Echolocation: ricochet's Echo: a sound wave bounces off of another object and returns to the sender.

The time it takes for the sound to return to the sender tells you how far the object is from the sender.

Speed of sound: \[ \frac{340 \text{ m/s}}{1} \]

Mach 2 = \( 2 \times 340 \text{ m/s} \) = 680 m/s
Ultrasounds

If it is higher then we can hear

$>20,000\ Hz$

Gel = helps sound waves get absorbed

Purpose: show muscles/bones/other below skin

1) Time for wave to return = distance

2) Strength of the wave that returns tells the type of material
Ultrasound

Sending and receiving sound waves (longitudinal)
If must be above 20,000 Hz

Gel: helps the sound waves travel through the skin

1) We can tell the type of material by looking at the intensity of wave that bounces back
2) Know the distance to the object by looking at the time it takes for the wave to return
Reflection
2 types of boundaries:

- Fixed/Closed
  - The end is stationary

- Loose/Open
  - The end can move

Before

After

Constructive Interference

Destructive Interference

Superposition when multiple waves interfere with each other