**Purpose:**

Students will design an instrument or improve an existing instrument to measure the health of an organism in the Puget Sound.

**Process:**

After learning about ocean instruments and Puget Sound health, students will research an organism in the Puget Sound, including how the health of the organism is currently measured. Then students will design a new instrument or improve an existing instrument that could help scientists measure the health of their animal.

**Product:**

Students will present their own research relating to a Puget Sound organism of their choosing as well as a new or improve an existing instrument. Students will also connect research and their instrument to the current health of the Puget Sound.

**Sequence:**

<day by day>

Assigned to Baljinder

**Few days before starting the unit**: Brainstorm with students to gain ideas of what they already know.

**Day 1:** Introduce unit; types of ocean tools platforms used by oceanographers. Work on the initial model of the tool student would like to design/modify for the project.

**Day2:** Identify factors that affect ocean health; select an organism of interest, and identify factors affecting health of selected sea animals.

**Day3:** Identify variables that affect the selected organism’s health and discuss how you will measure this variable using your tool/instrument.

**Day4:** Revise initial model of tool based on your research and propose design of your tool with labelled model +description of how it will measure the variable

**Standards:**

**MS Interdependent Relationships in Ecosystems**

MS-L-S2-5: Evaluate competing design solutions for maintaining biodiversity and ecosystem services.

**Science and Engineering Practices:**

Constructing Explanations and Designing Solutions

Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories.

**Disciplinary Core Ideas:**

LS2.C: Ecosystem Dynamics, Functioning, and Resilience

Biodiversity describes the variety of species found in Earth’s terrestrial and oceanic ecosystems. The completeness or integrity of an ecosystem’s biodiversity is often used as a measure of its health. (MS-LS2-5)

**Crosscutting Concepts:**

Influence of Science, Engineering, and Technology on Society and the Natural World

The use of technologies and any limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. Technology use varies from region to region and over time. (MS-LS2-5)

**MS-ETS1-1 Engineering Design**

MS-ETS1-1 Engineering Design 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.

**Science and Engineering Practices**

Asking Questions and Defining Problems

Asking questions and defining problems in grades 6–8 builds on grades K–5 experiences and progresses to specifying relationships between variables and clarifying arguments and models.

Define a design problem that can be solved through the development of an object, tool, process or system and includes multiple criteria and constraints, including scientific knowledge that may limit possible solutions.

**Disciplinary Core Ideas:**

ETS1.A: Defining and Delimiting Engineering Problems

The more precisely a design task’s criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that are likely to limit possible solutions.

**Crosscutting Concepts:**

Influence of Science, Engineering, and Technology on Society and the Natural World

The uses of technologies and limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions.

**MS-ETS1-4 Engineering Design**

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.

**Science and Engineering Practices**

Developing and Using Models

Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.

Develop a model to generate data to test ideas about designed systems, including those representing inputs and outputs.

**Disciplinary Core Ideas:**

ETS1.B: Developing Possible Solutions

A solution needs to be tested, and then modified on the basis of the test results, in order to improve it.

Models of all kinds are important for testing solutions.

**Other resources:**

Assigned to Chanelle, Steve

Name of sponsoring institution, URL.

Why you recommend this source