

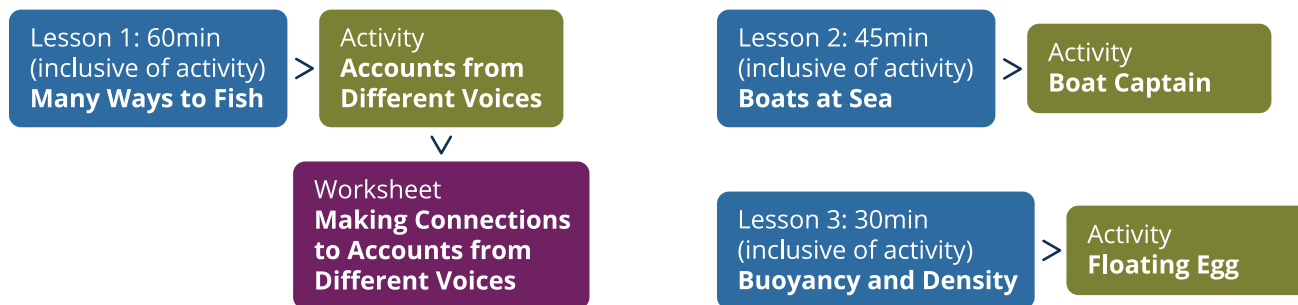
Ocean Sense Program

Science and Fishing Module Overview


Observation of your environment is key to understanding how to live and survive in the natural world. Key observations from time immemorial have helped the Ts'msyen* people thrive for thousands of years while living off the land and fishing. Explore observations and scientific principles of buoyancy and density in this interactive module.

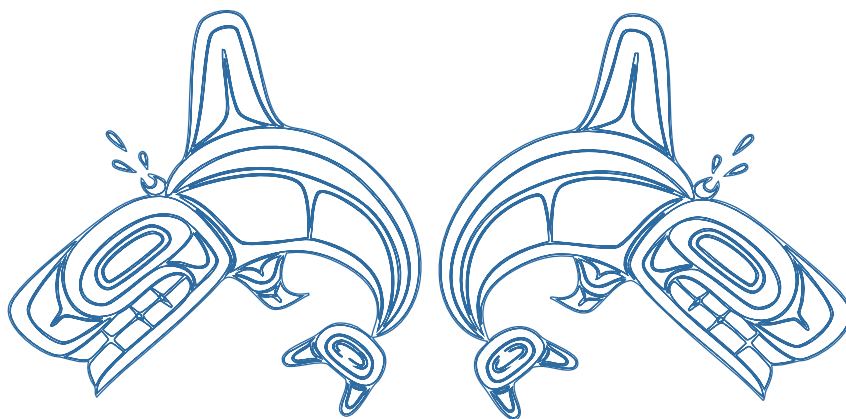


Suggested sequence:



This module includes:

-  slide deck
-  worksheet
-  quotes from knowledge holders
-  data dashboard
-  hands-on activity



*neexł (killer whale/orca in Sm'algyax language)

Kelli Clifton, Gitga'at Nation

*The spelling of the Nations can be either Ts'msyen or Tsmishian

Downloadable resource packs:

- Lesson 1: **Many Ways to Fish**

(includes a PDF for the lesson, activity *Accounts from Different Voices*, and worksheet *Making Connections to Accounts from Different Voices*)



slide deck



quotes from
knowledge holders



worksheet



data dashboard

- Lesson 2: **Boats at Sea**

(includes a PDF for the lesson and the activity *Boat Captain*)



slide deck



quotes from
knowledge holders



hands-on activity

- Lesson 3: **Buoyancy and Density**

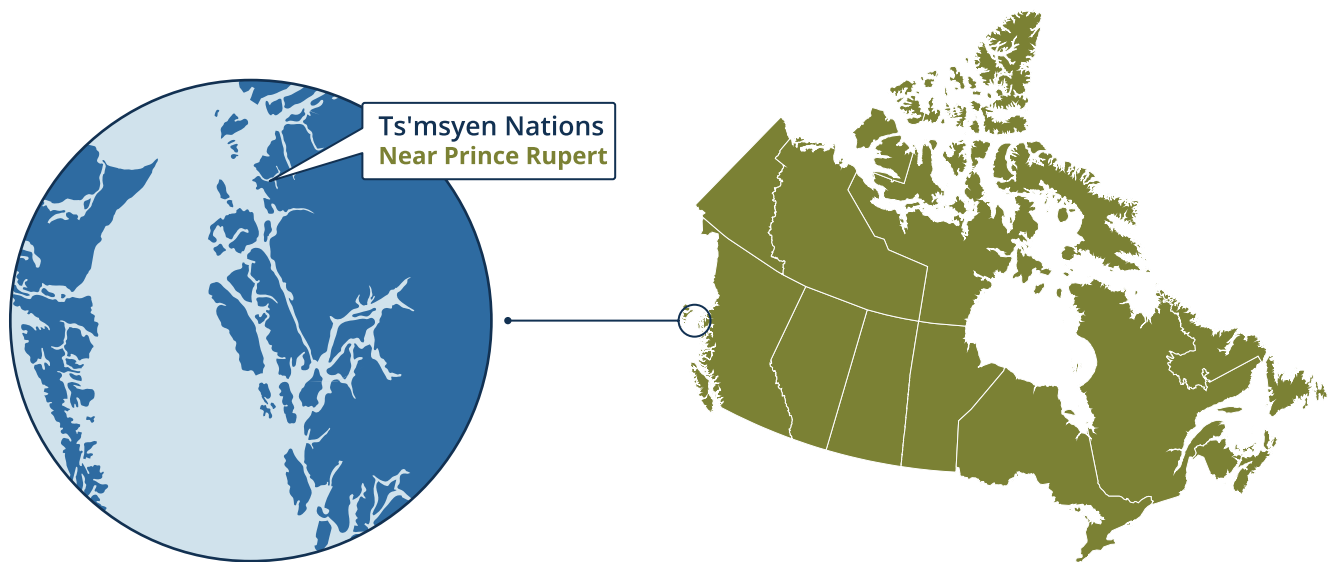
(includes a PDF for the lesson and the activity *Floating Egg*)



slide deck



hands-on activity



Community partners

This resource was developed in partnership between Ocean Networks Canada and Aboriginal Education School District 52 Prince Rupert, Wap Sigatgyet.

Ocean Sense Program



Lesson 1

Module:

Science and Fishing

Time:

60 minutes

Learning pillars:

- Indigenous knowledge
- Ocean science
- Data exploration

Grade & curriculum connection:

• BC Science 9

"The biosphere, geosphere, hydrosphere, & atmosphere are interconnected, as matter cycles and energy flows through them."

Created in partnership with:



Aboriginal Education School District 52
Prince Rupert, Wap Sigatgyet

Many Ways to Fish

Explore a variety of fishing techniques historically and currently used by people in Ts'msyen Territory by reading and listening to passages from local knowledge holders about spear and luulp traditional fishing methods. Examine how salinity varies in different locations around Ts'msyen Territory, thus impacting fish species habitats and fishing methods employed based on location.

Traditional fishing methods were developed based on the species, habitat (river, estuary, or ocean), and time of year the species preferred. Most marine species have preferred ranges of salinity and temperature which determine where they can be found in the water column. The Ts'msyen knowledge of seasonal cycles and fishes' depth preferences helped people harvest effectively, with different fishing methods and tools being used based on the specific situation.

Learning objectives

- Experience and interpret the local environment
- Identify First Peoples' perspectives and knowledge as sources of information
- Express and reflect on personal, shared, or others' experiences of place

Materials

- Computer with internet connection
- Projector and screen
- Slide deck: [Science and Fishing](#)
- Activity 1: *Accounts from Different Voices*
- Pen and paper (1 per student)
- Worksheet: *Making Connections to Accounts from Different Voices*
- Access to [Ocean Sense dashboard: Science and Fishing](#)

Teacher preparation

- Print slides 5-12 and/or display the slide deck provided
- Copy the worksheet
- Preload the [Ocean Sense dashboard: Science and Fishing](#)

Classroom instructions

Hook

1. Share slides 2-4, discussing the prompt, “Where do we get our food today?”, on slide 4 in order to connect to self, the past, and the future.

Step-by-step process

2. Complete the activity Accounts from Different Voices using slides 5-10 and the worksheet Making Connections to Accounts from Different Voices.
3. Highlighting knowledge Alex Campbell shared on slide 8, explore how salinity varies in Ts’msyen Territory by using the *Ocean Sense dashboard: Science and Fishing*. Discuss the questions on slide 11:

- a. What units is water salinity measured in?

Answer: Practical salinity units or psu. One gram of salt per 1000 grams of water is defined as one practical salinity unit or one psu.

- b. How does the salinity compare between the Digby Island and the Atlin Terminal underwater platforms?

Potential answer since data are live and change slightly each day: Digby Island observatory is saltier (~30-32 psu) than the Atlin Terminal observatory (~20-30 psu).

- c. What could account for these differences?

Potential answer: The Digby platform is located at 24m depth, while the Atlin platform is located at 7m depth. Deeper water is often saltier than shallower water, because salty water is more dense than freshwater. Digby Island is also closer to the open ocean and Dixon Entrance whereas the Atlin Terminal is closer to sources of freshwater.

4. Share slide 12 that highlights traditional knowledge from Alex Campbell about how species and fishing methods were specifically chosen based on knowledge of water properties, including salinity.
5. Return to the questions on slide 4, focusing on the final two questions. Ask students, based on what everyone has learned, do answers to B and C change? Why or why not? Allow students to discuss their learning with these guiding questions.

Modifications and adaptations

- Complete the activity Accounts from Different Voices as a guided, rather than personal reflection.

Final remarks to the educator

In these passages, observation and knowledge of specific events and water properties informed how people gathered fish. Remember, these are historical examples told in the past tense, but Ts’msyen people continue to fish on their traditional territory today.

Assessment

- Collect the students' responses in the worksheet.

Extensions

- Help students find other passages from their area, or share passages related to their own experiences.
- Add additional questions related to salinity and the data dashboard. Some examples include the following:
 - If there is 1 gram of salt in 1000 grams of water for 1 PSU, how many grams of salt are there in 1000 grams of water at Digby Island?
 - Why do you think the salinity value keeps going up and down throughout the day? Why does it change so much?
 - Where do you think the water is saltier? In a river, estuary, or in the ocean? Near the surface of the ocean or deeper in the ocean?

Glossary

Estuary: Where a large river meets the ocean, and that area is impacted by tides.

Gaff: A stick or pole with a large hook on the end for catching fish.

Luulp: A circular trap made of boulders and built up to the height of about three to four feet, covering a very wide area.

Ebb tide: Lowering tide as the water goes out; the opposite is a flood tide as water comes in.

Lax Kw'alaams: A village located on the northwest coast of British Columbia; the name, Lax Kw'alaams, is derived from Laxtgu'alaams, which means "place of the small roses" in the Sm'algyax language."

Practical salinity units (psu): One practical salinity unit (psu) is one gram of salt per 1000 grams of water.

Tide: The rise and fall of the ocean, usually twice a day at a particular location, that results from the gravitational pull of the moon.

Ts'msyen Territory: Located on the northwest coast of British Columbia, including the cities of Terrace and Prince Rupert; there are five Nations of Ts'msyen people, and Ts'msyen means "inside the Skeena River"; may also be spelled "Tsimshian."

References

Beynon, W. (1999). *Luutigm Hoon: Honouring the salmon: An anthology told in the voices of the Tsimshian*. Tsimshian Nation, School District 52 (Prince Rupert).

Campbell, K. (2005). *Persistence and Change: A History of the Ts'msyen Nation*. Prince Rupert, British Columbia: Tsimshian Nation and School District 52.

Dunn. (2000-2024). ts'mluulp.wav [Audio recording]. In *Sm'algyax*. FirstVoices.<https://www.firstvoices.com/smalgyax/search?q=Ts%E2%80%99mluulp&domain=both&types=word%2Cphrase%2Csong%2Cstory>

Lax kw'alaams band. (n.d.). Lax Kw'alaams Band. Retrieved February 3, 2023, from <https://laxkwalaams.ca/>

Making connections. (n.d.). Read Write Think. Retrieved January 24, 2024, from <https://www.readwritethink.org/classroom-resources/printouts/making-connections>

Ocean Sense Program



Activity 1

Module:

Science and Fishing

Lesson:

Many Ways to Fish

Learning pillars:

- Indigenous knowledge

Grade & curriculum connection:

- **BC Science 9**

"The biosphere, geosphere, hydrosphere, & atmosphere are interconnected, as matter cycles and energy flows through them."

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Accounts from Different Voices

In **Ts'msyen Territory**, a variety of fishing techniques have been and continue to be used. New fishing technologies have been introduced throughout **Ts'msyen Territory** over time to suit the developments and needs of large-scale industrial fishing, while many of the traditional **Ts'msyen** fishing methods continue to be used today. In these passages, students will read two examples of traditional methods and respond to them.

Materials

- Computer with internet connection
- Projector and screen
- Slide deck: [Science and fishing](#)
- Pen and paper (1 per student)
- Worksheet: [Making connections to accounts from different voices](#)
- Passages attached at the end of the activity

Teacher preparation

- Print slides 6-10 and/or display the slide deck provided
- Copy the worksheet

Procedure

1. Read the passages in a manner that works best for the students, either by sharing slides 6-8 or printing out the passages.
 - a. If displaying the passages with the slidedeck, be sure to play the audio recording of the word *ts'mluulp* by pressing the speaker icon at the top of the slide.
2. Have the students respond to the passages using the worksheet *Making Connections to Accounts from Different Voices*.

3. Gather back as a whole group for the discussion questions on slide 9.
- What do these accounts tell us about how the Ts'msyen people traditionally fished?

Potential answer: Careful observation of the tides and changes in water properties would inform people how to best interact with their environment without putting themselves at undue risk.

Potential answer: Although it could be challenging to catch fish, traditional knowledge helped Ts'msyen people catch fish safely, sustainably, and effectively.

- What does this tell you about people's ability to observe and utilize their environment?

Potential answer: These passages highlight how observation and knowledge of specific events and water properties informed how the Ts'msyen people gathered fish.

- What questions does this inspire for you?

Answers will vary

- Based on the passages, what skills do you think are needed to be a successful fisher?

Potential answer: Observations and knowledge can help us make informed decisions about how to safely and sustainably harvest fish.

4. In a manner that works best for the students, check the students' understanding to ensure that the following details are highlighted:
- Observation and knowledge of specific events and water properties informed how the Ts'msyen people gathered fish.
 - Careful observation of the tides and changes in water properties would inform people how to best interact with their environment without putting themselves at undue risk. This was seen in the second passage, Ts'mluulp, Stone Trap, where it's described that people would use canoes to guide fish into the stream at ebb tide.
 - Although it could be challenging to catch fish, traditional knowledge helped Ts'msyen people catch fish safely, sustainably, and effectively. Today, similar observations and knowledge can help us make informed decisions about how to safely harvest fish.

Conclusion

5. Share slide 10 featuring a quote from Alex Campbell about fishing methods and seasonal cycles.

Passage 1: Fishing with spears

“The last salmon that run up the river they call steelheads. They are just like trout, and they are pretty large. They come late in the fall, and the way they catch them they get long poles and they make at the end something like clamps or tongs, and they have a gaff at the end so they get the whole salmon, and they pull it back. They have one on the end of the tongs and it goes into the flesh of the fish. It was made of very thin and springy boards. That is the way they caught trout sometimes. And they used very this [sic] trap at night. They would take a torch cut out of pitch wood and they could see into the water to spear the fish, and they would load up the boat, and in the morning they would give the fish away. They didn’t smoke them, they just ate them fresh.”

Sidney Campbell, Metlakatla, Alaska, 1917 (Beynon, 1999, p. 50)

Passage 2: Ts’mлуulp, Stone Trap

“In the olden days it was with the greatest difficulty that the people were able to catch salmon before these went to the streams and rivers. In the rivers they could use traps made of pliable split cedar saplings and basket-like. They could only use those when the salmon headed for the streams. They also used weirs, a fence-like trap.

On the coast they made a luulp, a circular trap made of boulders and built up to the height of about three to four feet and covering a very wide area. The operation was very difficult. As the salmon approached in schools the many canoes on the water would endeavour to direct or force these schools of salmon into this enclosure, choosing a time of the falling ebb tide. Once the school was over the enclosure, it had to be kept there and long poles from the many canoes were used to shy the fish in whatever direction they were to be led. This was done until the tops of the luulp showed and thus the salmon would be trapped and when the tide left the luulp completely dry, then the salmon would be gathered up. Very nearly every salmon stream had a luulp.”

Saelaban (John Tate), Gispaxlots (Beynon, 1999, p. 51)

Passage 3: Traditional fishing methods

“Traditional fishing methods were developed and used based on the species of fish that was being harvested, where the fish was both in terms of habitat (river, estuary, or ocean) and depth the species preferred (Salmon being known as a ‘deep’ fish), as well as the specific time of year. Most marine species have preferred levels of salinity and temperature which determine where they can be found in the water column. The Ts’msyen knowledge surrounding seasonal cycles and depth preferences (based on salinity and temperature) for fish were used to help people fish effectively, with different fishing methods and tools being used based on the specific situation.”

Alex Campbell, Ts’msyen Nation, Lax Kw’alaams, British Columbia, personal communication, June 2016

Name: _____




Making connections to Accounts from Different Voices

As you read the passages in Accounts from Different Voices, record what you learned and a connection you've made to that learning. Use the three types of connections as you record what you've learned: text-to-self, text-to-text, and text-to-world connections.


Text-to-self

Connect the passages to something in your own life.




Text-to-text













Connect the passages to other non-fiction reading (book) or viewing (video) you've experienced.



Text-to-world

Connect the passages to something that has happened or is happening in the world.



What I learned	Connection I made	Type of connection (circle)
		  
		  
		  
		  

Ocean Sense Program



Lesson 2

Module:

Science and Fishing

Time:

45 minutes

Learning pillars:

- Indigenous knowledge
- Ocean science

Grade & curriculum connection:

- **BC Science 9**
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Boats at Sea

Key observations from time immemorial have helped the Ts'msyen people thrive for thousands of years while living off the land and fishing. Explore how Ts'msyen people have always understood the application of **buoyancy** by building and testing tin foil boats in different densities of water.

Ts'msyen people traveled the Skeena **estuary** to the sea in their canoes to harvest a wide variety of fish from the ocean, including salmon, cod, and halibut. Traditional fishing practices demonstrate a deep understanding of water density changes as fresh water meets ocean water. Water **density** is influenced as well by time of year and temperature, resulting in the **buoyancy** of a fishing vessel varying in different aquatic environments.

Learning objectives

- Systematically and accurately collect and record data
- Express and reflect on a variety of experiences, perspectives, and worldviews through place

Materials

- Slide deck: [Science and Fishing](#)
- Activity 2: *Boat Captain* and all materials listed therein

Teacher preparation

- Prepare the materials to distribute to students
- Make the salt solutions listed - note, water temperature is very important to this and can change the results of the demonstration

Classroom instructions

Hook

1. Prior to colonization and into the early 1900's, Ts'msyen people used canoes as their primary method of transportation on rivers, tributaries, and at sea. This enabled them to harvest a wide variety of fish from the ocean, including salmon, cod, and halibut. Fish were caught and processed in parallel with the Ts'msyen seasons and seasonal indicators; for example, some tribes would use the blooming of salmonberry flowers, while others used the migration patterns of other species.
2. Share slide 14 and read out the example of a seasonal indicator that was shared by Alex Campbell of Lax Kw'aalaams.

Step-by-step process

3. Complete the activity *Boat Captain* using slides 15-18.
4. Have the students make observations about the buoyancy of the different solutions (i.e. observe the distance between the waterline and the edge of the boat, or, if any parts of the vessel are lower than others in the water).
 - a. During the observations, challenge the students to get as much "catch" as possible.
5. Encourage the students to make changes to their design and to make as many observations as they can.

Modifications and adaptations

- Have the students work collaboratively on their boats.
- Allow for more than one iteration of each boat.

Final remarks to the educator

Observations of the natural environment long predate the term "science" and were used extensively by people to understand and interact with their environment. Remind students there are many ways to "know."

The students should have observed that salt water has a higher density than freshwater, and thus is able to provide more lift for the boats. This means it's possible to take in more catch than may be advisable for the vessel travelling in fresh water.

Assessment

- Have the students reflect on their experience building boats and trying them in different solutions. What did they notice as being the most meaningful for them?

Extensions

- Connect with local knowledge holders where you are to further explore how people discussed and shared information about their environment.
- Calculate the density of water from each basin using the formula $\text{density} = \text{mass}/\text{volume}$.
- Incorporate a study of how surface area impacts buoyancy by comparing flat, barge boat designs to narrow-hulled boat designs in the activity *Boat Captain*.

Glossary

Buoyancy: The ability to float in water or in a liquid of higher density.

Estuary: A geographical area where a freshwater river or stream meets the ocean, resulting in water mixing and a distinct ecosystem.

Density: How closely packed molecules are in a given subject. This can be given a numeric value by dividing the mass of the object by the volume of the object.

Seasonal indicators: Occurrences in the natural environment, such as the blooming of particular flowers or the sighting of particular animals that indicate a seasonal change has occurred.

References

- Beynon, W. (1999). *Luutigm Hoon: Honouring the salmon: An anthology told in the voices of the Tsimshian*. Tsimshian Nation, School District 52 (Prince Rupert).
- Bureau of Land Management Oregon and Washington's Photostream. (2015). *Coho salmon* [Photograph]. Wikimedia Commons. <https://www.flickr.com/photos/blmoregon/16335492972/>
- Laurent, G. (2022). *080 Wild Barn swallow in flight at Pfyng-Finges Photo by Giles Laurent* [Photograph]. Wikimedia Commons. https://commons.wikimedia.org/wiki/File:080_Wild_Barn_swallow_in_flight_at_Pfyng-Finges_Photo_by_Giles_Laurent.jpg
- Lax kw'alaams band*. Lax Kw'alaams Band. (n.d.). Retrieved February 3, 2023, from <https://laxkwalaams.ca/>
- Love, M. (2016). *Sockeye salmon swimming right* [Photograph]. Wikimedia Commons. https://commons.wikimedia.org/wiki/File:Sockeye_salmon_swimming_right.jpg

Ocean Sense Program



Activity 2

Module:

Science and Fishing

Lesson:

Boats at Sea

Learning pillars:

- Indigenous knowledge
- Ocean science

Grade & curriculum connection:

• BC Science 9

"The biosphere, geosphere, hydrosphere, & atmosphere are interconnected, as matter cycles and energy flows through them."

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Boat Captain

Observation of your environment is key to understanding how to live and survive in the natural world. Key observations from time immemorial have helped Indigenous people thrive for thousands of years while living off the land and fishing. In this activity, students explore how the **density** of water can impact fishing practices. Influenced by time of year and temperature, students may be surprised at how much **buoyancy** varies in different aquatic environments.

Materials

- Aluminum foil in ~35 cm x 26 cm sheets, 1 sheet/student
- Marbles or small glass beads
- 2 clear basins (*a plastic wash basin 40 cm x 31.8 cm x 15.2 cm with a 11.4L capacity works well*)
- Water
- Salt (*Tip: the results of this experiment can be exaggerated for effect by providing the students with supersaturated salt solutions rather than near sea water*)
- Tablespoon
- Measuring cup
- Towels

Teacher preparation

- Prepare the two water basins, one saltwater, one freshwater with at least 6 cm depth of water (*74 mL (5 Tbsp) in 5 L (20 cups) water should be sufficient*)
- Cut or portion the tinfoil
- Have towels ready for mopping up

Procedure

1. Introduce the activity with the scenario on slide 16 and share the instructions on slide 17.
2. Give one sheet of foil to each student and ask them to shape it into boats as they see fit.
 - a. Encourage students to create a boat shape, as seen on slide 2 and 16, with foil so as to avoid introducing surface area into this activity.
3. Have the students place their boat in one of the water basins.
4. Have the students add as many marbles or small glass beads to their boat, counting as they add, before the boat sinks.
 - a. These items added to the boat represent a catch of fish.
5. Have the students observe their vessel in the basins, noting the waterline in relation to the edge of their boat.
6. Once the students are happy with their catch numbers, have them remove the “fish” and then move their boat to the other basin.
 - a. Have the students maintain the integrity of their boat as much as possible and try not to let them make changes to the vessel between basins.
7. Add the “fish” back into their boat. If the boat continues to float, have the students observe the new waterline in relation to the edge of their boat. If the boat sinks, have the students consider why this might have occurred.
 - a. When moving from freshwater to saltwater, it is expected that their boat should be able to catch more “fish”.
 - b. When moving from saltwater to freshwater, it is expected that their boat will sink and not be able to carry as many “fish”.
8. Discuss why they think this is an important observation.

Conclusion

9. Share slide 18 featuring how in depth knowledge of water properties allowed Ts’mysen people to transport fish from saltwater through the estuaries to freshwater without waste.

Ocean Sense Program



Lesson 3

Module:

Science and Fishing

Time:

30 minutes

Learning pillars:

- Indigenous knowledge
- Ocean science
- Data exploration

Grade & curriculum connection:

• BC Science 9

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Buoyancy and Density

Collectively develop a definition of **buoyancy** through a controlled experiment and observations.

The **density** of water is a variable that can be influenced by water, temperature, and **salinity**. In this demonstration, observe how adding salt to a solution will increase the **density**, thus allowing an egg to float and be **positively buoyant**.

Learning objectives

- Use knowledge of scientific concepts to draw conclusions that are consistent with evidence (i.e. water density is a variable of salinity and temperature)

Materials

- Activity 3: *Floating Egg* and all materials listed therein

Teacher preparation

- Prepare the materials in groups for the students to do as a lab

Classroom instructions

Hook

1. Discuss students' personal experiences with buoyancy and density. Reference the activity *Boat Captain* and display the situations pictured on slide 20 in which they would likely experience this effect:
 - a. Swimming in a pool (particularly salt water)
 - b. Making salad dressing with oil and water
 - c. Putting ice in a drink
2. Ask what they think is going on in each of the photos.

Step-by-step process

3. In a manner that works best for the students, discuss what factors they think contribute to buoyancy and density. This can be done as a group or individually.
4. Complete the activity *Floating Egg*.
5. Revisit factors that students talked about in their initial brainstorm. Have their ideas changed based on their experiments and observations?
6. Talking about what they learned, how would they create a definition of buoyancy and density in their own words? How would they share this information to someone who was not in the class?
 - a. Expanding on the definitions of negatively and positively buoyant learned in the activity, collaboratively create a definition of neutrally buoyant.
7. Share slide 24 and discuss how Ocean Networks Canada uses floats and weights to adjust the buoyancy and density of our equipment so that it can function in the water.

Modifications and adaptations

- The individual experiments can be done as class demonstrations rather than as individual groups.

Final remarks to the educator

In this lesson, students explored how buoyancy and density can be factors of the water, or factors of the objects in the water. In nature, salinity levels can change due to evaporation or rain and are often tied to seasonal changes as well. Together, they contribute to how much an object will float, which is described scientifically as buoyancy.

Assessment

- Review the students definitions of buoyancy and density. What examples do they use? Do they have a clear understanding of the concepts?

Extensions

- Students may benefit from the challenge of trying to create either a solution or an object that is neutrally buoyant. For example, can the students make a solution that allows the egg in the

activity *Floating Egg* to remain suspended midway between the top and bottom of the water in a container (neutrally buoyant in the solution).

Glossary

Buoyancy: The observation of an object 'floating' or "sinking" when placed in a liquid.

Density: How closely packed molecules are in a given subject. This can be given a numeric value by dividing the mass of the object by the volume of the object.

Negatively buoyant: The technical description of an object that sinks in a liquid.

Neutrally buoyant: When an object neither floats or sinks in a liquid.

Positively buoyant: The technical description of an object that floats in a liquid.

Salinity: The measure of the concentration of dissolved salts in a body of water.

References

- Alby. (2023). *Pound-coin-floating-in-mercury* [Photograph]. Wikimedia Commons. <https://commons.wikimedia.org/w/index.php?title=File:Pound-coin-floating-in-mercury.jpg&oldid=749229549>.
- Blacus, V. (2021). *Water and Oil* [Photograph]. Wikimedia Commons. https://commons.wikimedia.org/w/index.php?title=File:Water_and_oil.jpg&oldid=592626863
- Cousins, S. (2023). *Tumbler of cola with ice* [Photograph]. Wikimedia Commons. https://commons.wikimedia.org/w/index.php?title=File:Tumbler_of_cola_with_ice.jpg&oldid=833930629.
- Gonzalez, B. N. (2017). *A guy in the Dead Sea, Israel* [Photograph]. Wikimedia Commons. https://commons.wikimedia.org/wiki/File:A_guy_in_the_Dead_Sea,_Israel,_2017.gif.
- Williams, R. (2020). *Brown Egg in Clear Glass Container* [Photograph]. Pexel. <https://www.pexels.com/photo/brown-egg-in-clear-glass-container-4837033/>.

Ocean Sense Program



Activity 3

Module:

Science and Fishing

Lesson:

Buoyancy and Density

Learning pillars:

- Ocean science

Grade & curriculum connection:

- **BC Science 9**

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Floating Egg

The **density** of water is a variable that can be influenced by temperature and **salinity**. In this demonstration, students will observe how adding salt to a solution will increase the density, thus allowing an egg to float and be **positively buoyant**.

Materials

The following items are required for each group:

- Tall glass or graduated cylinder
- Water
- Salt
- Tablespoon
- Spoon/stick
- Fresh, raw, in the shell Eggs (*Note: You must use a fresh egg. As eggs age, they will absorb oxygen and develop an air bubble in the shell. This can make it float rather than sink in the freshwater, rendering the demonstration useless!*)
- Towels

Teacher preparation

- Decide on group size and gather materials accordingly
- Have towels ready for mopping up

Procedure

1. Introduce the activity by sharing the instructions on slide 22.
2. Fill the glass or graduated cylinder with water.
3. Place the egg (in the shell) in the glass or graduated cylinder. The egg should sink in which case it is considered negatively buoyant.
4. Add several tablespoons of salt to the vessel and stir gently to dissolve. The egg will begin to float.
5. Continue to add salt until the egg floats on the surface of the water. Once floating, the egg is considered positively buoyant.
6. Discuss with students why they think this happened and if this applies to other materials.

Conclusion

7. Display and read through slide 23.