

**Round: 8A**  
**Category: Biology**  
**Time: 3 minutes**

1. Why would sound be a better way to communicate in the ocean rather than by sight? (4 pts)
  
2. Describe echolocation, and explain how a marine mammal such as a dolphin would use echolocation to determine the distance to an object in its path. (8 pts)
  
3. As a sperm whale travels towards an object, it will need to know how far away the object is, if the object is a potential food source, or if the object should be avoided.
  - a. Name and describe the internal structure it would use to focus the sound outwards. (2 pts)
  
  - b. Explain where on the whale's body it would receive the reflected sound waves. (2 pts)
  
  - c. Indicate the general frequencies the whale would use to determine first the distance, distance, and then the details of the object. (4 pts)

**ANSWER**

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1. Why would sound be a better way to communicate in the ocean rather than by sight?

*Sound travels faster in water than in air (2 pts) and has a much greater communication range than does sight (2 pts).*

2. Describe echolocation and explain how a marine mammal such as a dolphin would use echolocation to determine the distance to an object in its path.

*Echolocation is the biological sonar used by an animal to locate and identify objects (2 pts). An animal sends out a sonar wave from its body (2 pts), and when the sound waves encounter an object, they are reflected back and returned to the animal (2 pts).*

*The animal can then determine what type of object it is and how far away it is based on the returning echoes (2 pts).*

3. As a sperm whale travels towards an object, it will need to know how far away the object is, if the object is a potential food source, or if the object should be avoided.

a. Name and describe the internal structure it would use to focus the sound outwards.

*The sperm whale sends sound out using its melon (1 pt). The melon is an oily, bulbous feature located in the sperm whale's head (1 pt).*

b. Explain where on the whale's body it would receive the reflected sound waves.

*It would receive reflected sound waves in its lower jaw (2 pts).*

c. Indicate the general frequencies the whale would use to determine first the distance, and then the details of the object.

*To determine distance, the whale would use low frequencies (2 pts).*

*To determine details, the whale would use higher frequencies (2 pts).*