internship

Health Bars for Disaster Relief

Driving Question: As food engineering interns at Futura Engineering, how can we design a nutritional health bar to help meet the metabolic needs of rescue workers and natural disaster patients with the criteria of low cost and high taste score?

Content: Students act as food engineering interns and design a recipe for a health bar that addresses the needs of their target population by balancing the protein composition, carbohydrates, and glycemic index while maximizing the taste score and minimizing cost. Students complete several tests and tasks using Futura RecipeTest, a digital design tool, to collect data. They analyze this data and run iterative tests of their recipes, preparing a final proposal that justifies the choices they made relative to the criteria.

Standards: NGSS: **MS-ETS1-1.** Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions. **MS-ETS1-2.** Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. **MS-ETS1-3.** Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success. **MS-ETS1-4.** Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Major Products: Students will design an optimal health bar recipe, create a written proposal, and create a proposal presentation

Public Presentation: Projects will be presented in class and open to the public for viewing. Presentations will be filmed as well. Students will present to peers, staff, family members, and other community stakeholders, such as food engineers, health bar company employees, and rescue workers.



7th Plate Motion Engineering Internship: Tsunami Alert System

Driving Question: As geohazard engineering interns at Futura Engineering, how can we design a tsunami warning system for the Indian Ocean Region?

Content: Students act as mechanical/geohazard engineering interns to design a tsunami warning system for the Indian Ocean region. These warning systems must meet three design criteria: 1) giving people as much warning time as possible to move to safety; 2) causing as few false alarms as possible; and 3) minimizing cost as much as possible.

Standards: NGSS: **MS-ETS1-1:** Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions. **MS-ETS1-2:** Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. **MS-ETS1-3:** Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success. **MS-ETS1-4:** Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved. **MS-ESS3-2:** Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects. **MS-ESS2-2:** Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales. **MS-ESS2-3:** Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.

Major Products: Students will design an optimal tsunami warning system design, create a written proposal and create a proposal presentation

Public Presentation: Projects will be presented in class and open to the public for viewing. Presentations will be filmed as well. Students will present to peers, staff, family members, and other community stakeholders, such as local disaster management specialists and mechanical engineers

7TH GRADE HISTORICAL SCRAPBOOK PROJECT

Driving Question(s): How can we align ourselves with a person of the past?

How can we fully embrace and understand a person of the past or their said time period?

Content: Depending on which figure the student chooses, the standards will vary, but common overarching themes for each time period would include:

CCSS 7.1: Students analyze the causes and effects of the vast expansion and ultimate disintegration of the Roman Empire

CCSS 7.2: Students analyze the geographic, political, economic, religious, and social structures of the civilizations of Islam in the Middle Ages.

CCSS 7.3: Students analyze the geographic, political, economic, religious, and social structures of the civilizations of China in the Middle Ages.

Based off the choice, the student would receive a section of sub standards that would be adjacent to the overarching standards above. Students could go through to other geographical places, however these are the sections of time we have personally covered throughout our two trimesters.

Major Products: In this project, students will examine the life of any historical figure of their choosing between the time period of 0AD-1500AD. They will do individual research like an actual historian would and plant themselves in their figures shoes, directly in their time period. Students will create a first-person scrapbook in relation to the figure of their choosing which will include a multitude of mediums including the following: a personal letter, a business letter, a poem, artifacts from the individual, a bibliography, as well as additional illustrations and personal flare. As the audience, we firsthand will be able to live each and every one of these figures lives with the finish product scrapbook each student makes!

Public Presentation: Students will be required to not only share their scrapbooks with the rest of the class, but also we will be having an open house presentation which will allow outside staff as well as parents to view all of the finish products! We look forward to seeing you all!