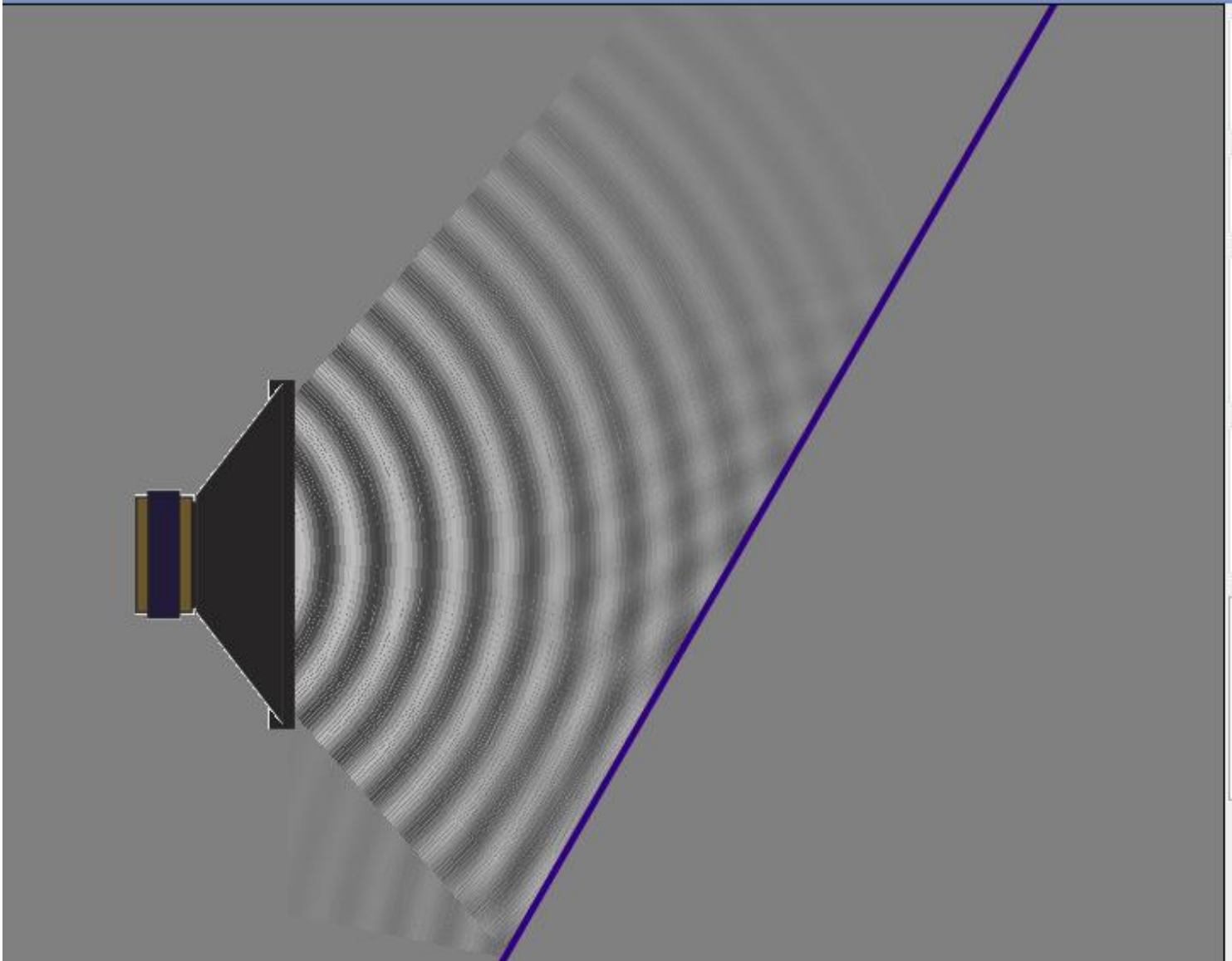


Echolocation

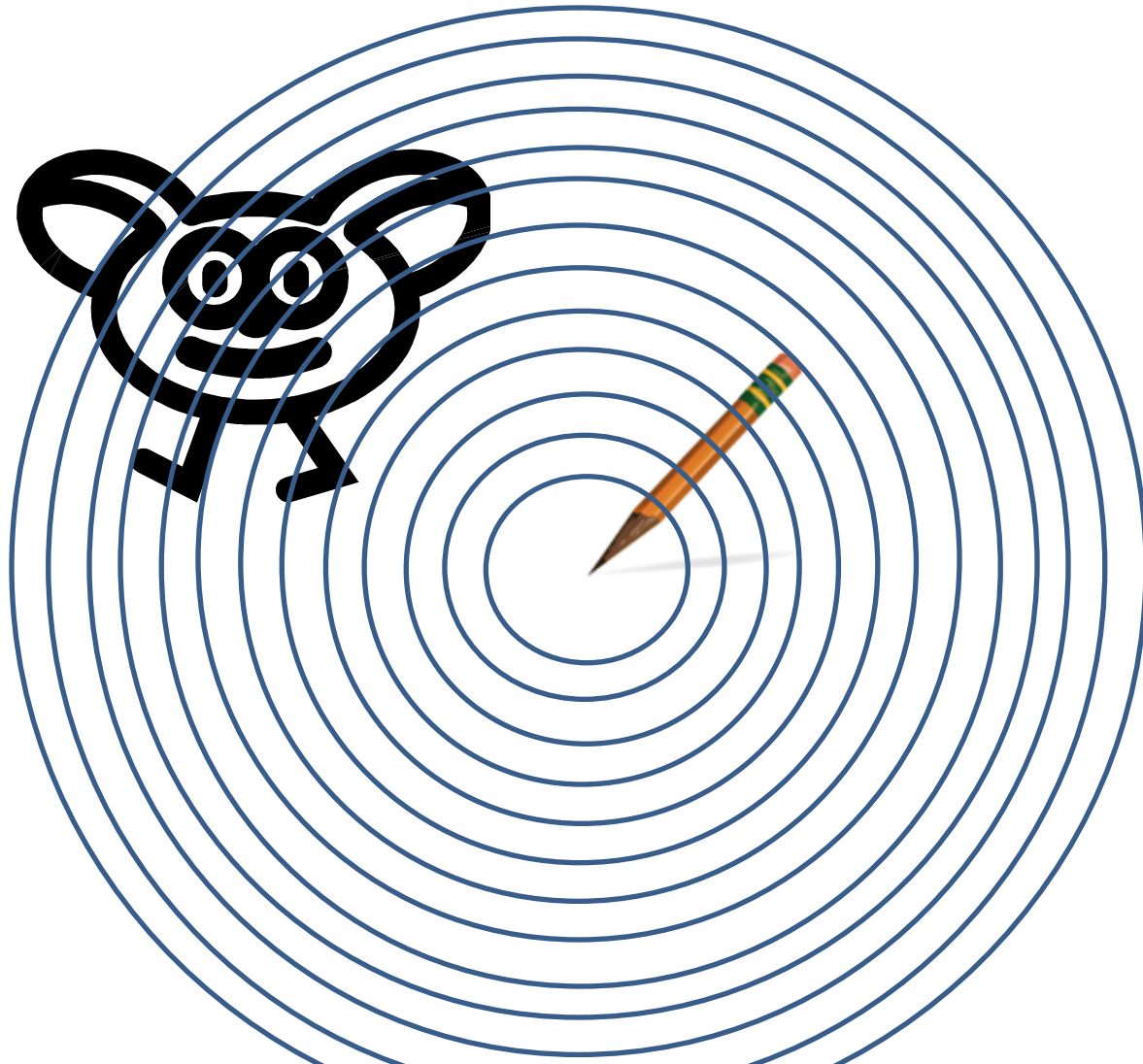
Sound bounces off of solid objects



Listen for echoes

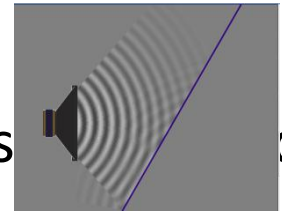
- Echolocators listen for the sounds bouncing back
- Most produce their own sounds (such as clicks) and listen for them to come back.
- People do this subconsciously

Locating sounds



Listen for the delay

- The delay tells the brain how far away an object is.
- If one ear hears it first, then it knows the object is to the side.



This is how dolphins and bats know how far away their prey is!

Speed of Sound

- 4.8 seconds to travel a mile in air
- 1.1 seconds to travel through water
- $\frac{1}{4}$ of a second to travel through solids

Acousticians

- Architectural acousticians
- Instrument makers
- Concert hall designers
- Speech scientist
- Hearing specialist
- Medical acoustics
- Animal bioacousticians
- Underwater acousticians