

Quiz #6 - Echolocation post test

Name: _____

1. Describe echolocation and how it works.

Echolocation is when an animal emits calls out to the environment and listens to the echoes of those calls that return from various objects near them. They use these echoes to locate and identify the objects.

2. How can echolocation be used to identify how far away an object is?

The further an object is away, the longer it takes for the sound to travel to the object and then echo back. The brains of animals who echolocate are very good and discerning the difference in time for echoes.

3. What is the Doppler effect?

The Doppler effect is the change in frequency of a wave (sound waves in our case) based on the motion of the source to the observer.

4. Why does the Doppler effect happen? Please use diagrams. (I can't draw with word – sorry)

When a source is moving towards a listener, each successive wave is closer together since the source is moving towards the listener as it emits a wave. If the source were moving away, the opposite happens, the waves are spread out since the source is further away each time it emits a wave front creating more space between each wave.

5. Explain how a sound changes (frequency/pitch) after it has traveled a long distance. Include evidence that you have for this.

As sound travels energy dissipates (the sounds become quieter). High frequencies dissipate more than low frequencies which means a sound that is heard at a great distance will still contain much of the low frequency information but not as much of the high frequencies.

For items 3 – 9 please write whether you *strongly disagree*, *disagree*, *neutral*, *agree* or *strongly agree* with each statement.

6. SONAR (SOund Navigation And Ranging) uses different science than echolocation. –
Strongly Disagree

7. Dolphins, bats and other echolocating animals can identify the difference between an inanimate object (rock) and a living creature (fish or bug) using only the signal from echolocation. . –
Strongly Agree

8. Echolocation is only useful for identifying objects at very close range (20 feet). -
Strongly Disagree
9. Sound travels faster in water than in air. . - *Strongly Agree*
10. Animals such as bats use echolocation alone without sight to locate and consume food. -
Strongly Disagree
11. Sounds used to echolocate are very narrowly focused only hitting a tiny area at a time. .
- *Strongly Agree*
12. It is much more challenging to hunt for food in the ocean or in the air since prey can be
all around and not just on the ground. - *Strongly Agree*
13. Any human can learn how to echolocate. - *Agree (as long as they can hear)*