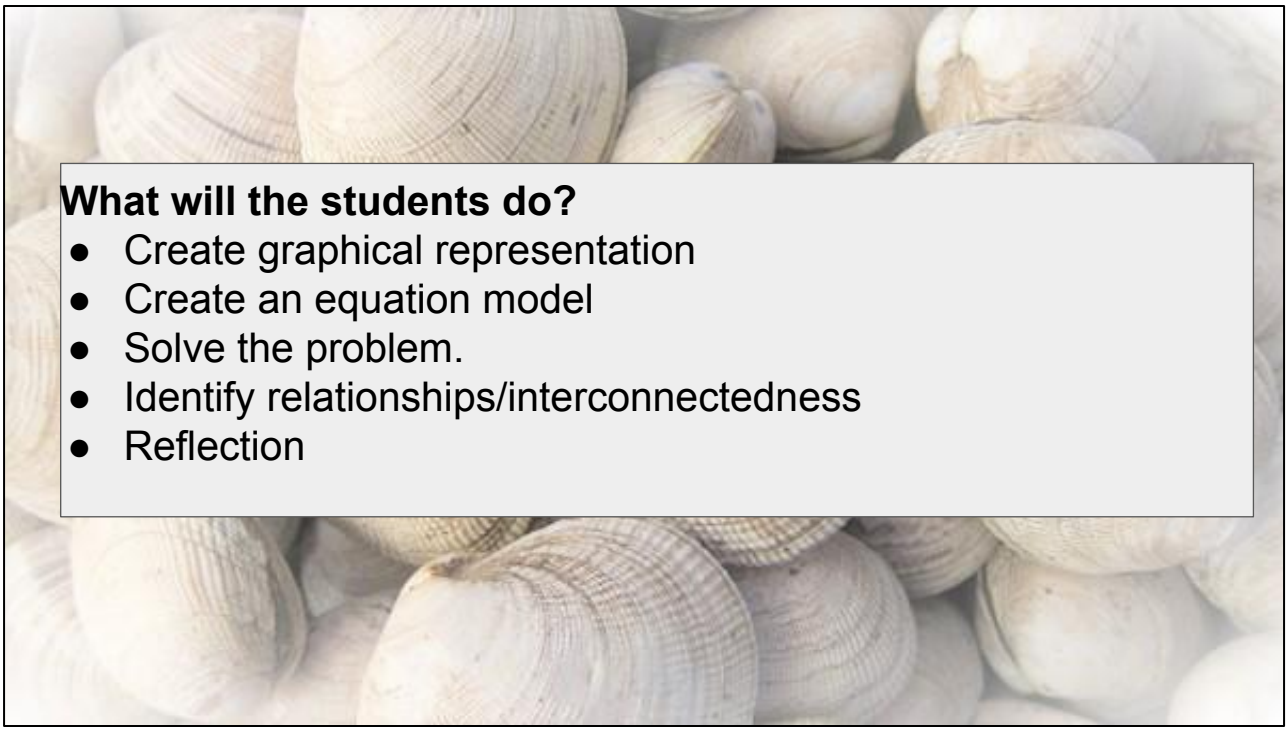
The background picture featured here was taken by me looking out over the Broughton Archipelago which addressed in the presentation.

Presentation Information for Students

- **Story**
- **Key People**
- **Maps**
- **Recorded Elder Interview**
- **Images, pictures and videos**
- **Indigenous knowledge and practices**
- **Types of clams**
- **Nutritional information**

- Story: “How Clams Came to Be”
  - An excerpt From: WSANEC Clam Garden Restoration Project Report
  - (there is also “If you want to visit a sea garden” by Roy Henry Vickers that could be used)
- Elder Interview:
  - Who will be speaking - Kim Recalma-Clutesi (Ogwi’low’gwa) - A member of the Qualicum First Nation, and daughter of late Clan Chief Ewanuxdzi, (Kwagiulth/Pentlatch)
  - Who will be spoken about - Chief Adam Dick (Kwaxsistalla Wathl’thla) - Late chieftain of the Kawadillikall Clan of the Dzawatainuk Tribe of the Kwakwaka’wakw First Nation (and Kim’s late husband)
- Maps to help student position themselves with respect to the land discussed - the Broughton Archipelago off North East Vancouver Island
- Images, pictures and videos of clam gardens and restoration efforts
- Indigenous knowledge and practices: Descriptions of how gardens were built, maintained, harvested and the clams preserved.
- Types of clams of the Pacific Northwest and some fun facts. For

- example: Butter clams: can live up to 12 years (the lines on their shells can be read like tree rings); popular choice for clam rattles, or that clams are a rare, non-plant, source of Vitamin C



What will the students do?

- Create graphical representation
- Create an equation model
- Solve the problem.
- Identify relationships/interconnectedness
- Reflection

Student Handout

Your Task:

If Iokiway are accessible when the tides drop below 2 metres, determine

- how long, approximately, your garden is accessible during one low tide cycle.
- between what day(s) and times of day, is your clam garden accessible.

Group Submission must include:

- Your tidal location and given information
- Hand-drawn sketch of the graph (picture or scan okay)
- All calculations and units (picture or scan okay)
- Function equation model (remember to state any assumptions)
- Complete a characteristics table for your function(s) - amplitude, period, phase shift, displacement
- Desmos graph of the function (clearly identify any intersection points)
- The solution to the problem.
- Response to reflection questions

- Students ask a lot of questions first - they don't like the messy data. I often turn them back to their partner (or another group) to discuss how to tackle the problem. They struggle with the fact that I'm not looking for ONE correct answer, but more about how they are working with the data to model and solve the problem.
- Students are encouraged to work together on all aspects, not divide and conquer
- Students often comment on how they didn't know how Earth's orbit and the moon work together to create the tides, and that they aren't perfect sinusoidal models.

Project Curricular Connections

- Hits BC Core Competencies: Communication/collaboration; Critical/Reflective Thinking; Social Awareness/Responsibility
- Also addresses each curricular competency (and sub-competency)
    - reasoning/modeling
    - understanding/solving
    - communicating/representing
    - connecting/reflecting
- Reflection of the connectedness (Earth's orbit, moon, tides, food systems)
- Practice of sustainability
- Lesser known impacts of Indian Residential Schools

Student Handout - continued

Reflection Questions:

1. Do tide cycles follow a perfect sinusoidal wave?
2. Why do the zero tides happen only in winter and summer?
3. What was the most interesting thing you learned doing this activity? Why did you find it interesting?
4. How does the practice of clam gardening support sustainability and environmental stewardship?
5. One of the First Peoples Principles of Learning is "learning is embedded in memory, history, and story." Explain how this applies to how we came to learn about clam gardens.

Tidal Data

Telegraph Cove (A) * High Tide of 3.5 m at 2:29 pm Jan 2/2022 * Low Tide of -0.5 m at 10:40 pm Jan 2/2022	**Telegraph Cove (B)** * Low Tide -0.5 m at 10:40 pm Jan 2/2022 * High Tide of 3.8 m at 6:50 am Jan 3/2022
Fulford Harbour (A) * High Tide of 3.4 m at 1:58 pm Jan 2/2022 * Low Tide of -0.2 m at 10:30 pm Jan 2/2022	**Fulford Harbour (B)** * Low Tide -0.2 m at 10:30 pm Jan 2/2022 * High Tide of 3.6 m at 6:59 am Jan 3/2022
Quadra Island (A) * High Tide of 4.5 m at 3:06 pm Jan 2/2022 * Low Tide of 0.2 m at 11:48 pm Jan 2/2022	**Quadra Island (B)** * Low Tide 0.2 m at 11:48 pm Jan 2/2022 * High Tide of 4.4 m at 6:16 am Jan 3/2022
Port Renfrew (A) * High Tide of 3.8 m at 11:30 am Jan 2/2022 * Low Tide of 0.2 m at 6:48 pm Jan 2/2022	**Port Renfrew (B)** * Low Tide 0.2 m at 6:48 pm Jan 2/2022 * High Tide of 3.1 m at 1:09 am Jan 3/2022

Esquimalt (A) * High Tide of 3.2 m at 12:23 pm Jan 2/2022 * Low Tide of -0.1 m at 8:59 pm Jan 2/2022	**Esquimalt (B)** * Low Tide -0.1 m at 8:59 pm Jan 2/2022 * High Tide of 2.7 m at 6:28 am Jan 3/2022
Gold River (A) * High Tide of 4.2 m at 11:40 am Jan 2/2022 * Low Tide of 0 m at 6:42 pm Jan 2/2022	**Gold River (B)** * Low Tide 0 m at 6:42 pm Jan 2/2022 * High Tide of 3.5 m at 1:05 am Jan 3/2022
Comox (A) * High Tide of 5.0 m at 3:47 pm Jan 2/2022 * Low Tide of -0.6 m at 11:30 pm Jan 2/2022	**Comox (B)** * Low Tide of -0.6 m at 11:30 pm Jan 2/2022 * High Tide of 5.3 m at 7:04 am Jan 3/2022

To randomize pairs, I have students select the beach out of a hat. Their partner will have the same beach but different tidal data.