



## Guess the Ocean Animal

### Summary:

Students play a guessing game to learn about less famous ocean animals, using images from Okeanos and MBARI dives. Students will connect and compare anatomy within phylum and between phyla. Students then use explore and share with the class photo data from MBARI dives or the FathomVerse mobile game. At the end of the lesson, students take a quiz to identify a selection of animals from dive images, and use their information from the lesson to explain their reasoning.

### Background Information:

Students are familiar with many vertebrates (fish, sharks, and turtles) and a few invertebrates (seastars, shrimp, and octopi). However, students are often less familiar with the diversity of animals found in the ocean, including many invertebrates.

It's estimated between 30-60% of animals in the ocean have not yet been described to science. Scientists have collected hundreds of thousands of hours of video from ocean dives, but have only analyzed a fraction of this data. AI models could help scientists process the data, but these models need to be trained using humans. Community science projects, including the new FathomVerse mobile game can help scientists get through their backlog of data. Students (or anyone) who wants to help need to learn to identify less well-known ocean animals if they are to help with this community science project.

Students may need a refresher about reading an evolutionary tree. Students will be asked to connect anatomical similarities and differences to how close or far different phyla are connected on a provided evolutionary tree. The evolutionary tree provided is limited only to the phyla and subphyla used in this lesson.

### Performance Expectations:

#### MS-LS4-2 Biological Evolution: Unity and Diversity

Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.

### Specific Learning Objectives:

- Students will use scientific vocabulary about anatomy to describe similarities and differences between ocean animals
- Students will use comparative anatomy to explain evolutionary relationships between ocean animals

## NGSS Dimensions:

### Science & Engineering Practices:

1. Obtaining, Evaluating, and Communicating Information ▾
2. Analyzing and Interpreting Data ▾

### Disciplinary Core Ideas:

1. LS4.A: Evidence of Common Ancestry and Diversity ▾
2. LS3.B: Variation of Traits ▾
3. LS4.C: Adaptation ▾

### Crosscutting Concepts:

1. Patterns ▾
2. Structure and function ▾

## Ocean Literacy Principles:

1. 5: The ocean supports a great diversity of life and ecosystems. ▾

## 5E Lesson Plan

<b>ENGAGE</b>		
<i>Teacher Does</i>	<i>Student Does</i>	<i>Concept</i>
Shows Slides of images of ocean animals (familiar and unfamiliar). Ask student  Teacher may introduce evolutionary tree or review how to read evolutionary trees	takes notes in Notice-Wonder Chart	The Ocean has a vast diversity of life, which is largely unexplored

<b>EXPLORE</b>		
<i>Teacher Does</i>	<i>Student Does</i>	<i>Concept</i>
Put students in groups of 2 Pass out Guess Who cards, instructions, and field guide to each group	Set up and Plays Guess Who Game	Using anatomy to compare and identify animals

<b>EXPLAIN</b>		
<i>Teacher Does</i>	<i>Student Does</i>	<i>Concept</i>
Teacher directs students towards patterns in anatomy within and between groups using the slides for the game reflection	Participate in class discussion and answer questions on a worksheet for game reflections.	Patterns Diversity and Common Ancestry

<b>ELABORATE</b>		
<i>Teacher Does</i>	<i>Student Does</i>	<i>Concept</i>
<p>Option 1: MBARI Deep Sea Guide - teacher shares link or how to access MBARI deep sea guide. Teacher guides students to find an animal and create their own slide to share their animal and image from a deep sea dive with the class</p> <p>Option 2: Fathomverse teacher shares link or instructions to download fathomverse</p> <p>Option 3: Fathomnet: share with students how to access fathomnet, which collects images from many dives (this site is aimed at professional scientists)</p>	<p>Option 1: Students access the MBARI Deep Sea Guide online, pick an animal, and create a google slide that they can share with the class featuring that animal, its phylum, and some additional facts.</p> <p>Option 2: Download and play Fathomverse game, and save one image as a favorite to share with the teacher</p> <p>Option 3: student accesses fathomnet with a computer and find images from Monterey Bay that they could identify and share with the class.</p>	Analyzing and Interpreting Data

<b>EVALUATE</b>		
<i>Teacher Does</i>	<i>Student Does</i>	<i>Concept</i>
<p>Teacher tells students they will take an open-resource quiz with their partner to identify a few images from a deep sea dive.</p> <p>Teacher shows each image and gives students time to</p>	Students work with their game partner to guess the animal and explain their reasoning, using anatomy concepts	Communicating Information Common Ancestry and shared traits



use the guide to identify the animal and write down their reasoning.		
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## Differentiation / Modifications

Differentiation:

- The game can be played with more or less “guess who” cards. Teachers may limit the cards available based on which are more difficult to identify. Students can choose their own level or teachers can choose levels for student groups

## Enrichment:

- Students may participate in a community science project using camera data. Zooniverse <https://www.zooniverse.org/> often has projects using camera data
- Students may play the fathomverse mobile game
- EARTH Thinking-Sinking Game <https://www.mbari.org/lesson-plan/thinking-sinking/>
- Citizen Science using JellyWatch: <https://www.mbari.org/lesson-plan/citizen-science-using-jellywatch/>

## Helpful Resources:

[FathomVerse Game](#) - an app-based community science game that enables players to interact with real ocean images collected by researchers and contribute to the process of teaching AI how to classify marine animals. Within the FathomVerse app, the animal library describes how to visually identify 50+ different morphological animal groups.

[FathomNet Website](#) - an online database for expert-labeled ocean imagery. Users can browse imagery from around the world and see where they were taken.

[Berkeley Evolution Tree Primer Room](#) - a website with a walk-through in how to read evolutionary trees. Helpful background information for a teacher or a usable resource for secondary students in understanding phylogenetic trees. This website also has many resources about the evolution of animal groups or certain organs (like the eye)

[NOAA Ocean Exploration Media](#) - Images and videos from NOAA ocean dives.

[MBARI Ocean Animals of the Deep](#) - Media about select ocean animals from MBARI