DIVE BENEATH THE SURFACE

Lesson 2: Marine Organisms – Structure & Function

4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.
[Clarification Statement: Examples of structures could include thorns, stems, roots, colored petals, heart, stomach, lung, brain, and skin.] [Assessment Boundary: Assessment is limited to macroscopic structures within plant and animal systems.]

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Engaging in Argument from Evidence. • Construct an argument with evidence, data, and/or a model. (4-LS1-1)	**LS1.A: Structure and Function.** • Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction.(4-LS1-1)	**Systems and System Models.** • A system can be described in terms of its components and their interactions. (4-LS1-1)

Objective:

Students will gain an understanding of the specific structures of the targeted marine organisms and how that structure functions as a mechanism of movement.

Materials

- Structure Flip Cards
- Structure and Function Flip Cards
- Structure and Function Video

Engage

5 minutes

Review Key Terms: Structure and Function.

Begin by writing the two terms on a white board/poster or project them onto the screen. Give students 30 seconds – 1 minute to discuss with a neighbor the definitions of structure and function. When time is up students should return attention to the front of the classroom and be prepared to share their thoughts with the class. Ask for several students to volunteer the definitions they discussed with their partner. Teacher will record the key terms in the definitions provided.

*Structure: The way that something is built. A part of a whole. (ex. Wings on a bird)
*Function: The special purpose or activity for which a thing exists or is used. (ex. The function of wings on a bird are to allow the bird to fly)

Introduction of specific marine organisms and the structures that function to allow movement.

Video:

"Humans vs. Marine Organisms: Structure and Function"

https://calpolydbs.wixsite.com/divebeneath/videos

Lesson will begin with a video that provides the first glimpse at life beneath the surface. The video will also introduce the structures of marine organisms that will be the focus of the lesson series and show the movement of each under water.

During the video students should be paying close attention to the different marine organisms they see, the different ways in which the organisms move, and how they are moving this way.

After the video students will share with a partner about what they saw. As a pair, they should write down one important thing that stood out to them in the video about either a specific organism, structure, or a type of movement they saw.

Have several student volunteers share something they discussed with their partner about the video.

After a brief class discussion teacher will introduce the 5 focus structures of marine organisms and the familiar object to which they will be compared. Teacher should make a list of the structures that can be visible to the students throughout the lesson. (Whiteboard, poster, docucam, overhead projector, etc.)

Explore

Activity:

20 minutes

During this activity students will be working in groups of 3.

Supplies for this activity:

- Flip Cards
- Structure Worksheet
- Analogy "As" Graph

Procedure:

1. Divide students into groups of 3.
2. Give each group a flip card with information for one specific organism structure (there will be two groups per structure).
    a. The flip card is composed of pictures on the front and informational text on the reverse side. The card compares the structure of a marine organism to an object that students are already familiar with (ex. ship anchor). The familiar object will serve as tool in understanding an organism's structure that has never been seen before.
    b. In the time provided the partnership is expected to read through the information and become an expert on that structure.
    c. Pairs should develop a working definition of the structure and its function and create an image or symbol to represent this structure. The group will be expected to fully fill out their

assigned section of the structure and function worksheet (picture, structure, function, and importance).

d. Groups should also be prepared to explain the relationship between the familiar object and the marine structure by completing the Analogy "As" Worksheet.

***Whole Class Example:** Prior to excusing students to begin their group research complete an example of structure and function as an entire class to demonstrate expectations. The example used should not be one of the five assigned to the students.

Ex. Ladder and A Giraffe's Neck

Picture	Structure	Function	Importance
	Giraffes are the tallest land animals. They have extremely long necks. The average length of a giraffe's neck is 6ft and weighs nearly 600lbs.	The giraffes use their necks to reach the leaves on trees that are really tall. They can also see over almost anything that would block their view.	Giraffes need such long necks because it helps the reach their food and they need this food to survive. Being able to see from up high helps them see any predators that may be coming.

Ladder **AS** **Giraffe's Neck**

A ladder helps humans reach things they need that are up really high as a Giraffe's neck helps them reach nutritious leaves on the top of tall trees.

3. After groups have had time to complete the structure and function worksheet for their assigned structure and created an Analogy "As" example they should begin preparing for sharing key information with the whole class.

Explain

Learn from Student Experts:

15 minutes

1. Now that student groups have become experts on a marine structure they will be teaching the rest of the class about what they learned (Both groups assigned to 1 structure will present together). Presentations to class should include:
    a. Name of structure.
    b. Function of structure.
    c. Importance of structure/function.
    d. Analogy "as" comparison between familiar object and marine structure.

    *Have image of structure displayed while students are teaching for the rest of the class to see.
2. During the presentations, the rest of the students should be filling in their structure and function with the remaining four structures.
3. Before the conclusion of the presentation on each structure give time for a couple of students to ask any clarifying questions they may have.

4. By the end every student should have information for each structure recorded. There will be time to fully complete this worksheet during lesson #3.

Have students save their structure worksheets. The structure worksheet will serve as a field guide or reference sheet when observing the live dive.

Expand

Introduction to Lesson #3: Live Dive

5 Minutes

Prior to the conclusion of Lesson #2, show students the video from the DBS website that will introduce the class to what they can expect during the live dive and what the team of Cal Poly DBS Divers will be expecting of the class.

Video: "Dive Beneath the Surface: Live Dive Expectations"

https://calpolydbs.wixsite.com/divebeneath/videos

Leave students with the task to begin to think of some questions they may have for the divers during the live dive. They will be able to answer these in real time!