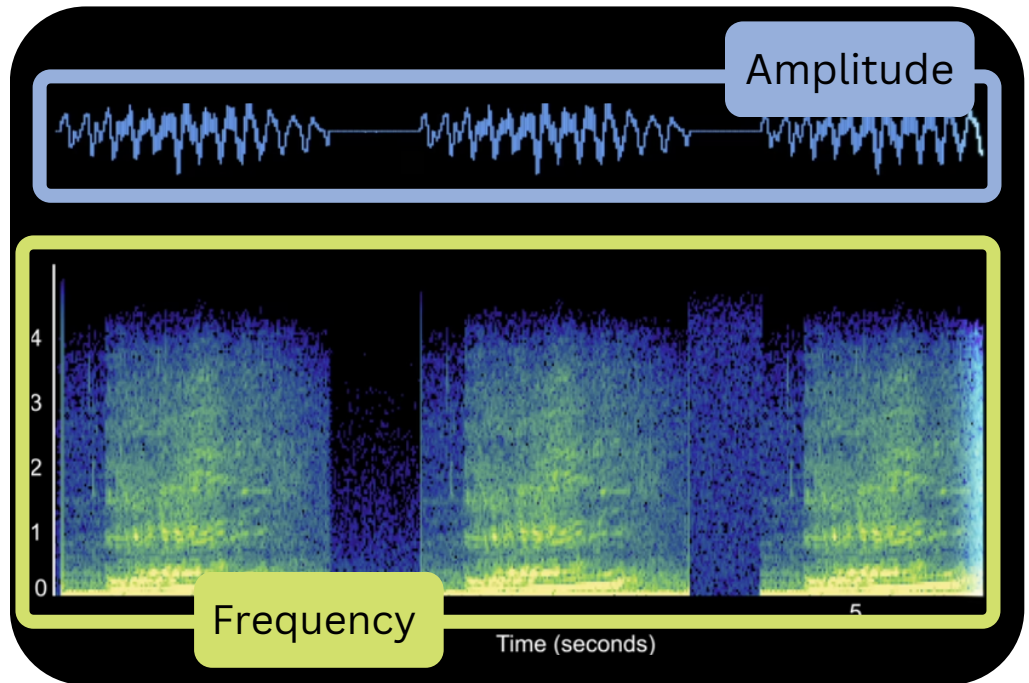


# How Do We Identify Sounds?

## *through physics!*

### What We've Learned:

- Biologists use special tools to collect sound samples in the ocean.
- Healthy coral reefs sound different than impacted coral reefs.
- Sounds mix to create a soundscape and can be categorized by their source.
- The types of sounds present in a reef ecosystem provide clues about its overall health.

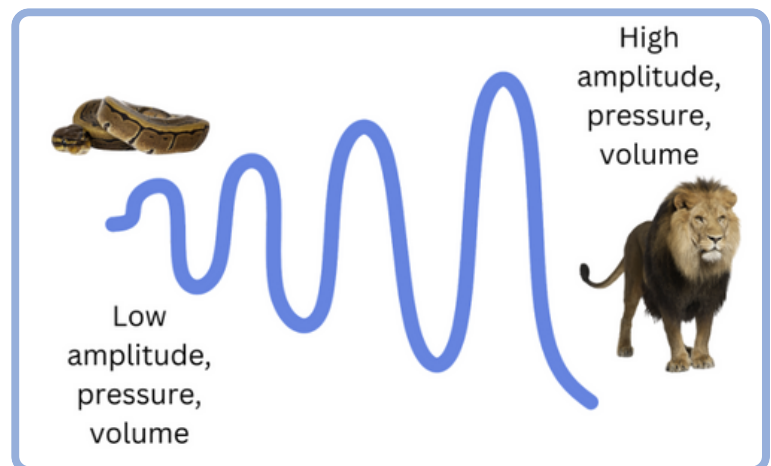
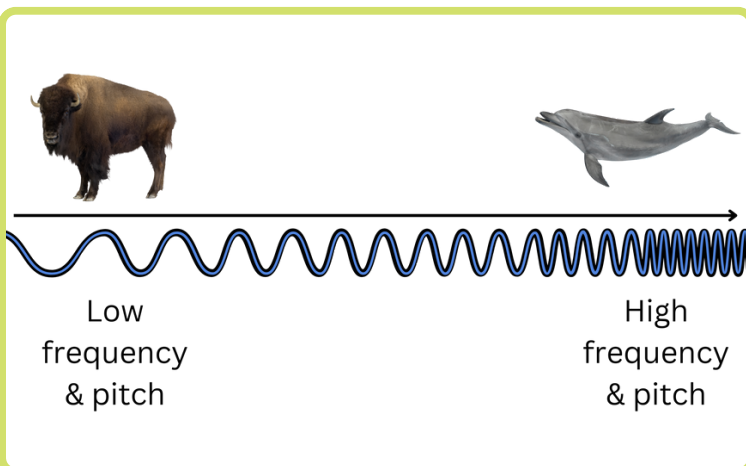


### What is **FREQUENCY**?

- Frequency is the physical measurement of pitch.
- It is determined by the number of sound waves that occur in one second.
- The pitch of a sound is how high or low something is.
- Measured in Hertz (Hz)

### How do we measure **LOUDNESS**?

- Amplitude is the physical measurement of sound intensity, pressure, or volume (loudness).
- Shown graphically by the change in the height of waves.
- As the amplitude increases, pressure and volume increase.
- Measured in units called decibels (Db)



Spectrograms and sound files obtained from: *Discovery Sound in the Sea*, University of Rhode Island (2021)  
<https://dosits.org/galleries/audio-gallery/>

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- Sounds can be identified by frequency and loudness.

# Investigating Further: Collecting Data



Listen to each of the sounds provided.

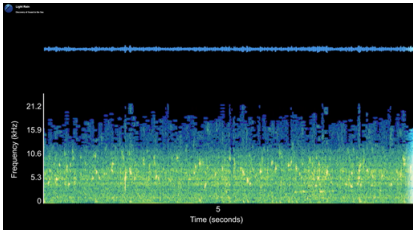
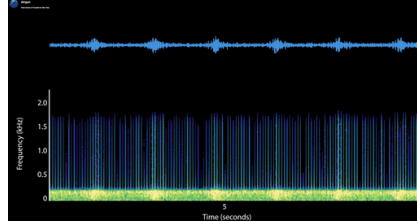
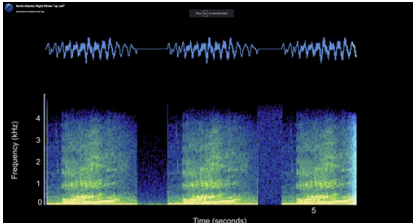
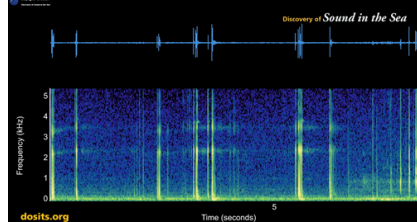
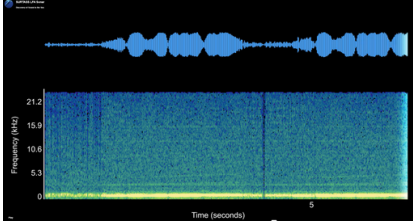
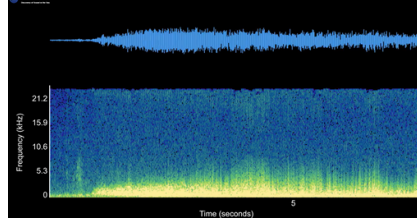
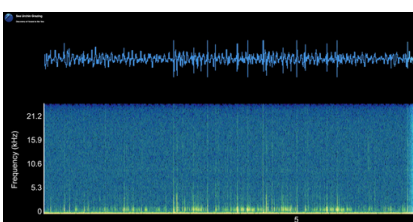
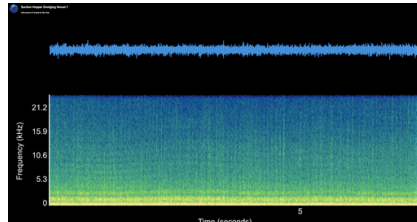
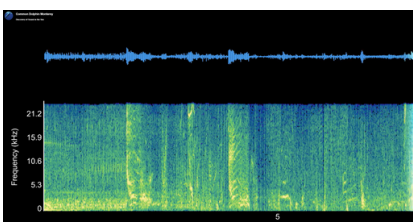
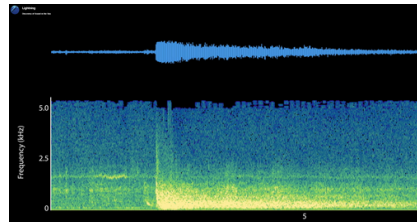
As you complete the table, listen for defining characteristics of geophonic, biophonic, and anthrophonic sounds.

**What evidence would help you characterize an unidentified sound?**

Source	Category	Frequency	Loudness	Description
Follow Link to Hear Sound	Anthrophony (A) Biophony (B) Geophony (G)	kHz	1-5	Narrative or comparison
Rainfall				
Atlantic Right Whale				
Sonar				
Sea Urchin				
Common Dolphin				
Airgun				
Stoptlight Parrotfish				
Earthquake				
Dredging				
Lightning				

# Identifying Patterns in Graphic Sound Data

What evidence would help you characterize an unidentified sound?

Source	Spectrogram Top: Amplitude Bottom: Frequency	<ul style="list-style-type: none"> <li>• Anthro</li> <li>• Bio</li> <li>• Geo</li> </ul>	Source	Spectrogram Top: Amplitude Bottom: Frequency	<ul style="list-style-type: none"> <li>• Anthro</li> <li>• Bio</li> <li>• Geo</li> </ul>
Rainfall			Airgun		
Atlantic Right Whale			Stoptlight Parrotfish		
SURTASS LFA Sonar			Earthquake		
Sea Urchin			Dredging		
Common Dolphin			Lightning		

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# Organizing Evidence

Use the observed patterns, data, and observational evidence collected to identify specific characteristics to help distinguish between anthrophony, biophony, and geophony.

**Can defining characteristics can be used to distinguish between biotic, abiotic, and anthropogenic sounds?**

Describe the unique characteristics of biotic sounds (biophony).

Describe the unique characteristics of abiotic sounds (geophony).

Describe the unique characteristics of anthropogenic sounds (anthrophony).