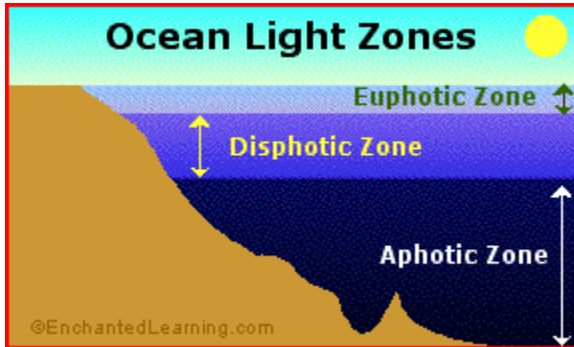


The Sunlit Ocean Zone: Photosynthesis Homework

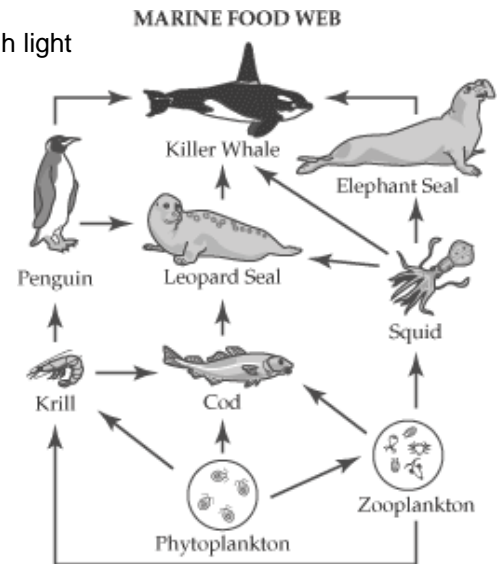


The uppermost (top) layer of the world's ocean is bathed in sunlight during the daytime. This bright ocean layer is called the **sunlit zone** or the **euphotic zone** (euphotic means "well lit" in Greek) or the epipelagic zone (epipelagic means "upon the sea"). The depth of this zone depends on the clarity or murkiness of the water. In clear water, the euphotic zone can be quite deep; in murky (unclear) water, it can be only 50 feet deep. The temperature in this zone ranges from 27 to 104 degrees F.

In this zone, there is enough light for photosynthesis to take place, so many plants and other photosynthetic organisms live in this zone and food is abundant. Photosynthesis is a process in which sunlight and carbon dioxide gas are converted into food (chemical energy contained in carbohydrates) and oxygen gas. Photosynthesis in the oceans creates approximately 90% of the Earth's gaseous oxygen. Most of the oxygen is produced by phytoplankton. These primary producers (also called autotrophs) are the first link in the food chain in the oceans. Because of this food source, many animals also live in this zone. In fact, most of the life in the ocean is found in this zone, although it is the smallest ocean zone in terms of volume of water.

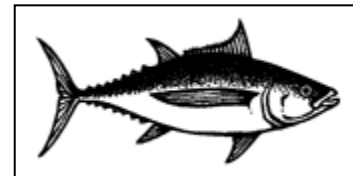
In the euphotic zone, photosynthesizers (autotrophs) include:

- Free-floating algae -- often called seaweed
 - Red algae (Rhodophyta) -- Porphyra (from which edible nori is made), dulse, Ceramium and maerl
 - Green algae (Chlorophyta) --thongweed, sea lettuce (Ulva)
 - Brown algae (Phaeophyta) -- like fast-growing kelp, Sargassum, Turbinaria, Dictyota, and wrack
- Phytoplankton -- tiny, one-celled photosynthetic plankton like diatoms, dinoflagellates, and coccolithophorids
- Plants
 - Flowering plants (angiosperms)
 - Submerged: Seagrasses -- flowering plants like eelgrass and thalassia
 - Not Entirely Submerged: Mangroves -- trees that root in the shallow seafloor but grow above water.



Animals: Examples of euphotic zone animals include most ocean fish (including sharks and rays), man-o'-war, jellyfish, sea turtles, seals, coral, and zooplankton. Some bottom-dwellers live in the euphotic zone - this zone is defined in terms of light, not depth.

Some of the animals in this zone have countershading. Countershading is when an animal is light on its underside and dark on its upper parts. When a predator looks down at a countershaded animal, it blends into the darker waters; when a predator looks at a countershaded animal from below, the light underbelly disappears into the light. This adaptation helps camouflage the organism, hiding it from predators and allowing it to sneak up on prey. Most sharks, for example, are countershaded.



Countershading: Dark on top, light on belly

Homework Directions: Read the article on Page 1 and then answer the questions below.

Part One: Summarize the article on a separate sheet of paper. Use the sentence starters below to keep you organized and on track. Remember in a summary, there is no opinion. Just state the facts from the article.

- The purpose of this article was
- The article informed me of...
- The importance of this article is...
- In conclusion, ...

Key Vocabulary

- a) murky: unclear
- b) uppermost: top
- c) phytoplankton: tiny microscopic plants that can photosynthesize
- d) bottom dweller: organisms that live at the bottom of the ocean/zone

Part Two: What other words could you use here?

a) "The depth of this zone depends on the clarity or murkiness of the water."

Other word(s) for clarity: _____

b) "In this zone, there is enough light for photosynthesis to take place, so many plants and other photosynthetic organisms live in this zone and food is abundant."

Other word(s) for abundant: _____

c) "Photosynthesis is a process in which sunlight and carbon dioxide gas are converted into food (chemical energy contained in carbohydrates) and oxygen gas."

Other word(s) for converted: _____

Part Three: Answer these questions below using complete sentences.

- 1) Based upon the information in the article, what is photosynthesis?

- 2) Why would cutting down all the trees not affect the oxygen levels of Earth? Explain using the article.

- 3) What do you think would happen if all of the phytoplankton on earth were killed by a chemical we placed in the oceans? Again, explain using the article.

- 4) Think or research another animal that has countershading (dark on top, light underneath). Describe the animal and explain how this countershading increases its chance of survival.