



Seafood Education Kit

A RESOURCE GUIDE FOR
**TEACHERS LEADING
CHANGE**

Grades 7-8

<http://education.ocean.org>

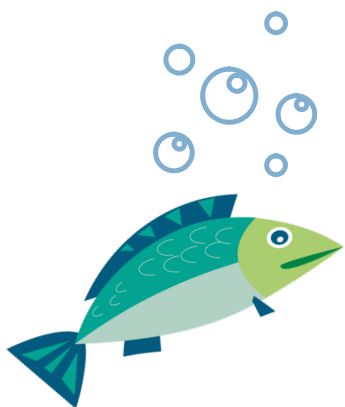
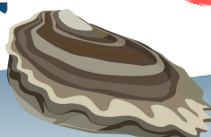
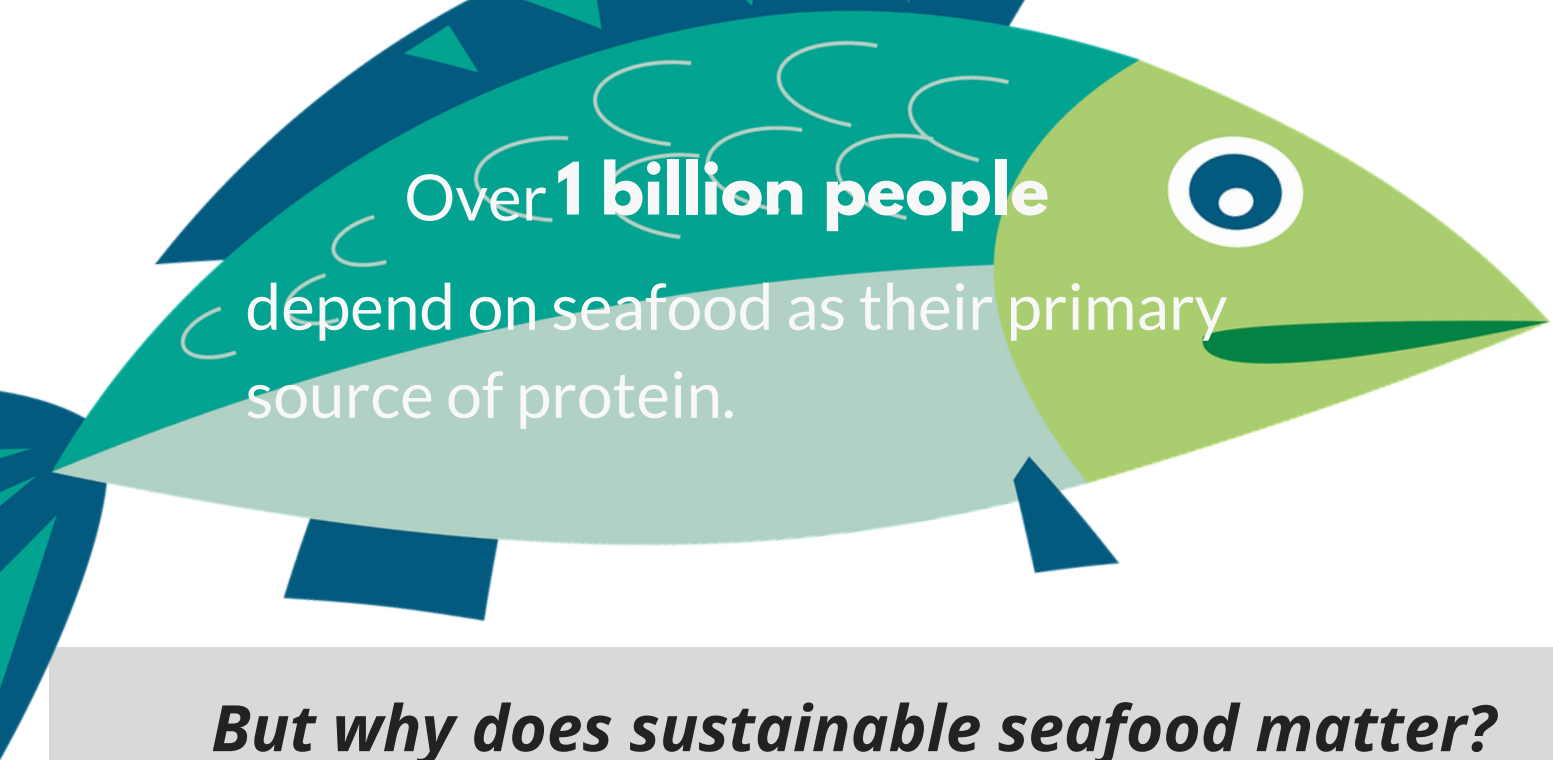


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*Help us inspire our
youth to lead advocacy
for sustainable
seafood...*

**and protect our
ocean.**

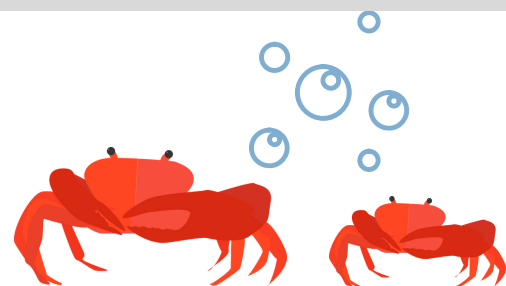


But why does sustainable seafood matter?

Overfishing is one of the **biggest threats facing our oceans today**. Roughly 90 percent of the world's assessed fish stocks are now fully fished or overfished according to the most recent report by the UN's Food and Agriculture Organization (FAO). This **leaves just 10 percent of fish stocks** underfished – a number that has decreased almost continuously since 1974. Choosing sustainable seafood helps to replenish fish stocks.

Why is our world's ocean essential?

- Our ocean maintains earth as we know it by **regulating the climate**, supplying oxygen to the atmosphere, and by maintaining the lives of the millions of organisms that make up the complex marine food web.
- Beyond the animals that live directly in the ocean, the marine ecosystem also **supports terrestrial creatures** such as bears, birds, and humans.
- Humans need the ocean as a source of food, for our **livelihoods**, as part of our cultures, and for a healthy life.

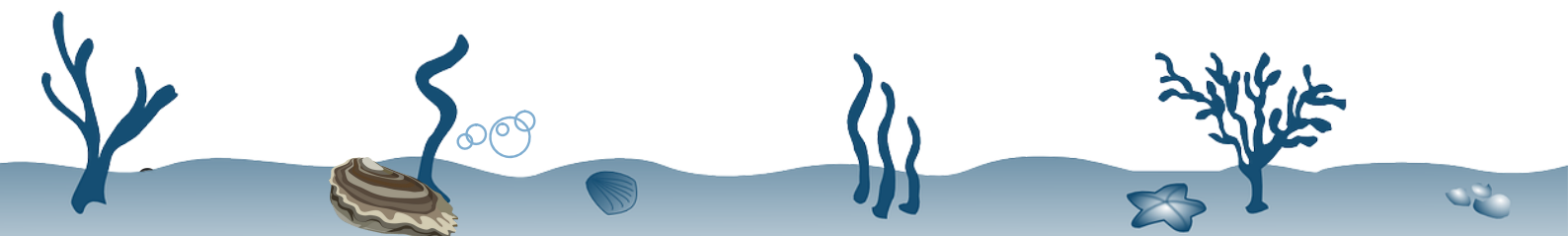
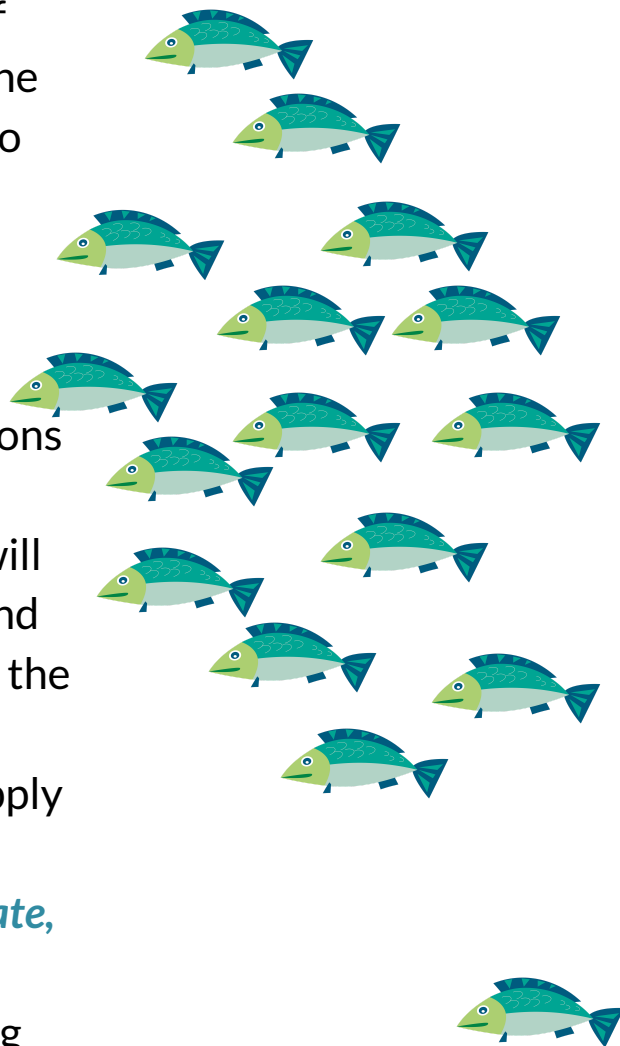


Dear Teachers...

The seafood industry is an expansive business that touches upon many corners of human life; ranging from supplying protein in our diets, to providing employment for communities, to being a tool of creativity and history for seafood chefs. With the many avenues seafood shapes, it is significant to highlight how *the growing demand for it is contributing to declining fish populations.*

Especially, as the planet faces environmental challenges such as *climate change, ocean acidification and habitat destruction*, conversations about *resource extraction* have become particularly relevant. In this section, students will learn about key terms related to aquaculture and wild fishing, the criteria of sustainable seafood, the social and economic factors that influence the industry to thereafter analyze, interpret and apply their findings in hands-on and inquiry based activities. The ultimate objective being to *educate, equip and empower students to be stewards for sustainable seafood choices.* Thank you for caring and helping us build a sustainable future for our oceans!

Best fish wishes,
The Ocean Wise Education Team



“I will share awareness of the link between consumer habits and ocean health.”

LESSON 1

GRADES
7-8

The seafood industry is an expansive business that shapes the lives of countless people. This lesson will have the students reflect on their own connection to the ocean and the importance of seafood to the global population. Moreover, students will see the breadth of the seafood industry via maps and statistics to comprehend the significance seafood upholds in supporting human life.

Students will be able to:

- ✓ Respond to questions about global fishing and aquaculture data
- ✓ Understand how they are connected to the oceans via their seafood choices
- ✓ Assess where their seafood comes from

The Earth has one big ocean with many features



All humans are connected to our oceans and seafood is an important part of that connection.

Materials

- Student Workbook
- Pen/Pencil
- Audio/visual system



CRITICAL QUESTIONS

How are you connected to the ocean? How does the ocean serve you? Who relies on the ocean? How big is the seafood industry? How is the seafood industry connected locally and globally?



LESSON GUIDE

- 1) **Class discussion:** What kind of seafood does your class consume? Where do your students think their seafood was sourced from? Was it a local species? Was it from across the globe?
- 2) **Workbook Page 1 & 2 :** Answer the questions listed in your workbook with the stats and data provided.
- 3) **Reflection:** Have the students share their findings in class to analyze their results. The stats and data can be found [here](#) in which the charts are interactive to break down the content further. Discuss how increased demand of fish is to be sustained for a growing global population?



RESOURCES (Click on them!)

- [WWF: We are all connected](#)
- [SOFIA 2018: Stats](#)
- [Global Fishing Watch: Map](#)
- [Ocean Wise: Sustainable Shrimp Farming in Vietnam](#)

“I will chat with my friends and family about sustainable seafood choices.”

Aquaculture uses a variety of methods and techniques. This lesson will provide fun ways for your students to identify, define and analyze aquaculture terms through a form of charades. Students will be acting out how various species are reared and cultivated to understand the challenges and benefits these techniques present. As the teacher, feel free to explore [Monterey Bay’s Fishing and Farming Methods](#) page to review key concepts.

LESSON 2 GRADES 7-8

Students will be able to:

- ✓ Evaluate aquaculture practices
- ✓ Understand key aquaculture terms
- ✓ Use Think Pair Share strategy to discuss the strengths and challenges of aquaculture

The ocean made the earth habitable.



A variety of seafood that we eat can be produced in an aquaculture/farmed environment.

Materials

- Student Workbook
- Pen/Pencil
- Audio/visual systems

? CRITICAL QUESTIONS

What is aquaculture? What are the methods and techniques utilized by aquaculture? Why is aquaculture important?

▶ LESSON GUIDE

- 1) **Introduction:** Watch the following video to learn why aquaculture use is increasing: [Make Better Seafood Choices- Seafood Watch](#) by the Monterey Bay Aquarium (Ocean Wise’s Sustainable Seafood criteria is based on Monterey Bay’s Seafood Watch Program).
- 2) **Workbook Page 3:** List with key terms and images to introduce basics of aquaculture found [here](#).
- 3) **Activity:** Aquaculture charades: Divide the class into small groups. Each group receives a key term of aquaculture to act out for the rest of the teams to guess. The team who guess correctly first wins a point.
- 4) Watch the [video](#) about sustainable aquaculture.
- 5) **Reflection:** Reflect on the challenges and benefits of each aquaculture method. How efficient do you think each method is? What species would be involved? How often are these systems used? *Surprise:* Aquaculture represents over 50% of global production and consumption of seafood.

💡 RESOURCES (Click on them!)

- [Ocean Wise: Farming Techniques](#)
- [Canadian Aquaculture Industry Alliance: Aquaculture in Canada](#)
- [CEFAS: Sustainable Aquaculture](#)
- [TED Talk: The case for fish farming](#)
- [Conserve Energy Future: What is Aquaculture?](#)
- [PBS: Aquaponic farming saves water, but can it feed the country?](#)
- [Monterey Bay Aquarium: Call to action: Seafood watch](#)

“I will choose Ocean Wise products to support ocean health.”

LESSON 3 GRADES 7-8

The seafood industry is directly connected to ocean health and obstacles such as habitat destruction, pollution and declining fish populations. These are prominent points of discussion when equipping students with the awareness that the ocean has a major influence on the climate of our planet. This activity enables students to break down these terms and apply them to seafood practices. The main message being the significance sustainable choices have on the health and balance of habitats and species.

Students will be able to:

- ✓ Develop criteria for sustainable aquaculture and compare their criteria to those of Ocean Wise
- ✓ Explain how the sustainability of aquaculture is determined
- ✓ Identify the short and long term effects of aquaculture on the environment

The ocean is a major influence on climate and weather



Sustainable seafood can minimize negative environmental impacts while providing an important food source.



CRITICAL QUESTIONS

What is sustainability? What are the criteria for sustainable aquaculture? What are the potential short and long term impacts on the environment?



LESSON GUIDE

- 1) **Introduction:** Watch the [video](#) 'Farms under the sea could feed the world in 2050'.
- 2) **Workbook Page 4:** Divide the students into small groups and have them create their own criteria of assessing the sustainability of aquaculture sites; using the key terms on the workbook page to help shape the criteria. Afterwards, students create their own seafood symbol to represent the brand of criteria they made for regulating sustainable aquaculture.
- 3) **Workbook Pages 5 & 6:** Provide the passages from the Ocean Wise Sustainable Seafood Team of 2 real candidates who were assessed for Ocean Wise Sustainable Seafood recommendation. Using the student made criteria, they will either refuse or accept the candidate for a recommendation.
- 4) **Reflection:** Students present their criteria, symbol and recommendation to the class. Review the Ocean Wise sustainable aquaculture criteria found [here](#) to compare to the student made criteria. Reveal which candidate was recommended by the official Ocean Wise Seafood team (the first candidate is recommended).

Materials

- Student Workbook
- Pen/Pencil
- Audio visual system



RESOURCES (Click on them!)

- [Ocean Wise: To Eat or Not to Eat Farmed Fish?](#)
- [Ocean Wise: BC Salmon](#)
- [Ocean Wise: Ocean Wise and Sustainable Seafood](#)
- [TED-Ed: Underwater farms vs. climate change?](#)
- [Vancouver Aquarium: Ocean Wise and Sustainable Seafood](#)
- [Ocean Wise: What is an Ocean Wise Assessment?](#)

“I will evaluate where my seafood comes from and share my findings with friends.”

Wild fishing and aquaculture are key players of the seafood discussion and evaluating the similarities and differences is crucial for students to make informed opinions and decisions. In this module, students will investigate the pros and cons of wild fishing and aquaculture to emphasize the negative and positive outcomes of our relationship with seafood.

LESSON 4

GRADES

7-8

Students will be able to:

- ✓ Identify the processes and impacts of catching wild fish and raising farmed fish
- ✓ Compare and contrast wild fishing and aquaculture
- ✓ Analyze sustainable seafood practices with a critical eye

? CRITICAL QUESTIONS

What is wild fishing? What are the key differences between wild fishing and aquaculture? Can you identify the pros and cons of both options?

▷ LESSON GUIDE

- 1) **Workbook Page 7:** Discuss and respond to the three statements that are included in the workbook:
 - a) All wild caught fish are good.
 - b) Farming fish is always bad.
 - c) Sustainable seafood is always expensive.
- 2) Watch the [video](#) Wild vs. Farmed Seafood: Mythbusters.
- 3) **Prezi:** Wild Fishing Key Terms and Breakdown → 4D Seafood on [Prezi](#)
- 4) **Workbook Page 8:** Split the class into two groups; one group is assigned aquaculture, the other is assigned wild fishing. Students must create pros/cons list for each form of seafood harvesting. Thereafter have class discussion to share findings.
- 5) **Reflection:** What were the similarities and differences found? Were there any findings you found surprising? How do your findings shape your outlook of sustainable seafood?

💡 RESOURCES (Click on them!)

- [Ocean Wise: Fishing and Farming Methods](#)
- [Ocean Wise: Wild vs. Farmed Seafood Mythbusters](#)
- [Ocean Wise: Haidi Gwarii Shore Lunch w/ Ned Bell](#)
- [Ted-Ed: Will the ocean ever run out of fish?](#)
- [Musqueam: An Introduction-Hunting and Fishing](#)
- [Global Aquaculture Alliance: Environmental Impact of Aquaculture](#)
- [Environmental Science: Environmental Consequences of Fishing Practices](#)
- [One World One Ocean: Know Your Seafood](#)

The ocean and humans are interconnected.



Wild fishing and aquaculture both have capacities to provide sustainable seafood.

Materials

- Student Workbook
- Pen/Pencil
- Audio visual system

“I will be an active consumer and investigate the systems in place that brings seafood to my plate.”

The diversity of life and ecosystems is extensive, making it quite the challenge for aquaculture to replicate. In this lesson, students will have the opportunity to understand what makes farming aquatic species possible. They will critically analyze components of differing ecosystems and interpret how to present those factors to their peers. Moreover, students will link these factors to aquaculture systems to comprehend the innovation taking place to sustain ethical seafood consumption.

LESSON 5

GRADES

7-8

Students will be able to:

- ✓ Identify life cycle stages of rainbow trout
- ✓ Identify components of recirculating aquaculture systems
- ✓ Connect life cycle stages to RAS aquaculture systems

The ocean supports a great diversity of life and ecosystems

Aquaculture mimics the natural rhythms of marine ecosystems to raise an array of fish species.

Materials

- Student Workbook
- Pen/Pencil
- Audio visual system

? CRITICAL QUESTIONS

What species can be farmed in aquaculture? Why are certain factors important to support marine life? How has aquaculture evolved to provide these factors?

▶ LESSON GUIDE

- 1) **Class discussion:** Discuss how an aquaculturist must uphold a healthy ecosystem for their stock to survive. To accomplish this, aquaculture systems mimic the rhythms of the ocean.
- 2) **Workbook Page 9 & 10:** Review the information of the layout of a recirculating aquaculture system (RAS) and how it supports fish. A great webpage that breaks this down further can be found [here](#) to help facilitate the learning.
- 3) **Workbook Page 11:** Have the students match the Rainbow Trout life cycle stage to the description of the RAS production stage. Answer Key can be found [here](#).
- 4) **Reflection:** What components must a RAS have? Why is it important the RAS has certain components to support fish? What could impact these systems?

💡 RESOURCES (Click on them!)

- [Food and Agriculture Organization of the United Nations: Guide to Recirculation Aquaculture](#)
- [National Lobster Hatchery: The Lobster Process and Release](#)
- [California Academy of Sciences: Coastal Food Webs](#)
- [Bon Appetit: Brad Explores an Oyster Farm](#)
- [Ocean Wise: Spot Prawn Fishery](#)
- [Canadian Government: Aquatic Ecosystems](#)
- [CBC: Arctic Char eggs from Whitehorse](#)

LESSON

6

GRADES

7-8

Students will be able to:

- ✓ Observe and analyze the social impacts of the seafood industry
- ✓ Demonstrate an understanding of the economic impacts of the seafood industry
- ✓ Collaborate to explore the range of perspectives within the seafood industry

“I will support people who promote and provide sustainable seafood.”

In this module, students will collaboratively analyze what social groups are connected to the seafood industry and how various scenarios could influence them. A major influence is the status of the environment ranging from habitat loss, pollution and unsustainable resource extraction. Students will explore these avenues to learn how interconnected society is to the environment and vice versa through seafood.

The ocean, and the life in the ocean shapes the earth



Seafood has a substantial environmental and social impact

Materials

- Student Workbook
- Pen/Pencil
- Audio visual system

? CRITICAL QUESTIONS

How does harvesting seafood shape our lives (socially & economically)? Who is employed by the seafood industry (farmers, restaurants, fishermen, retail etc.)? What communities are influenced by seafood? How are you connected to these communities?

▶ LESSON GUIDE

- 1) **Introduction:** Have the students brainstorm about the people (professionals, cultural groups, consumers, etc.) that are connected to the seafood industry.
- 2) **Workbook Page 12 & 13:** Split the students into 3 groups and assign them each a different group of people (example: fish farmers, seafood chefs, commercial fishers etc.) and with a blurb about that group found in the workbook. Have students brainstorm in their groups to answer the questions in their workbook and then come back together and discuss as a class.
- 3) **Reflection:** What differences and similarities are found in the responses to the scenarios? What role can consumers play in these scenarios to support these groups? How do environmental factors influence the outcomes of the proposed scenarios?

💡 RESOURCES (Click on them!)

- [DFO: Communities and Engagement](#)
- [DFO: Socio-Economic Impacts of Aquaculture](#)
- [Coast Salish Peoples Clam Gardens](#)
- [Roundtable: A false fish economy?](#)
- [Food and Agriculture Organization of the United Nations: Promoting Sustainable Aquaculture in the Black Sea](#)
- [Squamish Nation Stewardship](#)

“Share ideas to learn and explore options for sustainable seafood.”

LESSON 7 GRADES 7-8

Aquaculture is an evolving industry that is consistently striving to become more efficient and sustainable. This lesson will prompt students to get creative to form their own version of sustainable aquaculture. The objective for them is to take the knowledge they have cultivated from this education kit and apply it with their own interpretation. Encourage students to explain their aquaculture method then highlight the importance of questioning and understanding how seafood reaches our plates and how innovation can further the reliability and sustainability of these practices.

Students will be able to:

- ✓ Develop an aquaculture practice that follows self developed criteria for sustainability
- ✓ Critically evaluate seafood sustainability and technology
- ✓ Develop their own interpretations of seafood sustainability

The ocean is largely unexplored.



Aquaculture is always changing – innovation is important to create more sustainable options.

Materials

- Student Workbook
- Pen/Pencil
- Audio visual system
- Poster paper, 3D printing materials or computers

? CRITICAL QUESTIONS

What are some challenges of aquaculture? What are some benefits of aquaculture? How does innovation contribute to sustainability?

▷ LESSON GUIDE

- 1) **Introduction:** Watch one or all of the following videos in the resource section to open up the conversation of innovation in aquaculture.
- 2) **Discuss:** How would your students identify innovation in this/these video/s? Why have these innovations been made? Why are people looking for new methods of aquaculture? How does this connect to sustainability?
- 3) **Watch** the [video](#): Innovative Tools in Aquaculture
- 4) **Workbook Page 14:** Split the class into groups so that each group has around 3–4 students. The students must create their own aquaculture business that is able to harvest seafood sustainably. Answer the questions in the workbook to showcase the reasoning why its sustainable. Afterwards, have the students create their system by either drawing on poster paper, 3D printing or using Canva to illustrate their ideas.
- 5) **Reflection:** Compare answers to discussion questions. What did you find difficult and easy to accomplish this task? How do you think the fish farm you created exemplifies sustainability? What inspired the innovation of your fish farm?



RESOURCES (Click on them!)

- [Sea Choice: Aquaculture Methods](#)
- [Ocean Wise: Geoduck Aquaculture](#)
- [Ocean Wise: Variety is the Spice of Aquaculture](#)
- [Ocean Wise: Wolf-eels: Sustainable Seafood?](#)
- [DFO: Aquaculture Research](#)
- [DFO: Innovative Tools in Aquaculture](#)

Rubric for Teachers: Unit Evaluation

This rubric can be used as an evaluation of the student's performance throughout this unit. You will find the same rubric in the student workbook to help them understand how they may be evaluated.

Middle Years Level

Criteria Category	Extending	Proficient	Developing	Emerging
Questioning	-Supplies a thorough analysis of data to shape in depth inquiries	-Student can pose questions based on prior records of qualitative and quantitative observations	-Asks questions from some of the information provided	-Reviews concepts to shape inquiries, with adult guidance
Procedures and Evidence	-Evaluates evidence to compare and contrast findings to further understanding	-Accurately collects and applies data using a variety of tools from reliable sources	-Records some reliable information to plan investigation	-Records information and applies appropriately, with adult guidance
Perspectives and Ethics	-Analyzes multiple perspectives to cultivate an independent judgment and/or opinion	-Evaluates social, ethical, and environmental implications in investigation	-Provides evidence to support the presence of multiple factors that shape the ethics of a concept	-Lists several perspectives and explores them accordingly, with adult guidance
Communicating	-Elaborates on ideas in class discussions to independently form innovative ideas (ex. solutions, arguments etc.)	-Clearly and concisely communicates ideas and information both in independent and collaborative reflections	-Shares opinions and ideas that include some relevant information	-Contributes ideas and opinions, , with adult guidance

Special Thanks!

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