Name: _____ Pronouns: _____

FishSounds Educate

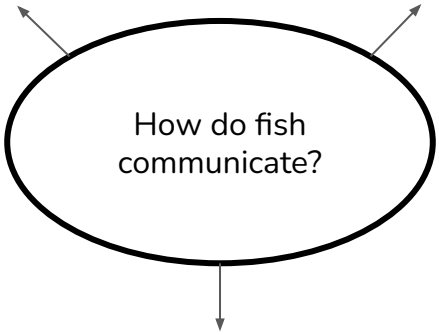
presents

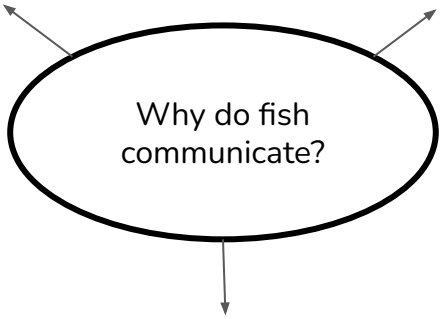
The Biology of Sounds in the Ocean

We will learn about ...

- Fish communication
- The speed of sound in air versus water
- Natural soundscapes
- How fishes hear and make sounds
- What different fish sound like
- How scientists record and “see” sound
- Human impacts on marine ecosystems

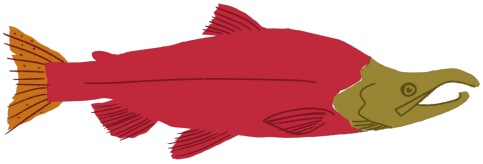
With the person next to you, brainstorm 3 possible answers to each of the following questions. Be prepared to share your answers!



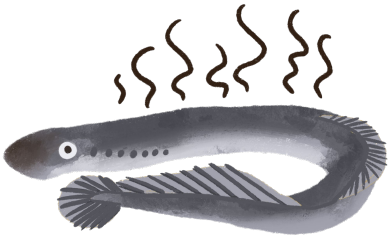


How do fish communicate?

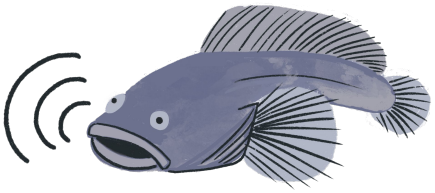
_____ _____ _____



Some fishes can use their physical appearance to signal warnings or attract mates, such as sockeye salmon turning bright red.



Some fishes can detect chemical cues, like the sea lamprey which can identify spawning grounds and avoid predators.



Many fishes use sounds to communicate for many reasons, such as the midshipman humming sound we just heard.

Why do fish communicate?

_____ _____ _____

Why do fish use sound?

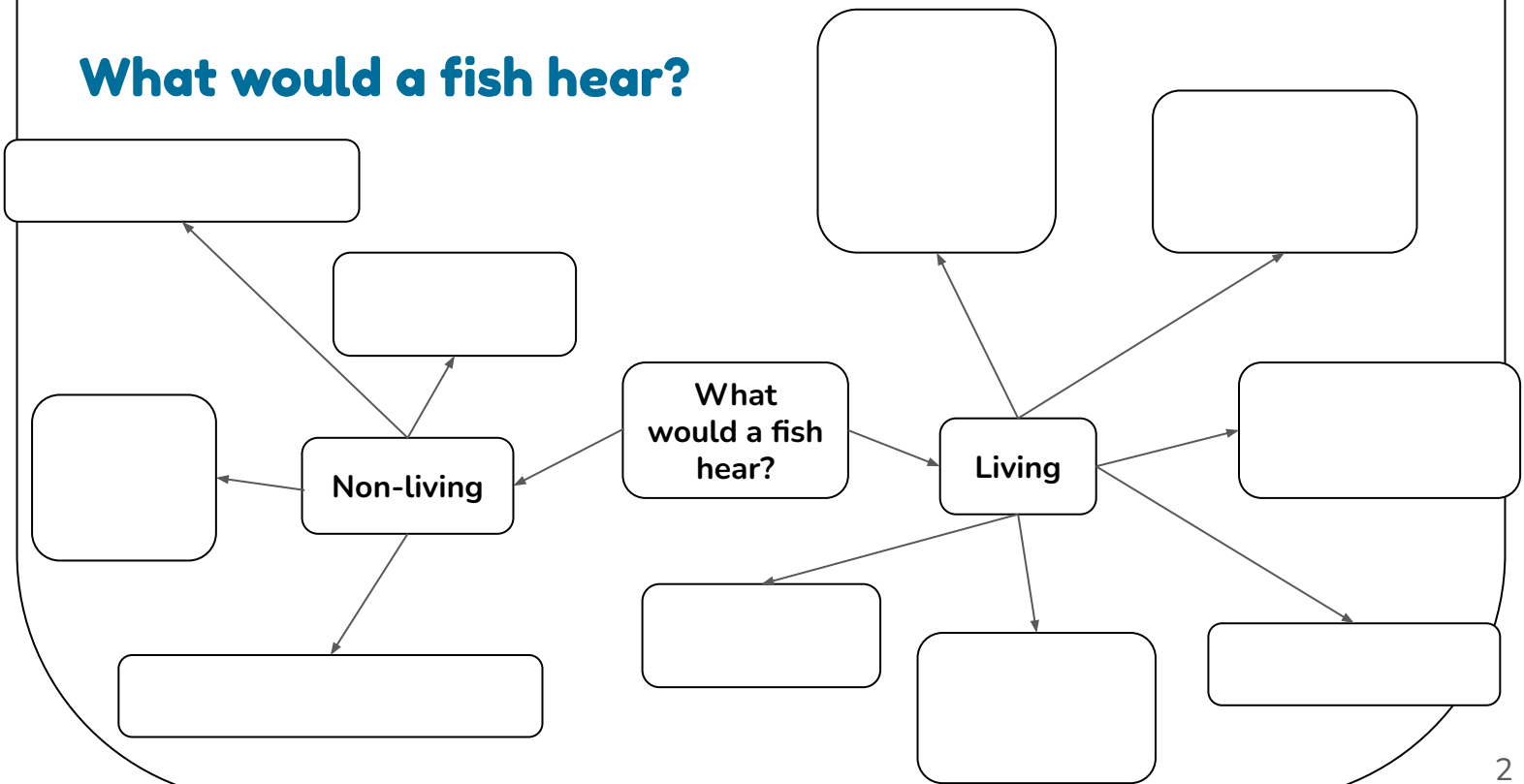
_____ only penetrates up to 200 m deep (in the ocean).

Sound travels very _____ and far in water!

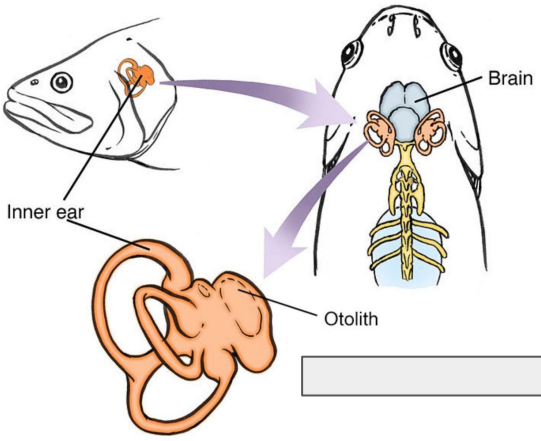
Sound travels _____X faster in water than air. **Speed in Water:** _____ metres/second

In water, sound can travel the length of _____ soccer fields in one second.

What would a fish hear?



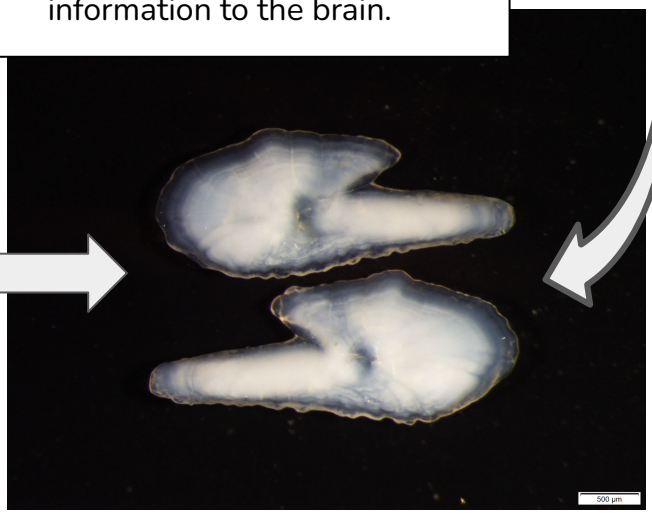
Fish hearing



Modified from Off the Scale

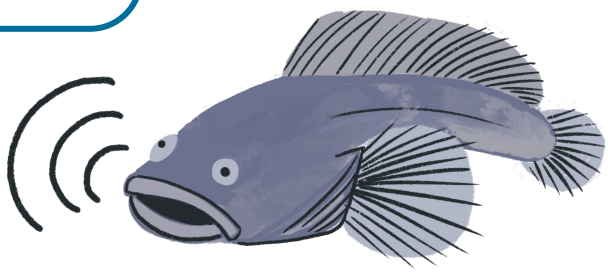
Sardine _____

are calcium carbonate structures found in their inner ears.
When a sound comes toward a fish, this causes the otolith to move. The movements are picked up by sensory cells which then send the acoustic information to the brain.



Juanes Lab, UVic, 2022

One grows on land, with branches and leaves
The other has scales and swims in the sea
How can these organisms, different as they may be
Both be studied the same, by **counting** 1, 2, 3... ?



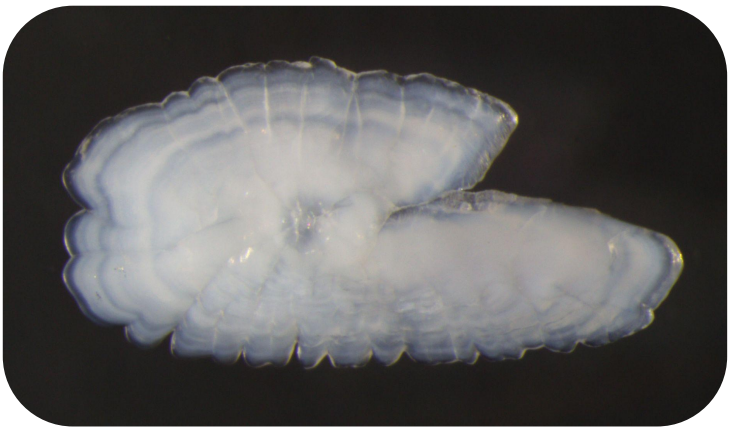
Answer:

_____ and _____ _____

both _____ _____ _____

How old was this herring?

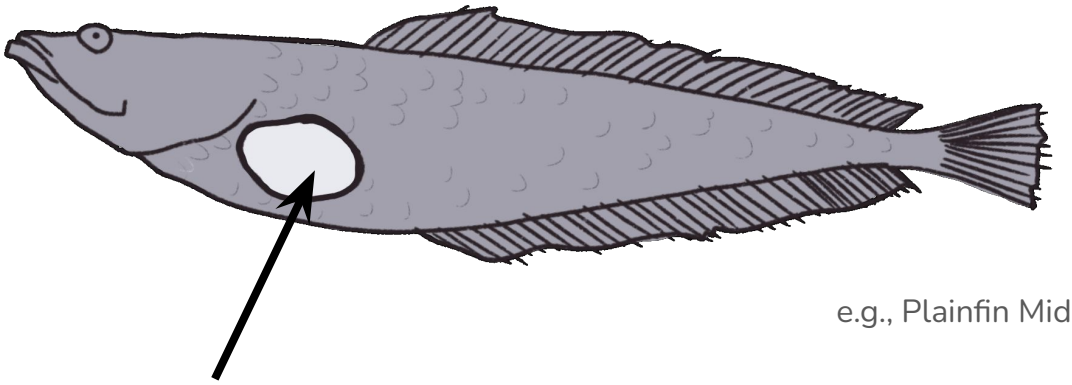
_____ years old



Jessica Qualley

Fish sound production

Fish make sounds using two main ways:



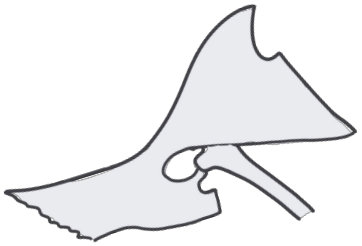
e.g., Plainfin Midshipman

_____ **of muscles** on their _____ _____

The other main way is:

Stridulation
(rubbing of _____)

e.g., seahorses & catfish



Fish make many different sounds!

We are going to be exploring FishSounds.net

Access the website on your phone using the QR code →

Answer the following:

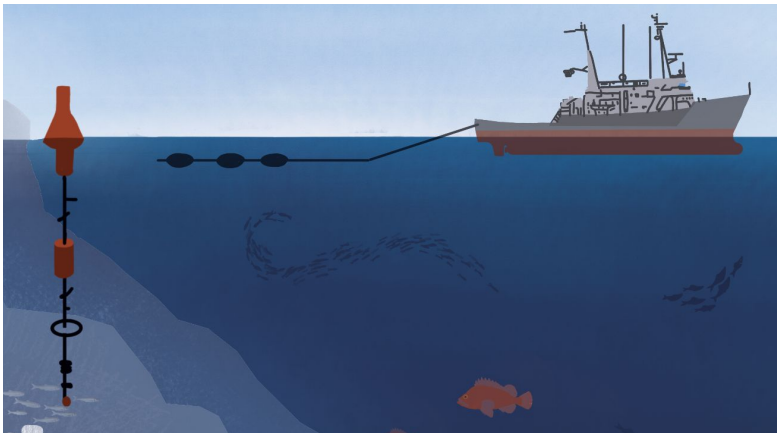
1. The number of sound-producing (soniferous!) fish species: _____

2. Find and play a **Rainbow Trout** sound by using the Search feature. Select the 3 bars at the top right, choose “Fish Species”, then click “Filter Results” at the top and type “Rainbow Trout” into the “Common Name” search bar. Listen and describe the sound:

   _____

Hydrophones

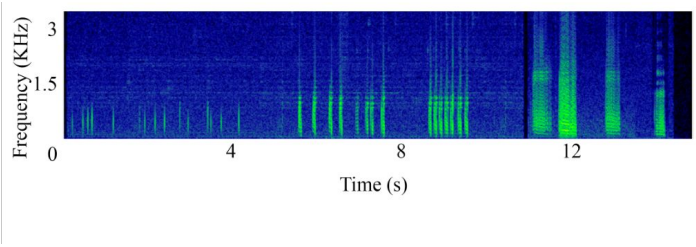
Hydrophones can be placed in a _____ position to capture information over _____, or they can be _____ to capture information over _____.



Sounds picked up from a hydrophone can be visualized as a _____.

Spectrograms

A spectrogram is a graph of _____ of sound waves over _____.



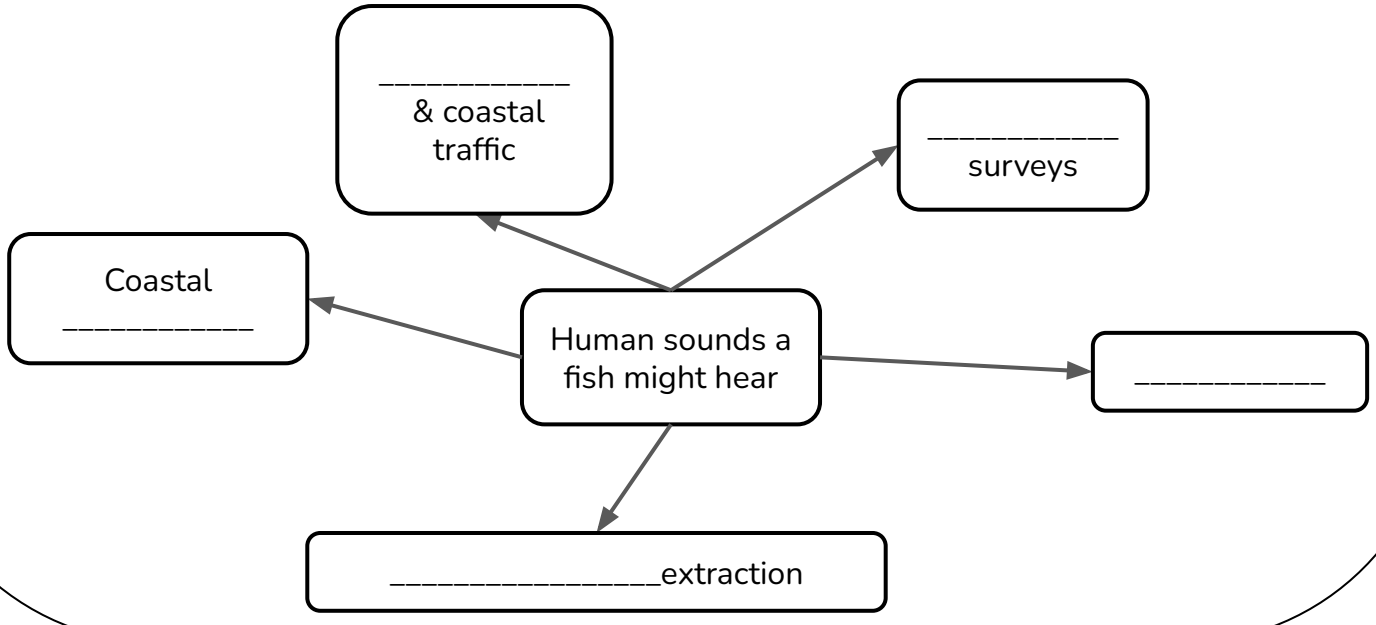
Changes in frequency can be heard as changes in _____

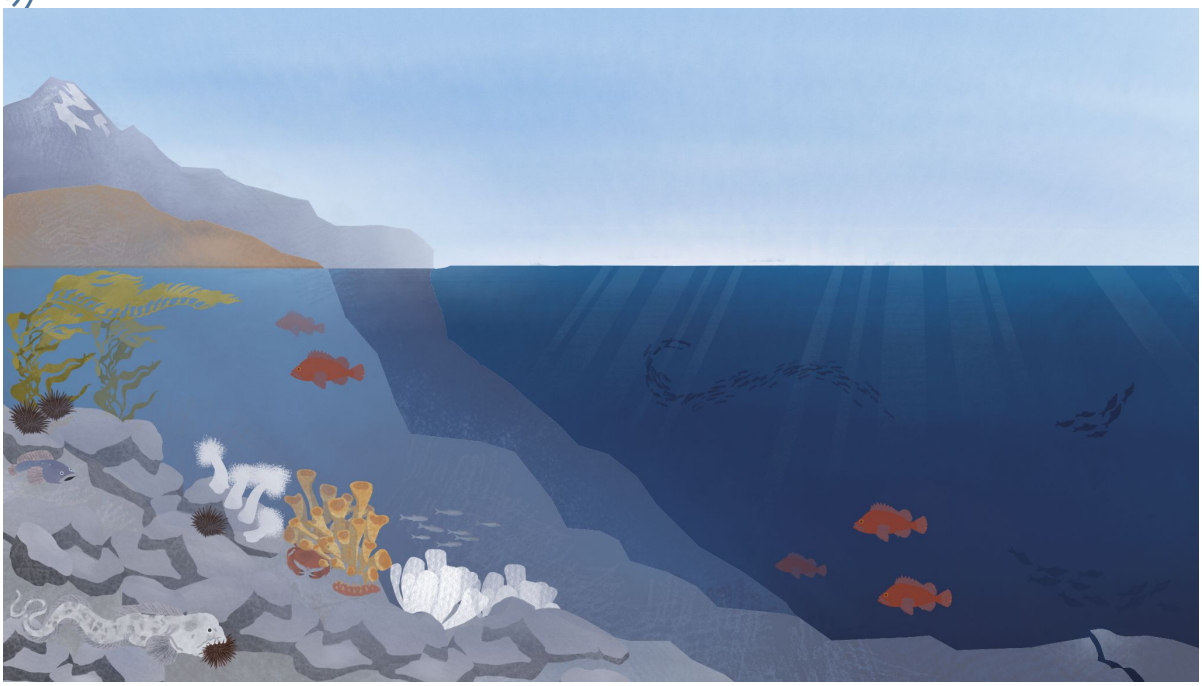
A _____ pitch is heard when the frequency is high

A _____ pitch is heard when the frequency is low

Anthropogenic sounds in the ocean

Fill in 5 human sounds a fish might hear:





Fill in 2-3 ideas below of how you can help fish hear each other:

_____

_____

_____

_____

	Emerging	Developing	Proficient	Extending
Workshop Participation	More than 4 answers are missing. Did not participate fully despite reminders. Needed constant reminders to put phone away.	2-3 answers/questions are missing. Needed encouragement or reminders to participate. Needed many reminders to put phone away.	All questions have been answered. Participated in all required activities.	All questions are answered in full sentences and show thoughtful consideration. Raised hand without prompting. Contributed to discussions. Encouraged others to participate. Provided considerate and helpful feedback.

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