

Reading comprehension questions - week 8

Echo Effects

Echoes can be used to judge how far away things are. Humans have invented specialised equipment to measure echoes accurately. However, some animals, such as bats, use echo sounding naturally. This extract explains how echo sounding works, and some of its uses.

Echo Effects

Like light, sound can bounce! It can be reflected off hard surfaces such as cliffs, buildings or the walls in an empty room, just like light being reflected off a mirror. A reflected sound is called an echo. Since we know the speed of sound, we can use a method called echo sounding to find out how far away an object is by measuring echoes. Some animals use this method too, to spot their enemies or find their prey in the dark.

Bouncing Sound

If you stand in a pedestrian underpass or subway and shout out loud, you'll frighten people! But apart from that, you'll also hear your own shout repeated a second or two later. This is an echo, caused by the sound waves being reflected off the walls of the underpass. You can also hear echoes in the countryside if you shout at a cliff or cave wall.

Because we know the speed of sound, echoes can be used to calculate the distance to an object. Echo sounding works best with high-pitched sounds that have a frequency of more than 20,000 Hz. This is called ultrasound, as it's too high for humans to hear. Instead, a special receiver is used to pick up sounds as they bounce off objects.

Echo sounding (sometimes called sonar) is used by ships and submarines for measuring distances underwater — such as how deep the sea is. To do this, a ship has an ultrasound transmitter and receiver mounted on its hull*. The transmitter sends out a series of ultrasound pulses. They travel through the water, bounce off the sea bed and back to the ship, where they are picked up by the receiver. The depth of water is worked out by measuring the time it takes for the ultrasound to reach the sea bed and bounce back to the ship.

Ultrasound also has medical uses. It can be used to scan a person's body. Some body parts, such as bone, reflect ultrasound better than others, so an ultrasound scan can build up a picture of different tissues in the body.

Glossary

hull — the bottom of a boat

An abridged extract from
Light and Sound by John Clark.

1 In the first paragraph, the author compares echoes to "light being reflected off a mirror". Why do you think the author used this example?

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2 marks

2 According to the text, why do some animals use echo sounding? Give two reasons.

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2 marks

3 The word "frighten" on line 10 is (circle one):

- a. a noun b. an adjective c. a verb d. an adverb

1 mark

4 In your own words, explain how echo sounding is used to measure how deep the sea is.

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2 marks

5 Why do you think bones might reflect ultrasound better than other parts of the body?

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1 mark

6 Which do you think is more useful: using ultrasound to measure distances underwater or using ultrasound to scan a person's body? Explain your answer.

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2 marks

Total
out of 10

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