Things that go “boom” under water

Joel D. Simon and Frederik J. Simons
What is sound?
Sound is a **Pressure Wave:**

\[ \text{Pressure} = \frac{\text{Force}}{\text{Area}} \]
Sound is a Pressure Wave:

Wave = Traveling oscillation

High Pressure

Low Pressure

https://www.mediacollege.com/audio/01/sound-waves.html
How we describe sound?
Amplitude [height]

Low

High
Frequency [time]

Low

High

time
What makes sounds?
Some Common Sounds

**Frequency & Wavelength: pitch**

- Humans hear between 20 and 20,000 Hz!
- The rumble of thunder is 100 Hz
- Middle C on a piano is 261 Hz
- A police siren is 1,000 Hz
- Crickets sing at 5,000 Hz

**Amplitude: loudness or volume**

- +10 dB doubles sound volume
- Cats purr at 25 dB
- Normal conversation is 50 dB
- A jet engine is 120 dB
- Saturn V rocket was over 200 dB!

Earthquakes make sounds, too
Can you hear an earthquake?
Seismometers hear earthquakes
Can you hear under water?
Can you hear an earthquake under water?
Hydrophones hear earthquakes under water
mag 5.2 event at 56 km depth and 7.36° distance, filtered 2-4 Hz
Can you see sound in water?
Low: 30 Hz

Mid: 60 Hz

High: 120 Hz