

Introduction to Sound (K-7)

SPS Outreach

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What is Sound?

Sound takes place in the form of waves called sound waves. Sounds are vibrations that travel through the air or other medium, like water.

How Does a Shark Hear Underwater?

Sharks hear underwater and hunt their prey through vibrations made by other animals. In figure 1, an arrow points to hairs on the sharks nose. If these hairs vibrate, the shark hears objects in the water like fish.

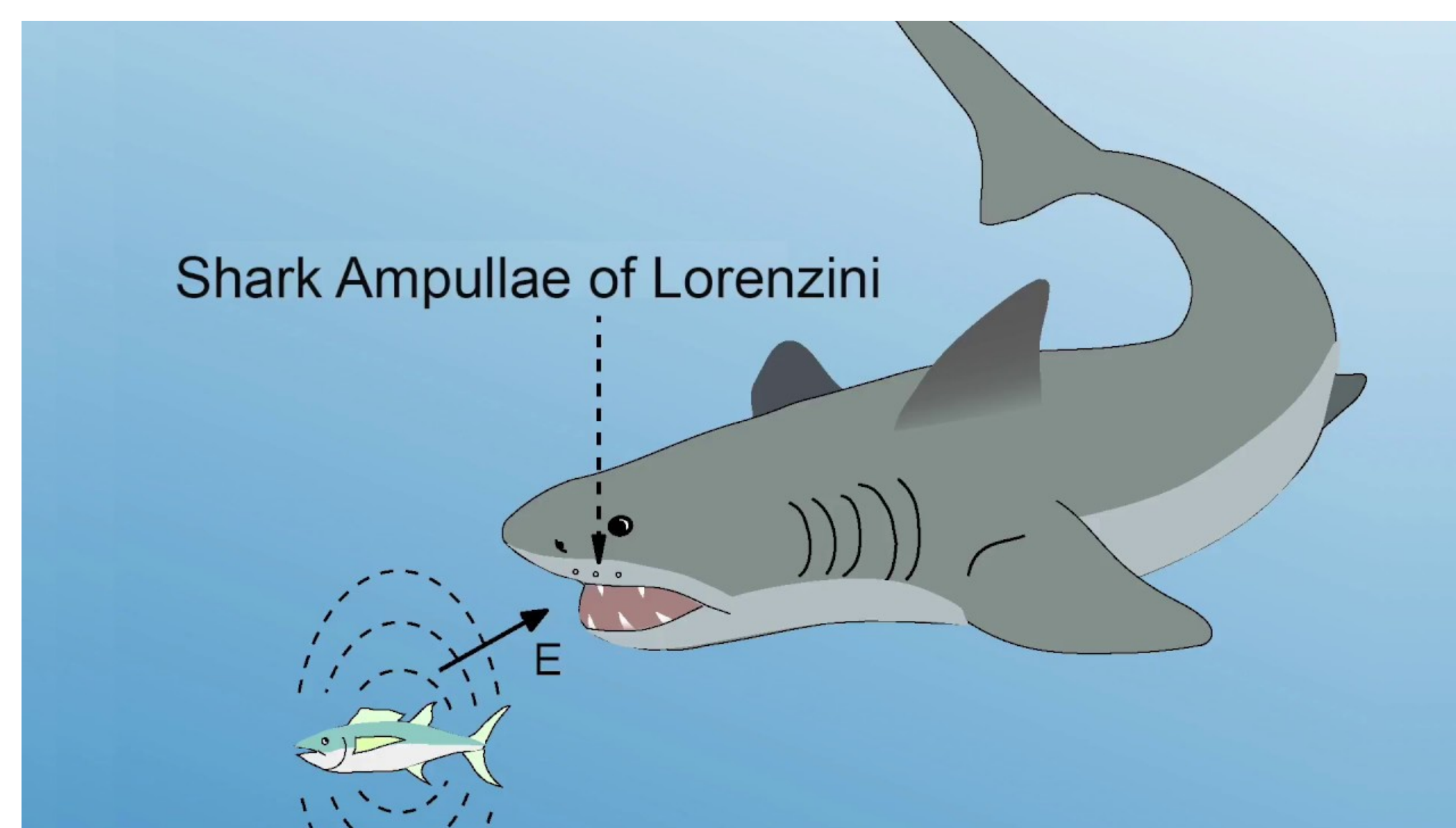


Figure 1. Shark hunting prey using vibrations in the water [1]

What are Waves?

Waves are curves that travel from one point to another. There are two main types of waves: transverse and longitudinal. A transverse wave travels in an up and down motion, and a longitudinal wave travels from side to side.

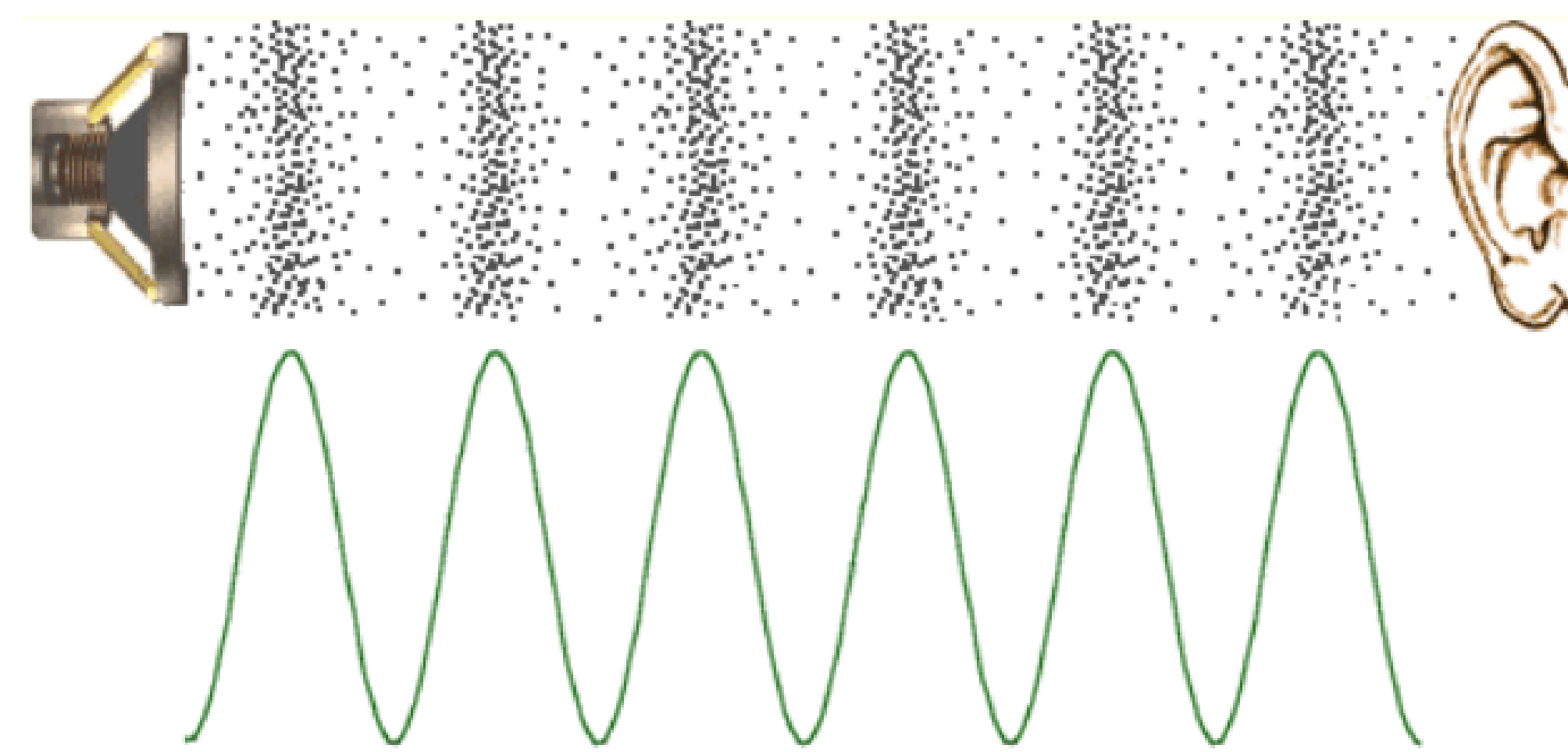


Figure 2. Sound Wave [2]

How Does Sound Travel?

Sound waves are longitudinal waves that travel from side to side. As seen in figure 2, the sound wave travels from the speaker to the ear in a side to side motion.

What is an Echo?

An echo happens when multiple sound waves reflect, or bounce, from objects around you, like in figures 3 and 4. An echo will have multiple sound waves arrive at the outside ear at different times, which is why we hear similar sounds over and over again.

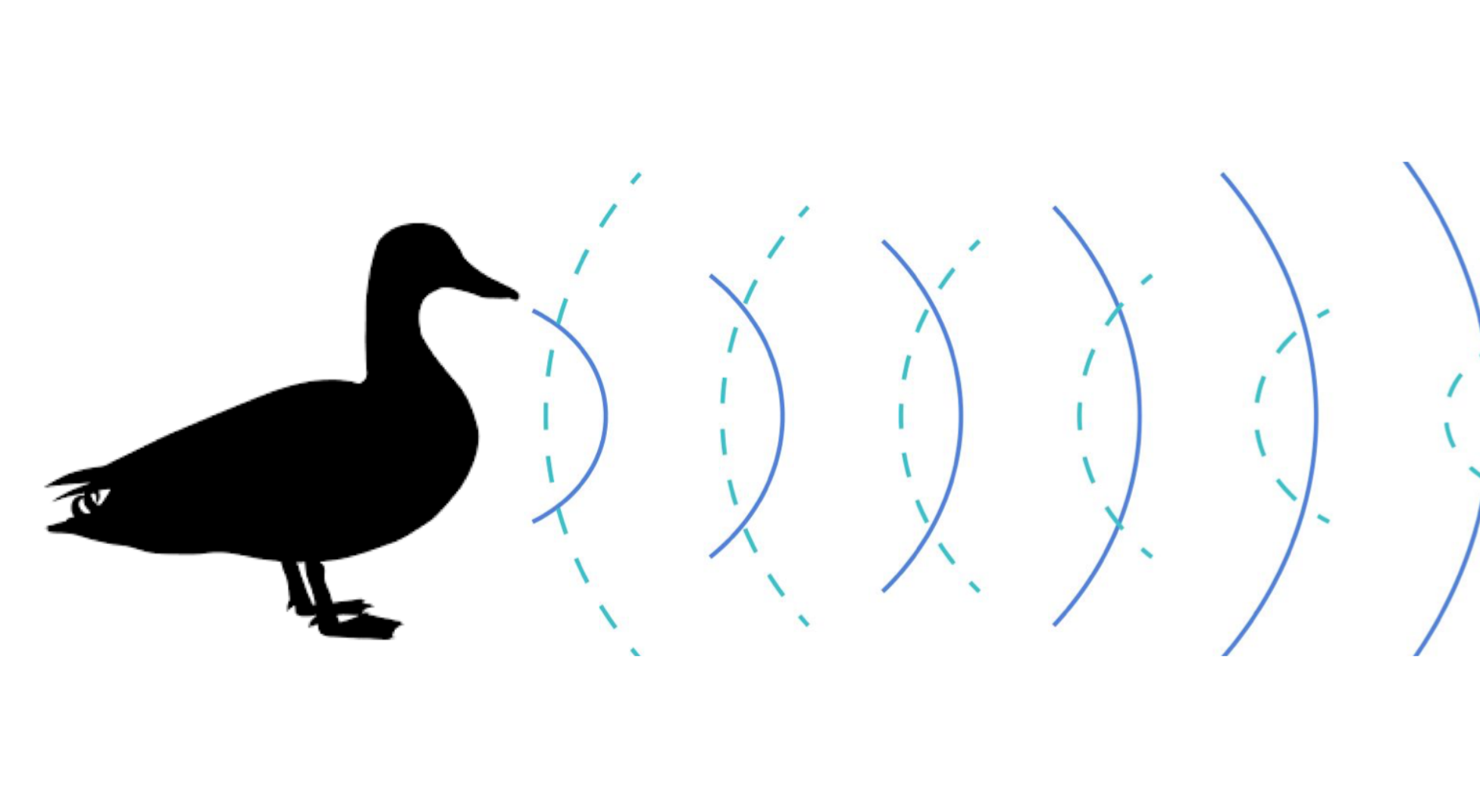


Figure 3. Reflection of sound [3]

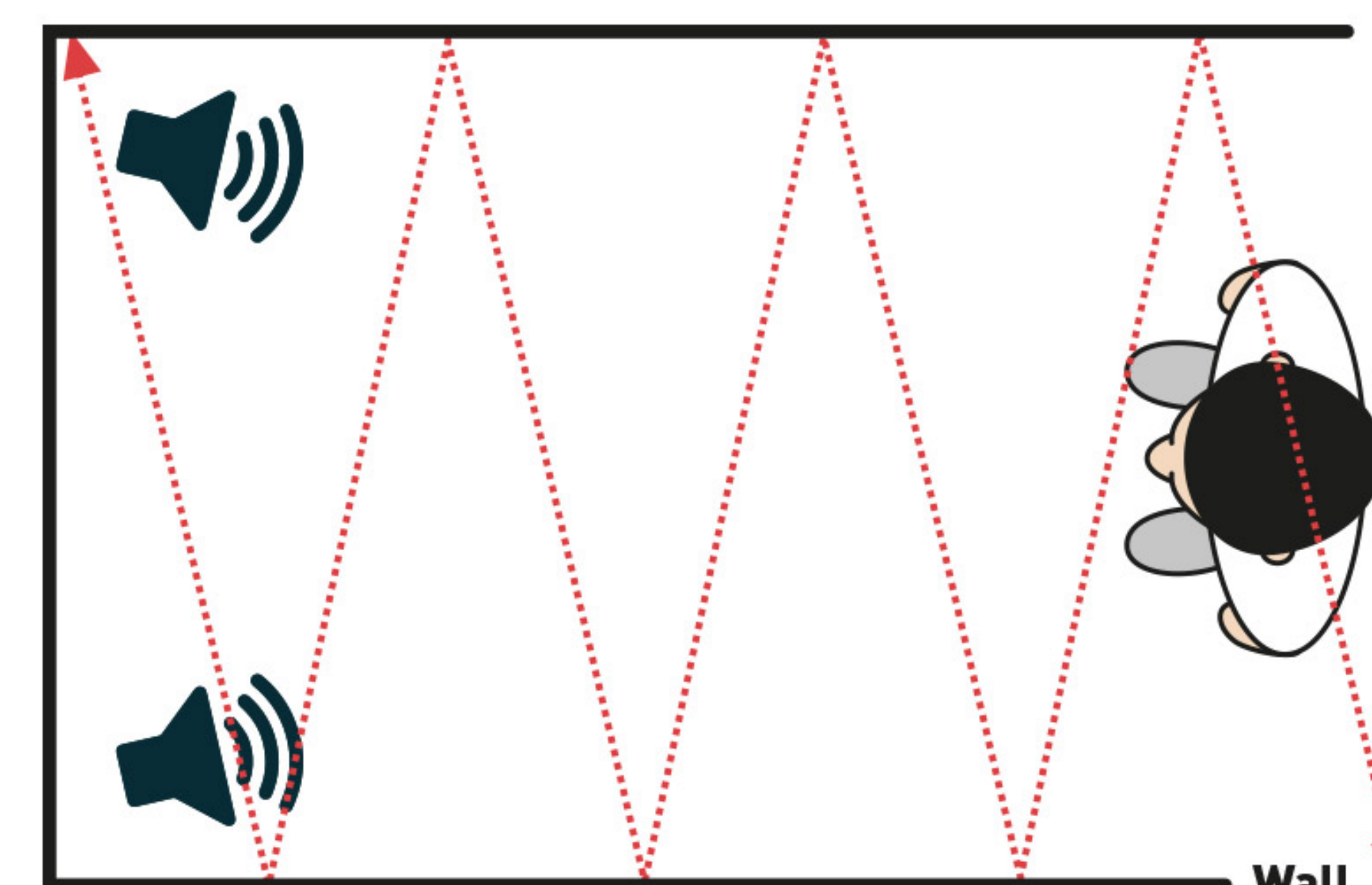


Figure 4. Flutter echo [3]

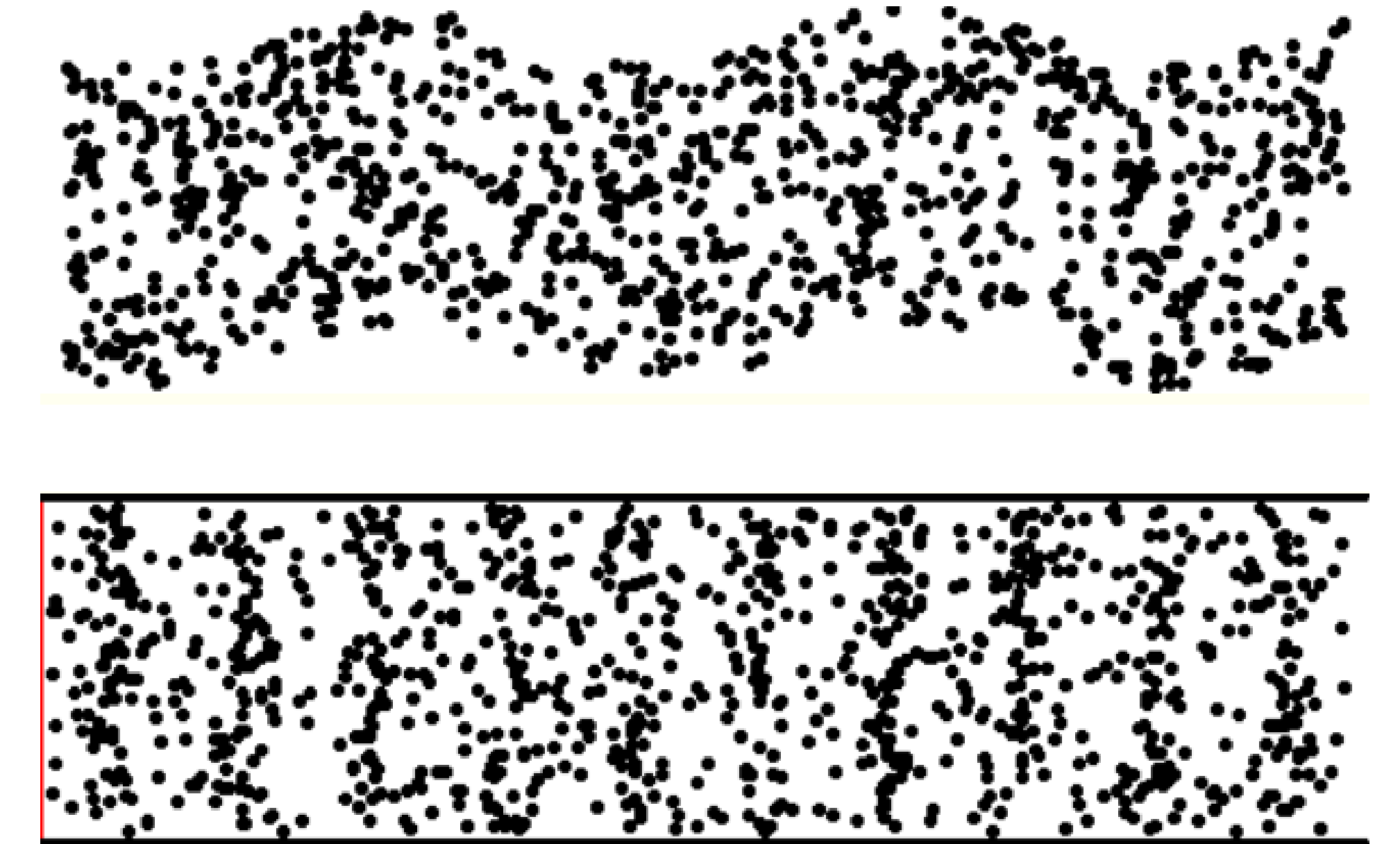


Figure 5. Comparison of the transverse wave (top) and longitudinal wave (bottom) [5]

References

- [1] How Sharks Hear Underwater: <https://blogs.ucl.ac.uk/researchers-in-museums/2014/04/23/question-of-the-week-how-do-sharks-hear/>: :text=Like%20in%20humans%20and%20other,to%20hear%20in%20multiple%20directions
- [2] How Do We Hear? <https://www.nidcd.nih.gov/health/how-do-we-hear>: :text=Sound%20waves%20enter%20the%20outer,bones%20in%20the%20middle%20ear.
- [3] Reflection of Sound: <https://www.geomicrobes.com/myth-ducks-quack-has-no-echo/>
- [4] Flutter Echo: <https://www.gbfoamdirect.co.uk/foam-cut-to-size/acoustic-foam-sound-proofing/flutter-echo-diagram/>
- [5] Transverse vs. Longitudinal Wave: <http://astronomy.swin.edu.au/smaddiso/astro/SiS/NPS/sound1.html>