

1.1 Making a Venn Diagram of Ocean Organisms

Overview

Many organisms in the ocean share similar features. In fact, you might have once put dolphins, sharks, whales, and fish into the same group because they all have fins and tails and swim in the ocean. Scientists look more deeply at organisms to determine relationships, going all the way back to their evolutionary history. They find that some features are similar because the organisms are related to a common ancestor and others are similar because the organisms evolved to survive in the same habitat. New advances in DNA science have helped differentiate species and support our knowledge of the groups in which each organism belongs.

Learning Objectives

- Organisms that have similar structures but no common ancestors (analogous structures) developed through convergent evolution because they adapted to the same environment.
- Structures that developed from a common ancestor through divergent evolution (homologous structures) might not appear or function the same today, even though they are related.

Student Activity: Making a Venn Diagram of Ocean Organisms

Materials

Similarities and Differences worksheet with Venn diagram template

Access to the Internet

Advance Preparation

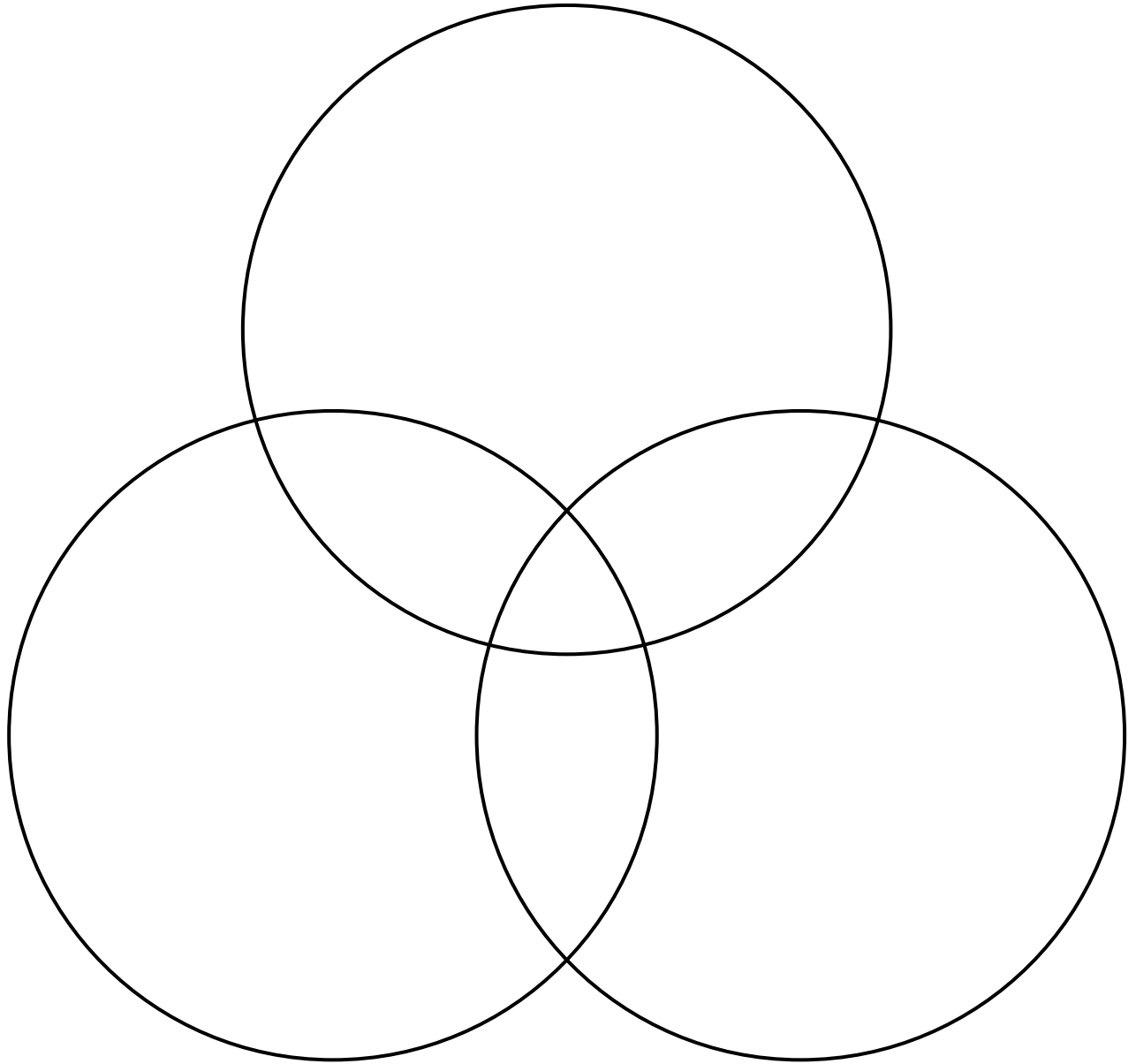
Read Section 1.1: What is Biodiversity?

Potential Misconceptions

- Because their body shape and appendages are similar, sharks, dolphins, whales, and other similar-looking organisms in the ocean are related to one another.

Process and Procedures

1. Recall that a Venn diagram helps you organize descriptions that belong only to one group (inside the individual circles) or that are shared with other groups (inside the overlapping sections of circles). If a description fits in all three circles, it is placed inside the center section in which all three circles intersect.
2. Use the Venn diagram template to compare and contrast a dolphin, a shark, and (pick one) a walrus/penguin/sailfish. To make a thorough comparison, include the following characteristics:
 - body shape
 - appendages
 - respiratory system
 - skeletal system
 - external appearance (coloration, markings, scales, hair, etc.)
3. You may search and use valid and credible resources for additional information.



Notes:



Expected Outcomes

What's the take-away? Students should realize through their comparisons that although many living things share similar structures and characteristics, not all of these commonalities have evolved in the same way nor within the same time frame.

What does the student work product look like?

Students should each produce a three circle Venn Diagram that addresses characteristics from each of the following categories:

- external structures - (such as; torpedo shape, fins, tails, flippers, skin, scales)
- internal structures - (such as; gills, lungs, cartilage, bony skeleton)
- behaviors - (such as; predator/prey, hunting or feeding behaviors, evolutionary history))

Characteristics should be taken from the text in the lesson as well as from outside sources provided by the teacher. The text provides examples of characteristics for sharks and dolphins. Students will need to research their third animal (walrus, penguin, or sailfish) using an outside source.

(Alternatively, if no additional sources are available, students can compare and contrast just the two organisms - shark and dolphin)

Characteristics described in the chapter:

Unique to a shark:

- *use gills to breathe*
- *skeleton made up of cartilage*
- *evolved around 400 million years ago*

Unique to a dolphin:

- *use lungs to breathe*
- *skeleton made up of*
- *evolved around 40 million years ago*

Shared between sharks and dolphins:

- *torpedo shape; streamlined for moving through water*
- *dorsal fin along the top of body*
- *two pectoral fins*
- *wide-flat tail used for propulsion*
- *apex predators*
- *vertebrates*
- *require oxygen*
- *internal structure*