

Round: 2A
Category: Biology
Time: 2 Minutes

1. Vertical migration of the organisms collectively known as the *deep sound scattering layer* has often been described as the largest animal migration on Earth. Describe this phenomenon and its primary stimulus. (4 pts)

2. Consider an example on a smaller scale: *Daphnia* is a small crustacean species found in freshwater lakes. Their only predators are mosquito fish. Mosquito fish are visual predators and are found throughout the water column. The phytoplankton that *Daphnia* eat is found in surface waters. (8 pts)
 - a. Where would you hypothesize that *Daphnia* would be found during the day and why?

 - b. Would you expect *Daphnia* to undergo vertical migrations? Why or why not?

3. Suppose pollution wipes out every single mosquito fish in this lake, but leaves *Daphnia* unaffected. Describe any effects this change could be predicted to eventually have on the depth distribution of *Daphnia* and your reasoning. (8 pts)

Round: 2A
Category: Biology
Time: 2 Minutes

1. Vertical migration of the organisms collectively known as the *deep sound scattering layer* has often been described as the largest animal migration on Earth. Describe this phenomenon and its primary stimulus.

Vertical migration is the periodic migration of animals between deeper depths and shallower depths, taking the availability of sunlight as their natural cue for movement (4 pts).

2. Consider an example on a smaller scale: *Daphnia* is a small crustacean species found in freshwater lakes. Their only predators are mosquito fish. Mosquito fish are visual predators and are found throughout the water column. The phytoplankton that *Daphnia* eat is found in surface waters. (8 pts)

- a. Where would you hypothesize that *Daphnia* would be found during the day and why?
Daphnia should be in deeper, darker waters during the day (2 pts), where it is difficult for the mosquito fish to see them (2 pts).

- b. Would you expect *Daphnia* to undergo vertical migrations? Why or why not?
Yes (2 pts) because their food is in the surface waters, so they need to come to the surface to feed at night. (2 pts)

3. Suppose pollution wipes out every single mosquito fish in this lake, but leaves *Daphnia* unaffected. Describe any effects this change could be predicted to eventually have on the depth distribution of *Daphnia* and your reasoning.

Daphnia would evolve to remain at the surface most of the time, where their food source is (4 pts) because in the absence of visual predators, there would be no selective pressure for them to migrate to deeper waters to hide (4 pts).