Life in the Open Ocean: Worksheet

Marine Biology · Worksheet for https://jugami.com/marine-biology/life-in-the-open-ocean/ · For instant feedback, try the self-guided quiz online.

Name _____ Date _____

Directions: Answer each problem in the space provided. Show your work for any calculation. Use these zone boundaries: epipelagic 0–200 m, mesopelagic 200–1,000 m, bathypelagic 1,000–4,000 m, abyssopelagic 4,000–6,000 m, hadalpelagic below 6,000 m. For pressure, use about 1 atmosphere (atm) for the air plus about 1 atm for every 10 m of seawater.

1. Name the pelagic zone for each depth: (a) 35 m (b) 750 m (c) 3,200 m (d) 7,400 m.

Answer: _____

2. A sea cucumber crawls across the mud 2,000 m down. A siphonophore (a jelly-like colonial animal) drifts at the same depth, well above the mud. Which one is pelagic and which is benthic? Explain in one sentence.

Answer: _____

3. Estimate the water pressure at (a) 30 m, a depth some recreational divers reach, and (b) 650 m. Show your work.

Answer: _____

4. A submersible's window is rated for 300 atm. About how deep can it safely go? Which zone would that put it in?

Answer: _____

5. Sort each organism as **plankton** or **nekton**, and give a one-line reason for each: (a) a sea turtle crossing an ocean basin (b) a drifting diatom (a single-celled alga) (c) a squid hunting at night (d) a fish larva only a few millimeters long.

Answer: _____

(a) _____

(b) _____

(c) _____

(d) _____

6. A sea urchin begins life as a tiny drifting larva, then settles to the seafloor as an adult. Is the larva holoplankton or meroplankton? What is the adult?

Answer: _____

7. A classmate says, "Phytoplankton should live deep down, where there are more nutrients and fewer grazers." Use what you know about light in the ocean to explain why phytoplankton are found near the surface instead.

Answer: _____

8. A net is pulled through the same spot at 400 m depth at noon and again at midnight. The noon sample has many more copepods than the midnight sample. Explain this result using diel vertical migration.

Answer: _____

9. The table below shows the depth of a dense layer of animals detected by sonar over one day. (These are made-up teaching data shaped like a typical pattern, not a real measurement.)

Time	**06:00**	**09:00**	**12:00**	**15:00**	**18:00**	**21:00**	**00:00**	**03:00**
Layer depth (m)	120	450	480	470	320	60	40	50

(a) Sketch a line graph with time on the x-axis and depth on the y-axis (put 0 m at the top and 500 m at the bottom). (b) At about what times does the layer rise and sink fastest? (c) How far did the layer travel between 12:00 and 00:00?

Answer: _____

10. An imaginary open-ocean fish has a dark blue back and a white belly. Describe what (a) a seabird looking down and (b) a small fish looking up would see, and explain how the coloring helps this fish.

Answer: _____

11. A shrimp from the twilight zone has glowing organs on its underside. Its glow gets brighter when it swims upward and dimmer when it swims down. Explain why this behavior makes sense.

Answer: _____

12. A bony fish with a swim bladder and an open-ocean shark of the same size both stop swimming. Predict what happens to each, and explain the difference using their buoyancy adaptations.

Answer: _____

13. Explain how a countercurrent exchanger helps a bluefin tuna, and give one advantage that warm muscles give it as a predator.

Answer: _____

14. **Challenge.** One survey found that about 80% of animals between 200 and 1,000 m are bioluminescent. Another, filming animals from the surface to 3,900 m off California, found that 76% of individuals could make light. A student says the two results contradict each other. Do you agree? Give two reasons the numbers could differ even if both studies are accurate.

Answer: _____