



# A Guide to Aquaculture in Ontario



**Teacher's Guide**  
Grade 7-12

## About This Resource

This Teacher Guide was designed through the support of and collaboration with the Ontario Aquaculture Association.

Curriculum connections updated in January 2020.

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# AN OVERVIEW OF AQUACULTURE IN ONTARIO

Grade 7-12

## WHAT IS FISH FARMING?

Aquaculture is the industry name for farming finfish, shellfish and other aquatic life like kelp and algae. Canada's aquaculture production is specifically dominated by six main categories: salmon, mussels, oysters, trout, clams and scallops. In 2017, the Canadian aquaculture industry produced a total of 191,416 metric tonnes which amounted to \$1.39 billion Canadian dollars. To express this in another way, the Canadian aquaculture industry's total production for 2017 weighed the same as 27,345 elephants!

In Ontario where we're blessed with abundant freshwater, most of the industry's production capacity is focused on rainbow trout, but thanks to technological advances in the industry Ontario's fish farmers are able to produce warm water species like barramundi, tilapia, shrimp and some other cold water species that are not traditionally cultured like walleye, sturgeon, lake whitefish and Arctic char. Out of the \$1.39 billion, Ontario produced \$122 million in 2018. In terms of the weight of fish produced, Ontario produced equivalent to the weight of 826.7 elephants!

## WHERE ARE THE FISH FARMS IN ONTARIO?

There are a variety of different types of fish farms scattered throughout Ontario, as far south as southwestern Ontario, all the way to the east of the province and then as far west as Thunder Bay. Despite the number of fish farms currently operating, it's very challenging to run these facilities; there are specific requirements including licenses, certifications and environmental permits that must be obtained prior to operation and kept up in order to continue operating. For example, fish farms must follow specific environmental and governmental (federal, provincial and territorial) policies to gain approval for their fish farm facilities, and many pursue third-party international aquaculture certifications with even higher standards validating that their products meet food safety, environmental and social standards.

## WHY IS FISH FARMING IMPORTANT?

Consumers are increasingly turning to fish and seafood as protein sources because of their reputation for environmental and personal health benefits. However, the Food and Agriculture Organization (FAO) of the United Nations estimates that 60% of world fisheries are maximally sustainably fished, 33% of fisheries are overfished which leaves just 7% of fisheries that are considered under-fished. With our growing population projected to reach close to 10 billion people by 2050, the fish industry, both commercialized fishing and fish farms, work together to supply the growing demand for fish and seafood protein. Today, more than half of all seafood is farmed and by 2030 that is projected to increase to 62%. The aquaculture industry is growing and promises to provide fulfilling, well-paying jobs for this and future generations of workers, many of which will be located in Ontario and throughout the rest of Canada.

## HOW ARE FISH PRODUCED?

A hatchery is a facility where fish eggs are hatched under controlled conditions. This requires the collection of eggs and milt (sperm) from the broodstock (mature fish) and then the fertilization of these eggs. Hatcheries are then responsible for the growth of the fish until they reach a size where they can be stocked. For rainbow trout, this is

about 15 centimetres in length and at this stage the fish are known as fingerlings. Once they have reached this stage, fingerlings are often transported to northern Ontario where they will be stocked into floating net-pens until they reach market weight of 1kg and then they are sent to be processed into human food and by-products.

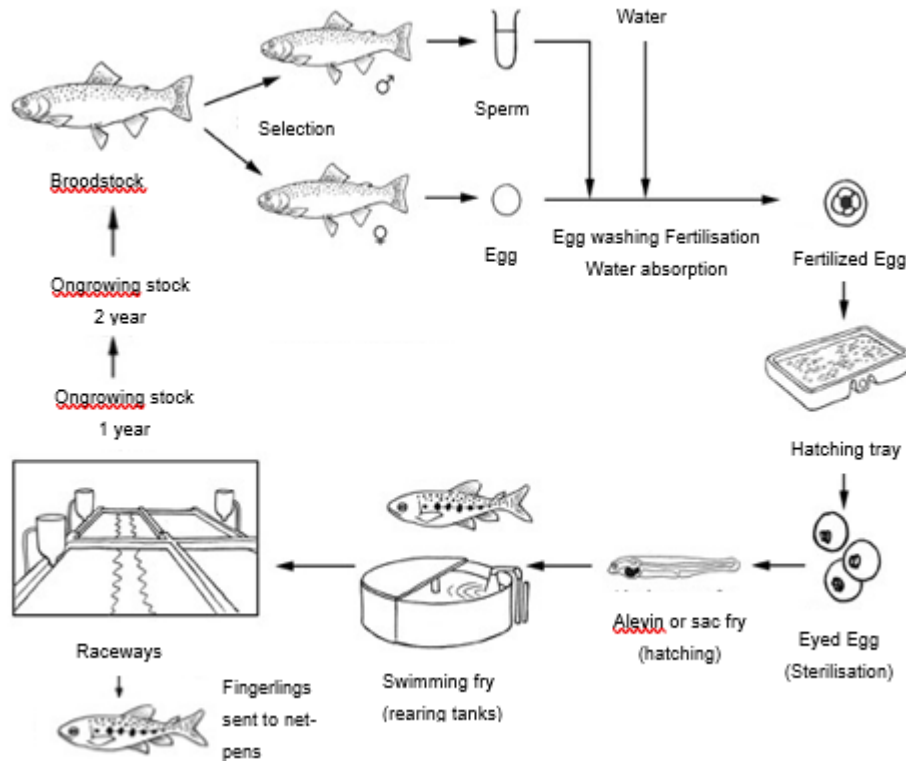


Image: Life cycle of a fish on a fish farm

## TYPES OF FISH FARMS

Cedar Crest Trout Farms, located in Hanover, Ontario, runs several different trout farm hatcheries. Like all hatcheries in Ontario, each facility has a unique design suited to the water source they are drawing from. Some are flow-through systems that draw water from a well, lake, river or headwater, pass it through the farm and then safely discharge it. Other hatcheries use recirculating aquaculture systems that rely on sophisticated water treatment technologies for reusing the water at rates of up to 98%. Other hatcheries use a combination of the two systems. The hatcheries produce fingerlings which are transferred to sites around Lake Huron and Georgian Bay.

Cole-Munro Trout Farms operates many large net-pen farms in Georgian Bay and around Manitoulin Island. Sites like these consist of arrays of floating nets that keep fish protected from predators and allow the farmer to feed and take care of them easily. Thanks to wind, tides and convection, clean, oxygen-rich lake water flows through them day and night to keep the fish healthy. Putting fingerlings into net-pens can be compared to putting cows out to pasture, as there is plenty of fresh water and space for them to grow to maturity.



Image: Cedar Crest Trout Farm, Hanover, Ontario

*Land-based flow-through aquaculture systems are facilities that are located on land and depend on water from springs, rivers or wells to supply water for the fish. The water drawn will circulate through circular tanks or “raceways”, providing fish with a suitable place to live and grow. These systems remove fish manure through natural settling zones and/or filtration. Discharge waters are regularly monitored to ensure no excess nutrients make their way into nearby water bodies.*



Image: Sandplains Aquaculture, Harrietsville, Ontario

*Land-based recirculation aquaculture systems (RAS) are facilities that are located on land and depend on water being initially supplied to the tanks and then filtered and recirculated through the system. The water supplied to the tanks will circulate through the farm, providing fish with a suitable place to live and grow. The main difference between flow-through and RAS systems is a sophisticated water treatment that takes place at the end of the cycle which removes effluent and conditions the water so it can be used again in the farm.*



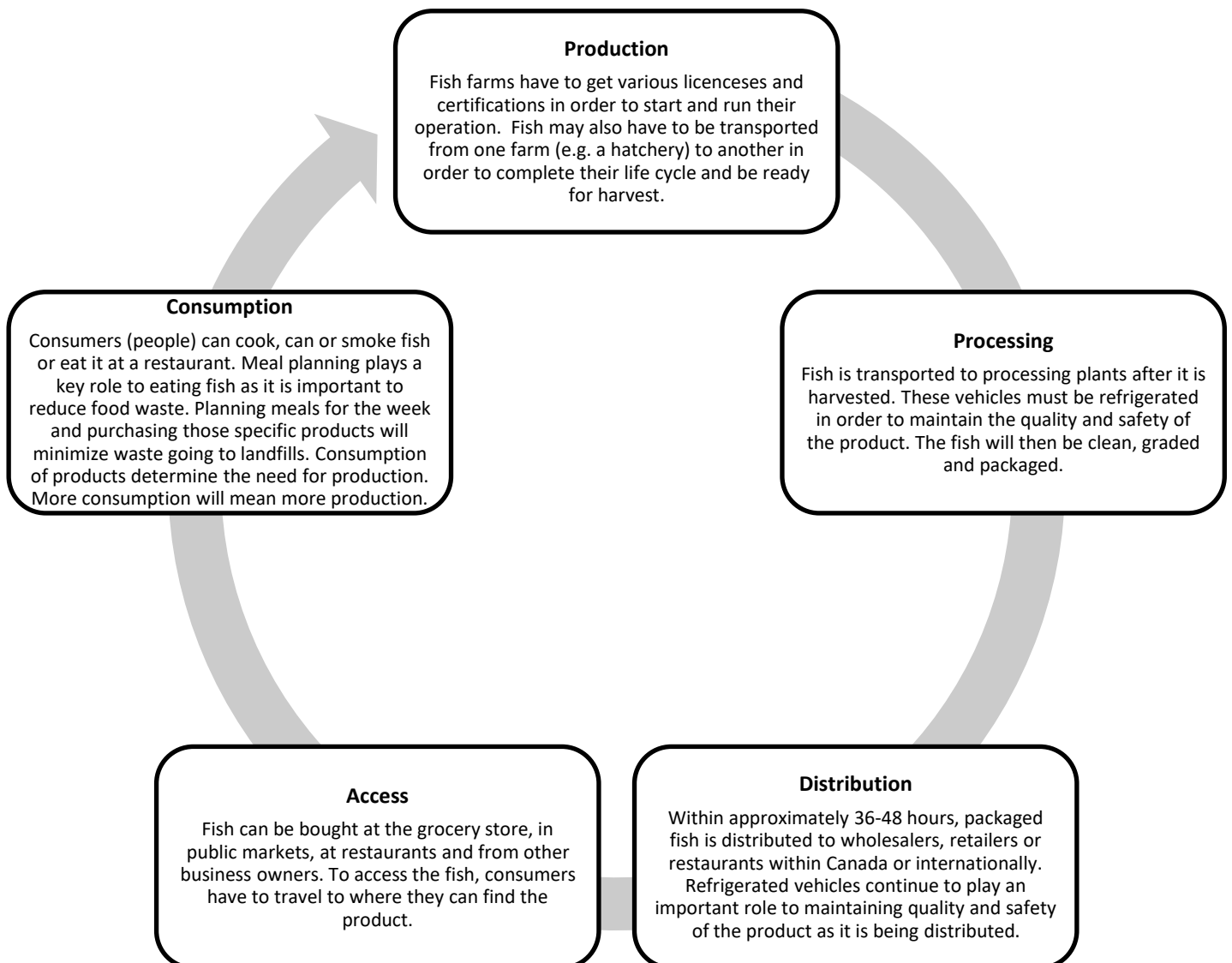
Image: Cole-Munro Fisheries

*Net-pen farms are found in large bodies of water, such as Lake Huron. They consist of segregated pens that float on top of the water. Some net-pens are fully submersible which helps minimize potential damage from surface ice that moves and shifts as it melts in the spring. In saltwater, submersible net-pens can be used to avoid parasites. Net-pen farms are a very low-carbon (CO<sub>2</sub>) operation, as they require little electricity or fossil fuels.*

## WHAT HAPPENS TO A FISH AFTER IT LEAVES THE FARM?

The diagram below offers a food system view of aquaculture. This process highlights what must happen to farmed fish, shellfish and aquatic life from farm to table.

### FOOD SYSTEM VIEW OF AQUACULTURE



## HOW IS FISH HEALTHY FOR HUMANS?

It is important to know that whether humans consume wild or farmed fish, they both offer the same type of health benefits. Aquaculture farmers provide nutritious feed to their farmed fish that allow them to absorb Omega-3 fatty acids, in the same way that wild fish consume food containing Omega 3 from the natural environment. Farmed fish and shellfish are also high in protein, contain vitamins and minerals, and are low in saturated fat. Fish farming is an efficient use of resources to produce a healthy meat protein. In fact, Ontario rainbow trout farmers use approximately 1.1 pound of feed to produce 1 pound of mass of rainbow trout, making fish farming an efficient industry.

## WHAT CHALLENGES DO FISH FARMERS FACE?

### ENVIRONMENTAL

When it comes to farming aquatic species, the aquaculture industry is extremely dependent upon the environment. Weather, temperature, predators, shifts in the health and stability of aquatic and terrestrial ecosystems, pollution and disease are only among some of the areas that an aquaculturist must think about when farming. In addition, each aquaculture facility is unique to its location in the environment with respect to what type of farm it may be (e.g. land-based flow-through system, land-based recirculatory system, net-pens etc.). Due to these unique aspects, each aquaculture farmer will face unique challenges.

For example, the below image is a layout of a land-based flow-through aquaculture system. The creek supplies the water to the raceways where the fish are being housed and then discharged back into the creek. However, before entering the raceways, the water of the creek is monitored for any potential pollutants, bacteria or human waste (e.g. garbage, plastics etc.) that could enter the farm and impact the health of the fish ecosystem.

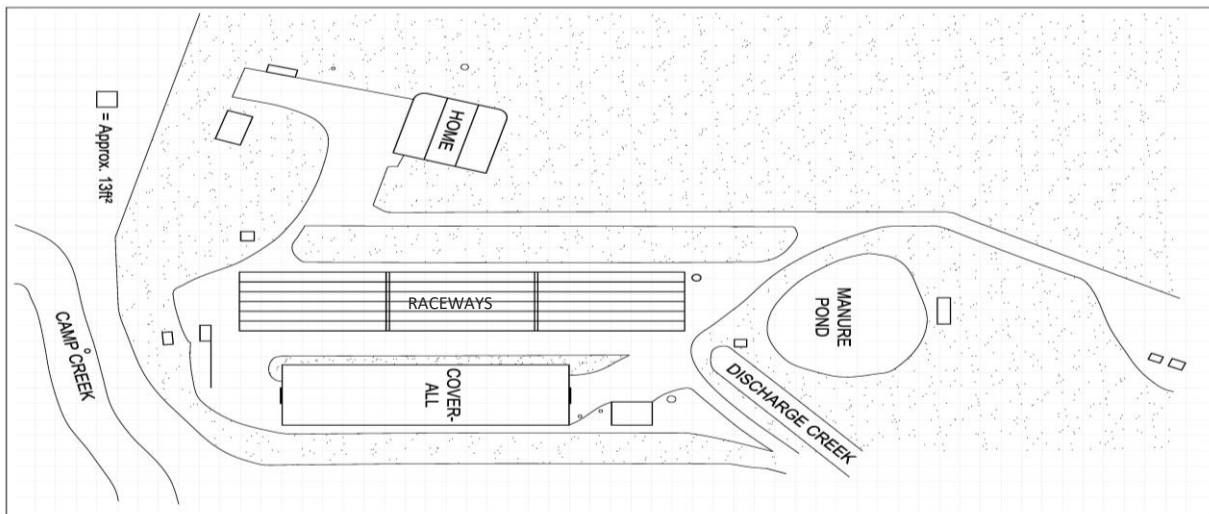


Image: Layout of a Land-Based Flow-Through Aquaculture System

Aquaculture farmers also want to reduce the impact their facilities have on the environment as much as possible. Fish farmers recognize that through the feeding process, waste is produced. Innovations in aquaculture have led to some farmers collecting the suspended solids or fish poop produced and use this material as fertilizer for crops.

### ECONOMICAL

The aquaculture industry is the fastest growing industry in agriculture. As of 2019, it currently employs approximately 26,000 across Canada, with 550 direct and indirect jobs being filled in Ontario. As an economic challenge, the industry faces difficulty in finding workers to fill positions. In the most recent study conducted by



the Canadian Agricultural Human Resource Council, they found in 2014, 400 jobs went unfilled costing the industry \$57 million. The Canadian Agricultural Human Resource Council further predicts that by 2025 there will be a growing labour shortage with 1,300 jobs expected to go unfilled in the primary production sector increasing costs and lost of sales to the industry. While this is a challenge being faced by the industry, it does provide opportunities for more people to navigate and find positions working in aquaculture.

An added challenge to the industry is that it has limited access to employing foreign workers. Since aquaculture is not approved on the national commodities list, the industry does not receive access to foreign workers through the Seasonal Workers Program (SAWP) and the Agricultural Stream of the Temporary Foreign Worker Program (TFWP). This barrier limits access to available workers, thus impacting the economical livelihood of small and larger scale aquaculture businesses.

Despite these challenges, innovations in the area of science and technology help the industry to thrive. For example, Ontario's largest fish farms are using sophisticated technology to count, grade and transport fish. There are also advances in water treatment for land-based facilities. Furthermore, many farms are utilizing leading-edge production software that's tracking every variable on their farm — including growth rates, temperature, feeding times, and more — and then using algorithms to suggest optimized feeding, breeding and handling procedures. Virtually every net-pen farm operating in Ontario is using high-tech underwater cameras and underwater drones that help make visual inspections easy and reduce the need for putting scuba divers in danger.

## SOCIAL

Public perceptions about the aquaculture industry vary. Research into this area has shown that the main areas of public concern are the following:

- nutrient pollution into water systems;
- chemical pollution into water systems from use of chemical treatments; and
- effects on wild aquatic species and surrounding ecosystems.

Fish farmers are proactively addressing these concerns through increased transparency for environmental and fish health data, educating the public, supporting research to understand impacts, and innovating new technologies and practices.

Sometimes the public hears stories of poorly operated fish farms, and they assume all fish farms have negative environmental impacts. That's why many fish farmers who grow fish sustainably and responsibly insist on securing certifications that demonstrate their farms as eco-friendly.

Best Aquaculture Practices (BAP) is one example of a certification that aquaculture farms can acquire to highlight their commitment to environmental stewardship, animal welfare, and social responsibility. The Global Aquaculture Alliance (GAA) developed BAP and regularly audits certified farms to ensure that they are meeting the highest international standards and quality possible. Many fish farms in Ontario hold BAP certification, among other sustainability seals and certifications. When shopping in the grocery store look for certifications such as BAP, Ocean Wise, Aquaculture Stewardship Council, Marine Stewardship Council to confirm whether your seafood, farmed or wild, is sustainably sourced.

### Can Ontario net-pen farms increase wild fish populations?

Surprisingly, that's what the latest peer-reviewed research is telling us!

A ten-year study from Fisheries and Oceans Canada put a net-pen in a small lake and examined impacts on the surrounding ecosystem. Within several years, populations of lake trout and other fish increased. While the study did show some negative effects on the population of crustaceans and oxygen levels in deeper parts of the lake, it overall highlighted that through additional research as well as proper regulations and strategies these effects could be mitigated.

Other research from the University of Guelph is showing just how much local ecosystems benefit from a nearby net-pen farm.

## WHO'S INVOLVED IN PRODUCING FISH?

There are a variety of indirect and direct jobs that exist within the aquaculture industry. Visit the below links in each category to meet a variety of people who work within the industry along with their job responsibilities.

- Fish farmers and fish processors
  - Meet Rob from Cole-Munro as he talks about his position as facility manager: [https://www.youtube.com/watch?time\\_continue=44&v=tQBwusq-iVg](https://www.youtube.com/watch?time_continue=44&v=tQBwusq-iVg).
  - Meet Jim from Cedar Crest Farms as he talks about his work in starting a fish farm and the daily responsibilities: <https://www.youtube.com/watch?v=uKL8BgbsFy0>.
- Nutritionists, veterinarians
  - Meet a veterinarian student working with Cooke Aquaculture in Nova Scotia to learn about her responsibilities: <https://www.youtube.com/watch?v=r-tC8hfSJKI>.
- Wholesalers, brokers, retailers
  - Meet Luciano from Shamrock Poissonnerie as he talks about his job as a fishmonger and his store: <https://www.youtube.com/watch?v=apkzEvWqQpE>.
- Government licensing agencies
  - Meet members of Fisheries and Ocean's Canada Aquaculture Management team who review whether aquaculture facilities are fulfilling their licensing requirements: [https://www.youtube.com/watch?time\\_continue=8&v=bDq7aC\\_J2RI](https://www.youtube.com/watch?time_continue=8&v=bDq7aC_J2RI).
- Ecologist, researchers, universities
  - Watch a series of scientists and researchers speak to their role in working within the aquaculture industry: <https://www.youtube.com/watch?v=mj760Fem2kA>.
  - Meet Jon from Fleming College as he talks about his role as the program coordinator for aquaculture: <https://www.youtube.com/watch?v=VqPzK0cIPkI>.
- Underwater robots and drones
  - Meet Kana from AquaCage Fisheries as she describes how robots are used at their trout farm: [https://www.youtube.com/watch?v=x4OxJMgrtoo&list=PLCTnpG7aXT2\\_VFFgquMTpRFuCsijqK3ks&index=7](https://www.youtube.com/watch?v=x4OxJMgrtoo&list=PLCTnpG7aXT2_VFFgquMTpRFuCsijqK3ks&index=7)

# LESSON PLAN:

## Activity One – Overview of Aquaculture



Grade 7-8

### ABOUT THIS LESSON

This activity is designed to give students a basic introduction to Ontario’s aquaculture industry. Students will learn about what is aquaculture, the life cycle of fish and why aquaculture is important to the local and global economy. Students will also design and construct a net-pen farm, which are used to house farmed fish in large bodies of water.

### MATERIALS NEEDED

- Appendix 1A- A Look at Ontario’s Rainbow Trout Industry
- Appendix 1B- A Look at Ontario’s Rainbow Trout Industry: Answer Key
- Appendix B-C Building a Net-pen
- YouTube video, A Look at Ontario’s Rainbow Trout Industry located at: <https://www.youtube.com/watch?v=C6s4ufA14aM>
- Materials for Net-pen:
  - large container filled with water
  - popsicle sticks
  - glue
  - styrofoam
  - lightweight (floating) beads
  - mesh netting
  - wire
  - twine
  - pipe cleaners
  - plastic straws

### CURRICULUM EXPECTATIONS

#### SOCIAL STUDIES: GEOGRAPHY

##### Geography, Grade 7

##### Natural resources Around the World: Use and Sustainability

*By the end of Grade 7, students will:*

- 1.2 analyse natural resource extraction/harvesting and use in some specific regions of the world;
- 3.2 describe ways in which people use the natural environment, including specific elements within it, to meet their needs and wants.

##### Geography, Grade 8

##### Global Settlements: Patterns and Sustainability

*By the end of Grade 7, students will:*

- 1.2 describe ways in which human settlement has affected the environment;
- 3.2 describe some practices that individuals and communities have adopted to help make human settlement more sustainable.

## SCIENCE

### Science, Grade 7

#### Understanding Life Systems: Interactions in the Environment

*By the end of Grade 7, students will:*

- 1.1 assess the impact of selected technologies for protecting the environment;
- 1.2 analyse the costs and benefits of selected strategies for protecting the environment;
- 2.2 design and construct a model ecosystem;
- 2.4 use appropriate science and technology vocabulary, including sustainability, biotic, ecosystem, community, population and producer, in oral and written communications;
- 3.1 demonstrate an understanding of an ecosystem as a system of interactions between living organisms and their environment.

### Science, Grade 7

#### Understanding Structures and Mechanisms: Form and Function

*By the end of Grade 7, students will:*

- 2.2 design, construct, and use physical models to investigate the effects of various forces on structures;
- 2.3 investigate the factors that determine the ability of a structure to support a load;
- 3.6 identify and describe factors that can cause a structure to fail.

### Science, Grade 8

#### Earth and Space Systems: Water Systems

*By the end of Grade 8, students will:*

- 2.5 use technological problem-solving skills to design, build, and test a water system device that performs a practical function or meets a need.

## TEACHING AND LEARNING STRATEGIES

### Hook

Ask students to name different types of animals or crops that are produced on the farm for human consumption. Allow for 3-4 different responses (e.g. beef cattle, sheep, pig, lamb, chicken, turkey, vegetables, fruits etc.). Ask students if they have ever thought about aquatic species like fish being farmed for us to eat.

Tell students that in 2017 alone, Ontario produced the weight of 1,142.8 elephants in farmed fish. Ask students to think of different types of fish they may have seen in the grocery store that could have been farmed in Ontario or Canada.

Ask students what they think aquaculture is. Have students work together as a class to create a definition of aquaculture. Ask students why they think aquaculture is important.

Tell students that according to the **2018 report from the Food and Agricultural Organization of the United Nations (FAO)**, there is simply not enough wild seafood on the planet to meet global demand. In fact, half the

seafood people eat in the world now comes from farms and will be growing to 62% by 2030.

### **Action 1: Fish Farming**

Tell students they are going to look at Ontario's Trout Industry and be introduced to how various people are involved in the process to bring trout to their grocery stores. Tell students that using Appendix A and while working in pairs, they should write down the name of the different life stages of a trout, along with what is happening to them at that stage in terms of fish farming production. In addition, students should write down any types of technology mentioned in the video that helps to ensure that the trout are being kept healthy and safe.

Play the video, "A Look at Ontario's Rainbow Trout Industry" located at the following link: <https://www.youtube.com/watch?v=C6s4ufAl4aM>. Stop the video at key intervals to point out the different stages of a trout's life cycle, what is happening to it at that stage, and key pieces of technology that are being used to support the fish farming process.

Ask students to share what they learned about trout farming.

Draw a T-Chart on the board and ask students to share the pros and cons of aquaculture.

### **Action 2: Build a Net-pen**

Tell students in lakes or oceans, fish are housed in net-pens where they will have enough room to reach the final stage of their life cycle. A net-pen is therefore an ecosystem for farmed fish, where they will be interacting with abiotic (non-living parts of the environment such as water, temperature and sunlight) and biotic (living parts of the environment such as microbes, other species etc.). For this activity, students will have to innovate and design their own net-pen and then test it for its functionality.

#### **Materials:**

- large container filled with water
- popsicle sticks
- glue
- styrofoam
- lightweight (floating) beads
- mesh netting
- wire
- twine
- pipe cleaners
- plastic straws

Optional: Water (growing) beads Smaller container for water Note: Any material can be substituted based on what you have available or something additional you think may work well.

Step 1. Divide students into groups of 2-4.

Step 2. Read the Background section (below) aloud to the class. Provide them the handout so that they can follow along.

#### **Background:**

You were driving a boat across Georgian Bay before a rainstorm hits making you unable to see where you are going. Your boat suddenly strikes a submerged rock, puncturing a hole into your boat! Your boat begins to sink and becomes stuck on the rock. You are forced to abandon the boat and swim to a nearby deserted island, but not before you grab a few essential items. On day 1, you make a makeshift raft out of logs, but it is not stable enough to get you far. After two days stranded, food stores are getting low and you need to start thinking of how you will feed yourself and your team until help arrives. You know you are surrounded by water teeming with life, but the big fish that make a great meal are farther out at sea. With only your makeshift raft, trips far from shore is near impossible. If you are going to survive much longer you will have to find an alternative.

Before your trip, you had recently heard stories about a new kind of farmer, fish farmers. You decide that fish farming would be more sustainable than trying to catch one fish at a time, as it would be able to supply multiple fish for days. This will help to limit how often you need to go out fishing and give you and the crew more time to focus on creating shelter and searching for help.

In order to construct a fish-farm, or aquaculture operation, you must build infrastructure that can contain the fish in the lake and allow them to grow without escaping into the wild. Your job now is to use the materials you salvaged from your boat to build a structure that can hold your fish.

Step 3: Now instruct each team to complete 2-3 designs of their model highlighting where they will be using specific materials. Tell students to remember that since they are on a deserted island, they have limited access to resources and must be mindful of their design and model.

Step 4. Tell students that after completing 2-3 designs, they must show all the designs to the teacher and explain which design they are going to use and why. After showing their designs and getting approval, they can now begin building the model. Explain that when a team finishes a model, it will be tested by the instructor in a large container of water, which represents the lake.

Step 5. Place the model in the water and set a timer to see how long it will float. Observe for flotation. Have students record how long it floats up to 5 minutes. If it floats, have student explain why it was successful. If it sinks, have students explain why it was unsuccessful. Provide students some feedback and suggestions for improvement then allow students an opportunity to fix their design and try again.

### **Consolidation**

Bring students together as a class and share their success and challenges in building net-pens. Ask students why they think technology, design and innovation would be important to the aquaculture industry (i.e. how is it important to the environment, food safety, and welfare of the fish).

## **ASSESSMENT AND EVALUATION**

Completion of Appendix 1A- A look at Ontario's Rainbow Trout Industry.

Completion of net-pen model as well as Appendix B.

## **ENRICHMENT**

- Ask students to create a diagram, with labels, of the life cycle of an aquatic species grown in Ontario.
- Visit a local aquaculture farm.
- Start a classroom hatchery.

## APPENDIX A – A LOOK AT ONTARIO’S RAINBOW TROUT INDUSTRY

While watching the video, “A Look at Ontario’s Rainbow Trout Industry”, fill out the below chart.

Write down the name of each life cycle stage.	Describe what is happening to them during that stage of their life cycle (e.g. housing, feeding, transportation, handling/treatment).	Describe what potential technology is being used to support them at that stage of their life cycle.

## APPENDIX A – A LOOK AT ONTARIO’S RAINBOW TROUT INDUSTRY: ANSWER KEY

While watching the video, “A Look at Ontario’s Rainbow Trout Industry”, fill out the below chart.

Write down the name of each life cycle stage.	Describe what is happening to them during that stage of their life cycle (e.g. housing, feeding, transportation, handling/treatment).	Describe what potential technology is being used to support them at that stage of their life cycle.



## APPENDIX B – BUILDING A NET-PEN

**Background:** You were driving a boat across Georgian Bay before a rainstorm hits making you unable to see where you are going. Your boat suddenly strikes a submerged rock, puncturing a hole into your boat! Your boat begins to sink and becomes stuck on the rock. You are forced to abandon the boat and swim to a nearby deserted island, but not before you grab a few essential items. On day 1, you make a makeshift raft out of logs, but it is not stable enough to get you far. After two days stranded, food stores are getting low and you need to start thinking of how you will feed yourself and your team until help arrives. You know you are surrounded by water teeming with life, but the big fish that make a great meal are farther out at sea. With only your makeshift raft, trips far from shore is near impossible. If you are going to survive much longer you will have to find an alternative.

Before your trip, you had recently heard stories about a new kind of farmer, fish farmers. You decide that fish farming would be more sustainable than trying to catch one fish at a time, as it would be able to supply multiple fish for days. This will help to limit how often you need to go out fishing and give you and the crew more time to focus on creating shelter and searching for help.

In order to construct a fish farm, or aquaculture operation, you must build infrastructure that can contain the fish in the lake and allow them to grow without escaping into the wild. Your job now is to use the materials you salvaged from your boat to build a structure that can hold your fish.

**Task:** In groups of 2-4, you will innovate and design your own net-pen and then test it for its ability to float in water.

**Step 1:** Collect your materials.

Materials:

Large container filled with water	Lightweight (floating) beads	Plastic straws
Popsicle sticks	Mesh netting	Smaller container for water
Glue	Wire	Optional: Water (growing) beads
Styrofoam	Twine	
	Pipe cleaners	

**Step 2:** Complete 2-3 designs of your model highlighting where you will be using specific materials. Remember that since you are on a deserted island, you have limited access to resources and have to be mindful of your design and model.

**Step 3:** After completing 2-3 designs, show all the designs to your teacher and explain which design you are going to use and why. After getting approval on your design, begin building the model.

**Step 4:** After completing your model, test it in a large container of water, which represents the lake.

**Step 5:** Place the model in the water and set a timer to see how long it will float. Observe for flotation. Record your findings on the following chart.

## APPENDIX B – BUILDING A NET-PEN

**Step 6:** Record your findings on how your model floated in the below chart. Complete multiple attempts (at most 3) if model does not successfully float the first time. If it floats, explain why it was successful. If it sinks, explain why it was unsuccessful. Take this opportunity to fix your design and try again.

**Step 7:** Respond to the below questions. External research using the internet can be done if needed.

Trial	Time- Record time (up to 5 minutes)	Description of what happened (e.g. why it floated successfully/why it did not float)	Suggestion for improvements (e.g. how could you make it float longer, how could it hold more fish inside the cage at different life cycle stages etc.)
Attempt # 1			
Attempt # 2			
Attempt # 3			

1. What are the benefits to humans and the environment in using net-pens to raise fish (Suggested website: [SeaChoice.Org-Aquaculture Methods](http://SeaChoice.Org-Aquaculture Methods))? List potential abiotic and biotic factors.
  
2. What are potential drawbacks to humans and the environment for using net-pens (Suggested website: [SeaChoice.Org-Aquaculture Methods](http://SeaChoice.Org-Aquaculture Methods))? List potential abiotic and biotic factors.

# LESSON PLAN:

## Activity Two – Career Discovery



Grade 9-10

### ABOUT THIS LESSON

This activity is designed to give students a basic introduction to Ontario’s aquaculture industry. Students will learn what is aquaculture, why aquaculture is important to the local and global economy, along with potential careers in the industry. Students will also design and construct an infographic focused on a specific career in the aquaculture industry.

### MATERIALS NEEDED

- Appendix A- A Food System View of Aquaculture
- Appendix B- Career Discovery Infographic and Rubric
- Laptop, projector, projector screen
- Class-set of laptops for students
- YouTube video, A Look at Ontario’s Rainbow Trout Industry located at: <https://www.youtube.com/watch?v=C6s4ufA14aM>

### CURRICULUM EXPECTATIONS

#### ENGLISH

#### English, Grade 9, Academic (ENG1D)

##### Media Studies

*By the end of Grade 9, students will:*

- 3.4 produce media texts for several different purposes and audiences, using appropriate forms, conventions, and techniques.

#### English, Grade 9, Applied (ENG1P)

##### Media Studies

*By the end of Grade 9, students will:*

- 3.4 produce media texts for several different purposes and audiences, using appropriate forms, conventions, and techniques.

#### English, Grade 10, Academic (ENG2D)

##### Media Studies

*By the end of Grade 10, students will:*

- 3.4 produce media texts for several different purposes and audiences, using appropriate forms, conventions, and techniques.

## English, Grade 10, Applied (ENG2P)

### Media Studies

*By the end of Grade 10, students will:*

- 3.4 produce media texts for several different purposes and audiences, using appropriate forms, conventions, and techniques.

## SCIENCE

### Science, Grade 9, Academic (SNC1D)

#### Scientific Investigation Skills and Career Exploration

*By the end of Grade 9, students will:*

- A2.1 identify and describe a variety of careers related to the field of science under study and the education and training necessary for these careers.

### Science, Grade 9, Applied (SNC1P)

#### Scientific Investigation Skills and Career Exploration

*By the end of Grade 9, students will:*

- A2.1 identify and describe a variety of careers related to the field of science under study and the education and training necessary for these careers.

### Science, Grade 10, Academic (SNC2D)

#### Scientific Investigation Skills and Career Exploration

*By the end of Grade 10, students will:*

- A2.1 identify and describe a variety of careers related to the field of science under study and the education and training necessary for these careers.

### Science, Grade 10, Applied (SNC2P)

#### Scientific Investigation Skills and Career Exploration

*By the end of Grade 10, students will:*

- A2.1 identify and describe a variety of careers related to the field of science under study and the education and training necessary for these careers.

## TECHNOLOGICAL EDUCATION

### Green Industries, Grade 10, University/College (THJ20)

#### Professional Practice and Career Opportunities

*By the end of Grade 10, students will:*

- D2.1 describe career opportunities in a variety of sectors in the green industries and the education, training, and certification required for employment in green industry occupations.

## GUIDANCE AND CAREER EDUCATION

### Career Studies, Grade 10, Open (GLC20)

#### Exploring and Preparing for the World of Work

*By the end of Grade 10, students will:*

- B1.1 identify some recent and evolving technological, economic, and social trends that have influenced the world of work, both locally and globally, noting their impact on the kind of work we do and how we do it as well as workers' rights and responsibilities, and analyse the possible impact of those trends on their own choices now and in the future;
- B2.2 identify factors and conditions other than an individual's strengths, interests, and needs that inform education and career/life choices, and explain which of these factors may be influencing their own decisions;
- B3.1 use a research process to identify and compare a few postsecondary options that suit their aspirations, skills, interests, values, and personal circumstances.

## TEACHING AND LEARNING STRATEGIES

### Hook

Write the word "career" on the board. Ask students to share description or words of what the term career means to them (e.g. stability, passion, income etc.). Ask students to rank the top 3 things they find important in their future career. Allow students to share what career they would potentially want in their future and explain why. Ask students: Why they may find difficulty in choosing a future career pathway.

### Action 1: Career Discovery

Tell students they will be introduced to and discover careers that exist in the aquaculture industry. Explain that before the discovery of potential careers, they will watch a brief YouTube clip that provides an overview of what is aquaculture. Play the following clip, "A Look At Ontario's Rainbow Trout Industry," to introduce students to the aquaculture industry: <https://www.youtube.com/watch?v=C6s4ufAl4aM>.

Ask students, in pairs, to write down and share the following:

- one thing they found interesting in the video,
- one thing they would like to learn more about, and
- if they ever thought of a potential career in aquaculture.

Ask students to share their thoughts with the class.

Provide each student with a copy of Appendix A: A Food System View of Aquaculture. Tell students that you will be playing a series of short clips of careers in the aquaculture industry. Tell students they will write down in what area of the food system view of aquaculture that career belongs to as well as one fact that stood out to them. After each video, review the handout as a class.

Please find a list of videos to play:

- Fish farmers and fish processors
  - Meet Rob from Cole-Munro as he talks about his position as facility manager:  
[https://www.youtube.com/watch?time\\_continue=44&v=tQBwusq-iVg](https://www.youtube.com/watch?time_continue=44&v=tQBwusq-iVg).
  - Meet Jim from Cedar Crest Farms as he talks about his work in starting a fish farm and the daily responsibilities: <https://www.youtube.com/watch?v=uKL8BgbsFy0>.
- Nutritionists, veterinarians
  - Meet a veterinarian student working with Cooke Aquaculture in Nova Scotia to learn about her

responsibilities: <https://www.youtube.com/watch?v=r-tC8hfSJKI>.

- Wholesalers, brokers, retailers
  - Meet Luciano from Shamrock Poissonnerie as he talks about his job as a fishmonger and his store: <https://www.youtube.com/watch?v=apkzEvWqQpE>.
- Government licensing agencies
  - Meet members of Fisheries and Ocean's Canada Aquaculture Management team who review whether aquaculture facilities are fulfilling their licensing requirements: [https://www.youtube.com/watch?time\\_continue=8&v=bDq7aC\\_J2RI](https://www.youtube.com/watch?time_continue=8&v=bDq7aC_J2RI).
  - Watch an advertisement in becoming a Fishery Officer for the federal government of Canada: [https://www.youtube.com/watch?v=zluUQJ\\_MaK4](https://www.youtube.com/watch?v=zluUQJ_MaK4).
- Ecologist, researchers, universities
  - Watch a series of scientists and researchers speak to their role in working within the aquaculture industry: <https://www.youtube.com/watch?v=mj760Fem2kA>.
  - Meet Jon from Fleming College as he talks about his role as the program coordinator for aquaculture: <https://www.youtube.com/watch?v=VqPzK0cIPkI>.
- Underwater robots and drones
  - Meet Kana from AquaCage Fisheries as she describes how robots are used at their trout farm: [https://www.youtube.com/watch?v=x4OxJMgtrto&list=PLCTnpG7aXT2\\_VFFgquMTpRFuCsijqK3ks&index=7](https://www.youtube.com/watch?v=x4OxJMgtrto&list=PLCTnpG7aXT2_VFFgquMTpRFuCsijqK3ks&index=7)

Ask students to share their observations around the variety of careers in the aquaculture industry. Ask students what career their favourite was and why. Ask students to explain in 3-5 sentences why a particular video captured their attention (e.g. visuals, personal stories, passion, job responsibilities etc.). Ask students if there were any careers that did not fit in the category. If this is the case, what new category would they create and why.

### **Action 2: Career Discovery Infographic**

Tell students they will now create an infographic about a specific career in the aquaculture industry. Provide each student a copy of Appendix B: Career Discovery Infographic and Rubric. Explain to students that the infographic can be of a career that they discovered in the series of videos they have seen or can be a different career found in the industry. Tell students that each infographic must contain the following:

- a brief description of the aquaculture industry (e.g. Who, What, Where, When, Why and How); and
- the profile of a career in the industry.

The information that must be included in the career profile is the following:

- description of the job responsibilities;
- expected salary;
- required education (e.g. college, university, apprenticeship etc.);
- companies that employ that position;
- positives and negatives of the career; and
- why that career is important to the aquaculture industry.

Provide students 2-3 work periods to complete their infographic. Students will then place their infographic on the walls of the classroom, and students will participate in a gallery walk. Students will present their infographic to

students visiting their infographic.

### **Consolidation**

Bring students together as a class and ask them what they have learned about the aquaculture industry and what careers they have discovered through this activity. Emphasize to students that the aquaculture industry provides a wide variety of opportunities in many areas such as science, communications, technology and geography.

## **ASSESSMENT AND EVALUATION**

Completion of Appendix A: A Food System View of Aquaculture.

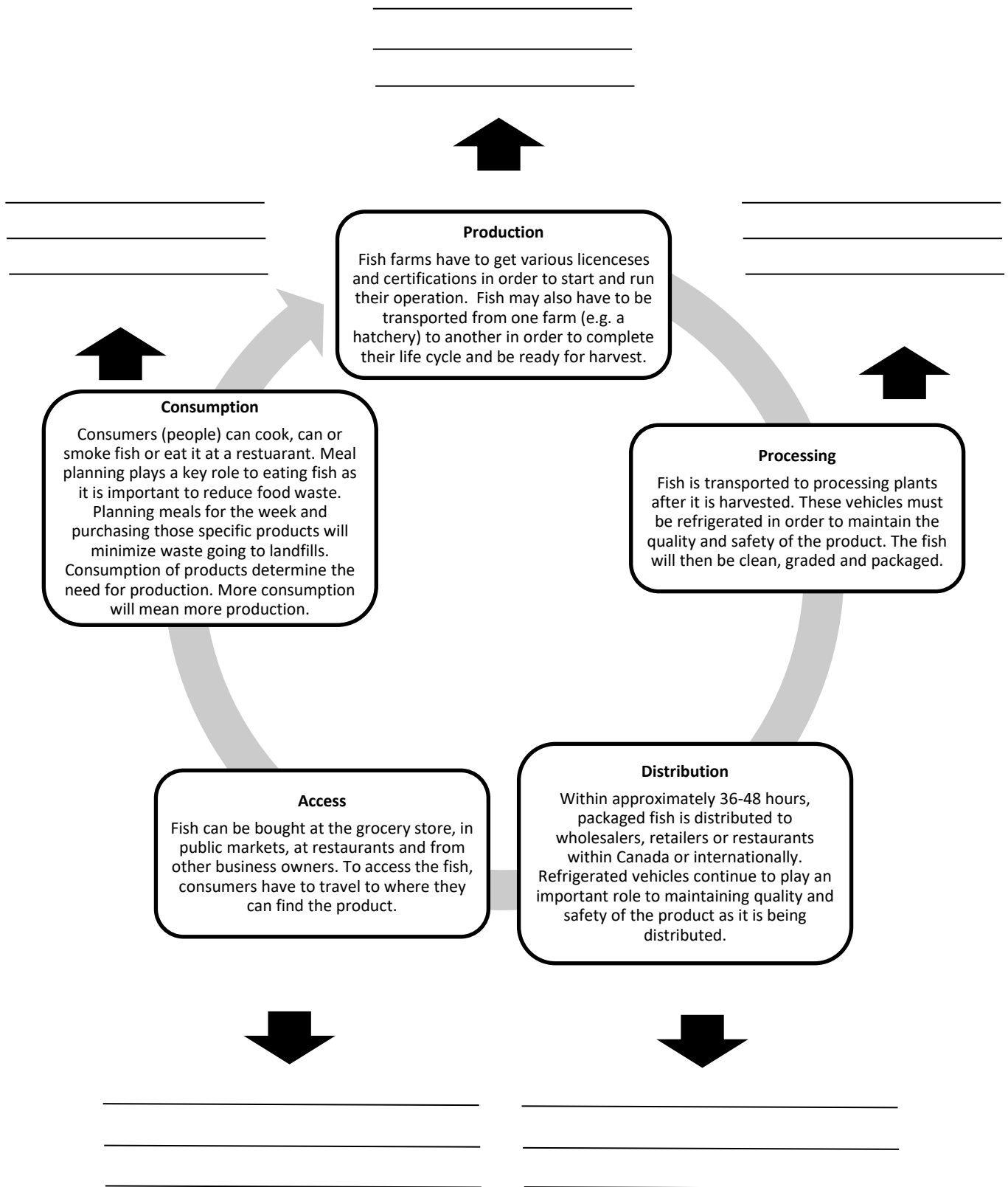
Completion and evaluation of Career Discovery infographic.

## **ENRICHMENT**

- Students can enrich their infographics by including memorable quotes or advice from people working within the industry. If looking to connect your students with people in the industry, contact the Ontario Aquaculture Association at [hello@ontarioseafoodfarmers.ca](mailto:hello@ontarioseafoodfarmers.ca).
- Students can participate in a tour at their local grocery store and speak to their resident dietician or fishmonger about the benefits of fish along with career opportunities.

## APPENDIX A – FOOD SYSTEM VIEW OF AQUACULTURE

**Task:** On the line, write down 3 potential careers that would be needed for that stage of the food system.





## APPENDIX B – CAREER DISCOVERY INFOGRAPHIC ACTIVITY AND RUBRIC

Task: Design an infographic or poster of a chosen career in aquaculture. Your infographic should include the following information:

- education required;
- expected salary;
- a brief description of a company that employs that position (e.g. who, what, and where);
- job responsibilities and work skills;
- positives and negatives of that career;
- why that career is important to the aquaculture industry;
- a brief overview of the aquaculture industry (e.g. who, what, where etc.);
- Piktochart: <https://piktochart.com/>

Success Criteria	Weight	Exceptional	Admirable	Marginal	Not There Yet
Content	50%	Appropriate details support main idea  Accurate and detailed information  Information adequately supports purpose of visual	Most details support main idea  Accurate information for almost all subject matter  Information is mostly adequate and supportive of visual's purpose	Few details support main idea  Lacking accurate information  Inadequate information is not clearly supportive of visual's purpose	No details to support main idea  Information is not accurate  Information does not support the visual's purpose
Focus	20%	Topic and title clear and easy identifiable  Main idea is clearly appropriate to topic  All illustration complement purpose of the visual	Topic and title are mostly clear and easily identifiable  Main idea is appropriate to topic  Most illustrations complement purpose of visual	Topic and title difficult to identify  Main idea not clearly stated  Few illustrations complement purpose of visual	Topic and title are not clearly identifiable  No main idea  Illustrations do not complement purpose of visual
Visual Appeal	20%	Outstanding use of colour, design, and space  Original and creative design  Overall design is pleasing and harmonious	Adequate use of colour, design and space  Design is adequate  Overall design is mostly pleasing and harmonious	Inappropriate use of colour, design, and space  Design lacks creativity  Lack of harmonious design in presentation	Little attempt to use colour, design and space appropriately  Design and presentation are not cohesive
Grammar	10%	Free of grammatical errors  Words are legible and pertinent to topic	Mostly free of grammatical errors  Most words are legible and pertinent to topic	Frequent grammatical errors  Presentation is illegible and confusing	Too frequent grammatical errors  Distractive elements make illustration ineffective

Comments:

Final Score:

# LESSON PLAN:

## Activity Three – Build an Aquaculture Business



Grade 11-12

### ABOUT THIS LESSON

This activity is designed to give students a basic introduction to Ontario’s aquaculture industry. Students will learn about what is aquaculture along with research and design their own aquaculture farming business.

### MATERIALS NEEDED

- Appendix A- Analyzing an Aquaculture Business
- Appendix B- Building an Aquaculture Business: Getting Started
- Appendix C- Building an Aquaculture Business: Figuring Out Who You Are, Your Goals and Objectives
- Appendix D- Building an Aquaculture Business: Put Your Business Plan Together
- Appendix E- Building an Aquaculture Business: Rubric
- Laptop, projector, projector screen
- Class-set of laptops for students
- YouTube video, From Egg to Plate Documentary, located at: <https://www.youtube.com/watch?v=sEVFKPQ8lh8>

### CURRICULUM EXPECTATIONS

#### SCIENCE

##### Environmental Science, Grade 11, University/College (SVN3M) Scientific Solutions to Contemporary Environmental Challenges

*By the end of Grade 11, students will:*

- B1.2 analyze ways in which societal needs or demands have influenced scientific endeavours related to the environment.

##### Environmental Science, Grade 11, University/College (SVN3M) Sustainable Agriculture and Forestry

*By the end of Grade 11, students will:*

- D1.1 evaluate, on the basis of research, a variety of agricultural and forestry practices with respect to their impact on the economy and the environment;
- D3.1 explain the basic principles of various agricultural and forestry practices, and identify regulations and regulatory bodies associated with these practices;
- D3.6 describe sustainable water-management practices in agricultural and forestry settings.

## BUSINESS

### Entrepreneurship: The Venture, Grade 11, College (BDI3C)

#### Enterprising People and Entrepreneurs

*By the end of Grade 11, students will:*

- describe the importance that local entrepreneurs have had on the community;
- use appropriate sources to identify the characteristics of potential target markets for their proposed good or service.

### Entrepreneurship: The Venture, Grade 11, College (BDI3C)

#### Ideas and Opportunities for New Ventures

*By the end of Grade 11, students will:*

- explain how new ventures have been developed in response to consumer needs or wants;
- describe how entrepreneurs have been agents of change;
- evaluate the opportunity or idea for their proposed venture to determine its viability.

### Entrepreneurship: The Venture, Grade 11, College (BDI3C)

#### The Benefits of a Venture Plan

*By the end of Grade 11, students will:*

- identify and describe the components of a venture plan.

### Entrepreneurship: The Venture, Grade 11, College (BDI3C)

#### Developing and Completing a Venture Plan for the Proposed Business

*By the end of Grade 11, students will:*

- identify and describe the applicable insurance and regulatory requirements that must be met in starting their proposed venture;
- determine the human resource needs for their proposed venture;
- describe the process involved in producing a new product or delivering a new service;
- determine the production process that is most appropriate for their chosen venture;
- determine the goods and potential supplies that are required for their chosen venture;
- compare ways in which a specific good or service can be distributed to the customers;
- identify the most appropriate method to deliver their good or service;
- identify sources and methods of financing their chosen venture;
- develop the overview of their venture plan;
- demonstrate the effective use of business communication techniques when developing, carrying out, and presenting their venture plan.

## TECHNOLOGICAL EDUCATION

### Green Industries, Grade 11, University/College (THJ3M)

#### Green Industry Fundamentals

*By the end of Grade 11, students will:*

- A1.2 identify geographical regions on the basis of classification criteria relevant to the green industries;
- A1.3 explain the relationship between the characteristics of different geographical regions and the key desirable characteristics of plan and/or animal groups within them;
- A3.3 identify a variety of structures used in the green industries, and explain how their structural features relate to their function;
- A3.4 demonstrate an understanding of correct procedures for the care and handling of plants and/or animals.

### Green Industries, Grade 11, University/College (THJ3M)

#### Green Industry Skills

*By the end of Grade 11, students will:*

- B1.5 demonstrate an understanding of and apply marketing techniques that are commonly used in the green industries.

### Green Industries, Grade 11, University/College (THJ3M)

#### Technology, the Environment and Society

*By the end of Grade 11, students will:*

- C1.2 analyse the effects of green industry activities on the environment in the past and in the present;
- C1.4 identify sustainable practices and guidelines that are currently applied within the green industries or may be applied in the future;
- C1.5 explain the environmental implications of using particular materials, products, processes, and disposal methods;
- C2.1 describe linkages between local communities and economies and the green industries;
- C2.2 analyse societal issues relating to the green industries, and identify ways of resolving them, taking a variety of perspectives into account.

### Green Industries, Grade 11, University/College (THJ3M)

#### Professional Practice and Career Opportunities

*By the end of Grade 11, students will:*

- D2.2 explain principles, concepts, and practices related to the marketing and distribution of commodity products and/or services;
- D3.1 describe careers in the green industries and the education, training, and certification required for entry into these occupations;
- D3.2 identify ways of acquiring knowledge and experience in green industry occupations.

### Green Industries, Grade 12, University/College (THJ4M)

#### Green Industry Skills

*By the end of Grade 12, students will:*

- B1.2 design and implement a management plan or site layout for a specific application.

## Green Industries, Grade 12, University/College (THJ4M) Technology, the Environment and Society

*By the end of Grade 12, students will:*

- C1.1 evaluate green industry operations and processes in terms of their impacts on environmental sustainability;
- C1.4 analyse ways of reducing negative or enhancing positive environmental consequences through the use of particular materials, products, processes, and disposal methods;
- C1.5 describe legislation, regulations, standards and guidelines relating to environmental protection that affect operations in the green industries;
- C2.1 analyse ways in which the green industries are affected by the social, economic, and cultural characteristics of the communities in which they operate.

## Green Industries, Grade 12, University/College (THJ4M) Professional Practice and Career Opportunities

*By the end of Grade 12, students will:*

- D3.1 identify careers in the green industries that require postsecondary education, and describe the nature of the work in these operations;
- D3.2 describe the educational programs, training, and certification needed for entry into a variety of green industry occupations requiring postsecondary education.

## TEACHING AND LEARNING STRATEGIES

### Hook

Write the word “business” on the board. Ask students to write on a sticky note and place it on the board a word or description that connects to any of the following:

- what is required to run a successful business;
- what they look for in a business or when buying a product; or
- something that describes what the word business means.

### Action 1: Introduction to an Aquaculture Business

Tell students they will be learning about business of aquaculture or fish farming. Tell students they will watch a documentary of From Egg to Plate: <https://www.youtube.com/watch?v=sEVFKPQ8lh8>. Ask students to fill out Appendix A: Analyzing an Aquaculture Business with 2-3 points that help to make it a successful business. Review the video as a class and allow students to share their thoughts around what is unique about Cooke’s Aquaculture and what strategies make the business successful.

### Action 2: Building a Fish Farm Business

Tell students that, in groups of 3-4, they will be making a business plan for their own aquaculture farm. Students will be required to research the industry, select a viable location in Ontario where they would build their facility, select what species they will be producing, and assess what requirements they must meet to ensure they are meeting government and provincial regulations as well as building a profitable business model.

Students must also create a 3-D model of the aquaculture facility.

Provide students 4-5 work periods to work on their handouts, 3-D model and build their presentation.

### Consolidation

Students will end this activity with presenting their business plan in the form of a PowerPoint presentation to the

class. Students will vote on what business they would invest in and explain why.

Complete the lesson by asking students what the challenges and rewards are to owning and operating your own business whether it be an aquaculture farm or something else.

## ASSESSMENT AND EVALUATION

Completion of Appendix A: Analyzing an Aquaculture Business.

Completion of Appendix C: Building an Aquaculture Business: Getting Started.

Completion of Appendix D: Building an Aquaculture Business: Figuring Out Who You Are, Your Goals and Objectives.

Completion and evaluation of Building an Aquaculture Farm Business presentation using Appendix E.

Completion of 3-D model.

## ENRICHMENT

Students can visit an aquaculture facility to learn about innovations and practices on the farm.

## APPENDIX A – ANALYZING AN AQUACULTURE BUSINESS

While watching the video, “From Egg to Plate”, fill out the below chart.

10 Steps to Building an Aquaculture Business	Describe what decisions were made to meet the specific step and make the business successful, challenged it, or were solutions to a problem.
1. Research the industry (i.e. what is already being done, what gap needs to be filled in terms of product availability and access).	
2. Get a good location for your farm	
3. Get a good source of water	
4. Choose the appropriate fish farm facility (e.g. net-pens, land-based recirculatory, land-based flow-through etc.)	
5. Decide the right aquatic species (e.g. trout, arctic char, shrimp etc.)	

## APPENDIX A – ANALYZING AN AQUACULTURE BUSINESS

While watching the video, “From Egg to Plate”, fill out the below chart.

10 Steps to Building an Aquaculture Business	Describe what decisions were made to meet the specific step and make the business successful, challenged it, or were solutions to a problem.
6. Understand fish feeds and feeding	
7. Start marketing your fish before they grow up (e.g. what consumers or markets will you target)	
8. Be business minded (e.g. create a business plan, think of solutions to a problem)	
9. Get good and practical fish farming training and education	
10. What makes the business unique?	

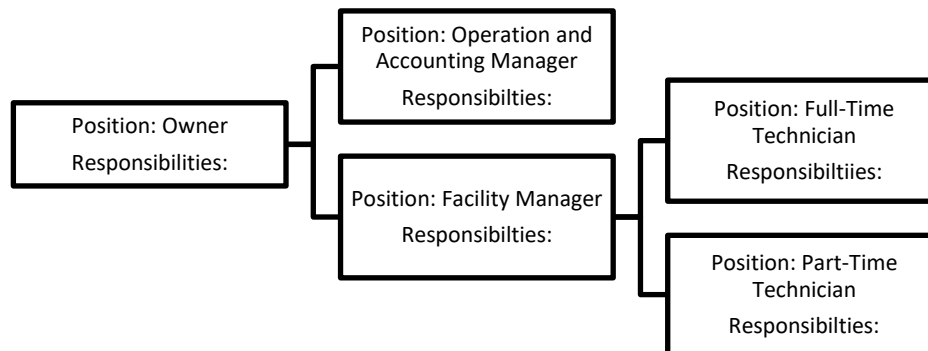


## APPENDIX B – BUILDING AN AQUACULTURE BUSINESS

### Part 1: The Task

In groups of 3-4, you will create a business plan for building an aquaculture business. You will present this business plan in the form of a PowerPoint presentation to the class. Below you will find all the requirements of your business plan.

1. **Introduction:** Name of your company, logo and mission statement.
2. **Business Profile:** Description of your business, where it is located geographically, description of the environment, the type of production facility, species being farmed, environmental challenges and rewards, 10-year timeline for goals and objectives along with what education is needed by you to run this business.
3. **Marketing Strategy:** Description of who is your target consumer, how you know you are filling a market gap or need, how you will get your product to the consumer along with an explanation of how you will market yourself to consumers (e.g. partnerships with community, education on property, social media presence etc.). Describe how your business is unique; what is its WOW Factor.
4. **Plan of Operation:** Draw an organizational structure of the people who will work at your aquaculture facility along with their job responsibilities. Please see below for an example:



5. **Financial Plan:** Who will you be getting money from to support your business? Will you be getting a loan or grant? Include who and where you will be getting money from and how much. Describe how this money will be paid back and how long it will take.
6. **3-D Model:** Showcase the 3-D model of your facility and highlight what it will be made from along with social, economic and environmental actions that you will be taking.
7. **Conclusion:** Summarize what you have to offer with 1-2 minutes sales pitch.

## APPENDIX C – BUILDING AN AQUACULTURE BUSINESS

### Part 2: Getting Started

In groups of 3-4, research the below information to begin the planning process of your business. Write responses in spaces provided below.

1. In what geographic region do you want to operate your facility and why? (i.e. include name of body of water whether it be a lake, river or stream, why you would want to be in that area, cost to buy land in that area etc.).

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2. What aquatic species do you want to grow and why? Is your goal to be a hatchery and supply fish to another company who will finishing growing the fish to adulthood?

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3. How long will it take to for the aquatic species to reach the age required for gaining a profit?

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4. What type of production systems will you be using? Circle the response that applies. Explain the challenges and rewards for the production system that you have selected. Highlight how you will innovate solutions to potentially challenges you will face.

a. Net-pens

c. Flow-through recirculatory system

b. Flow-through land-based system

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5. What kind of labour is available to you for your full-time operation? How many people do you think you will need? Circle what applies and write on the space provided how many people that will be needed for your operation as well as how you will recruit them.

- a. Self
- b. Family and friends
- c. Hired Hands (e.g. co-op students, immigrants, seasonal labour etc.)

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6. What market coverage are you considering? Circle what applies and write on the space provided why you chose those specific options and what strategies would be needed to grow enough product to meet that demand.

- a. Local
- b. Province-wide
- c. National
- d. International

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7. Where can you receive training on growing aquatic species? How long with it take and how much will it cost.

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8. In what form will you sell your product? Circle the response that applies to your business model. In the space provided, describe the challenges and rewards to selling your product in a specific form in terms of financial reward, social perception and potential competition.

- a. Live
- b. Whole
- c. Processed

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9. How will you get your product to market? Circle the response that applies to your business model. In the space provided, describe the challenges and rewards to selling your product in a specific form in terms of financial reward, social perception and the environment.

- a. On-farm sales
- b. Deliver to retailers
- c. Sell to Wholesale/Distributor

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## APPENDIX D – BUILDING AN AQUACULTURE BUSINESS

### Part 3: Figuring Out Who You Are, Your Goals and Objectives

In groups of 3-4, research the below information to figure out the goals and objectives of the business. Write responses in spaces provided below.

1. What name and message do you want the public to associate with you? In the below space provide the name of your company, draw a logo design and write the mission of your company.

a. Name of Company: \_\_\_\_\_

b. Logo Design:

c. Mission of the Company. Please note that a mission statement is the vision of what a company is, what it is to become, and what it stands for. It is generally 3-5 sentences. As an example, here is the mission statement of Starbucks: "Our mission: to inspire and nurture the human spirit – one person, one cup and one neighborhood at a time". Write your business' mission statement in the below space.

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2. What are the goals of your aquaculture business? What is your timeline to achieving these goals? Consider the following when building your timeline: acquiring licensing and certifications for building aquaculture facility, buying and locating the property or space needed, timelines for growth of the aquaculture species, when will a profit be seen from the aquaculture product, partnerships to be formed in the community it is located, and future growth. Draw a 10-year timeline for your business, with descriptions at each year of what you are doing in the space provided below.

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Timeline:

## APPENDIX E – BUSINESS PLAN PRESENTATION RUBRIC

Success Criteria	Exceptional (4 points)	Admirable (3 points)	Marginal (2 points)	Not There Yet (1 point)
<b>Mission Statement, Company logo and company name</b>	Mission statement, company logo and name generated excitement, were creative and provided a clear cohesive overview as well as direction of the business.	Mission statement, company logo and name were creative and provided a cohesive overview as well as direction of the business.	Mission statement, company name and logo were lacking and did not provide a clear overview of the business or direction.	Mission statement, company name and logo does not clearly connect to the business or suggest direction.
<b>Business Profile</b>	Description of the business profile along with product and/or service and its unique features was highly effective and detailed. All requirements were included and exceeded expectations.	Description of the business profile along with product and/or service and its unique features was effective and detailed. All requirements were included.	Description of the business profile along with product and/or service and features were provided, but without sufficient detail. Only some requirements were included.	Description of the business profile along with product and/or service and its features were missing details and/or very limited. Few to none of the requirements were included.
<b>Market Strategy</b>	Market analysis identified and described target consumer and competitors, as well as industry outlook. Strategy for reaching market through a variety of mediums is included with excellent detail.	Market analysis is mostly identified and described target consumer and competitors, as well as industry outlook. Strategy for reaching market through a variety of mediums is included with detail.	Market analysis is somewhat identified and described target consumer and competitors, as well as industry outlook. Strategy for reaching market through a variety of mediums is somewhat included.	Market analysis is missing details and does not clearly identify and describe target consumer and competitors, as well as industry outlook. Strategy for reaching market along through a variety of mediums is missing or lacking detail.
<b>Operation Plan</b>	Detailed visual of organizational chart is included and contains all required information.	Visual of organizational chart is included and contains all most of the information.	Visual of organizational chart is included and contains all some of the information.	Visual of organizational chart is missing.
<b>Financial Plan</b>	Possible financing sources were identified along with details around total money and plan for paying back.	Possible financing sources were identified along with some details around total money and plan for paying back.	Possible financing sources were somewhat identified along with a few details around total money and plan for paying back.	Information missing in relation to possible financing sources along with details around total money and plan for paying back.
<b>3-D Model</b>	3-D model was expertly built and effectively showcases the future facility. Model shows ingenuity and innovation based on research.	3-D model was built and showcases the future facility. Model shows good ingenuity and innovation based on research.	3-D model was built and showcases the future facility. Model shows some attempt to include informed research.	3-D model is missing or not complete.
<b>Conclusion- Final Pitch</b>	Final pitch was brief, creative and effectively summarized key aspects of the business.	Final pitch was brief and summarized most key aspects of the business.	Final pitch summarized a few key aspects of the business.	Final pitch was missing or do not connect to the business.
<b>Professionalism</b>	Presentation was presented with conviction, creativity and highly effective in describing the overall business plan.	Presentation was presented with conviction and was mostly effective in describing the overall business plan.	Presentation was somewhat effective and included a few details of the business plan.	Presentation was not effective, and most details of business plan was missing.

Comments:

Final Score:

## CITATIONS

- BC Dairy Association. (2014). BC at the Table: Salmon. Retrieved from [https://www.bcaitc.ca/sites/default/files/resources/salmon\\_teacher\\_guide.pdf](https://www.bcaitc.ca/sites/default/files/resources/salmon_teacher_guide.pdf).
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## ADDITIONAL RESOURCES: WEBSITES FOR TEACHERS AND STUDENTS

Agriculture and Agri-Food Canada .....	<a href="http://www.agr.gc.ca">www.agr.gc.ca</a>
Alma Aquaculture Research Station.....	<a href="http://animalbiosciences.uoguelph.ca/aquacentre/aars/aars.html">http://animalbiosciences.uoguelph.ca/aquacentre/aars/aars.html</a>
Canadian Aquaculture Industry Alliance .....	<a href="https://www.aquaculture.ca/">https://www.aquaculture.ca/</a>
FAO: Aquaculture .....	<a href="http://www.fao.org/fishery/aquaculture/en">http://www.fao.org/fishery/aquaculture/en</a>
Fisheries and Oceans Canada .....	<a href="https://www.dfo-mpo.gc.ca/stats/aquaculture-eng.htm">https://www.dfo-mpo.gc.ca/stats/aquaculture-eng.htm</a>
Fisheries and Oceans Canada: Teacher Resources.....	<a href="https://www.pac.dfo-mpo.gc.ca/education/resources-ressources-eng.html">https://www.pac.dfo-mpo.gc.ca/education/resources-ressources-eng.html</a>
Foodland Ontario .....	<a href="https://www.ontario.ca/foodland-ontario">https://www.ontario.ca/foodland-ontario</a>
Health Canada .....	<a href="http://www.hc-sc.gc.ca">www.hc-sc.gc.ca</a>
Loblaws.....	<a href="https://www.loblaws.ca/">https://www.loblaws.ca/</a>
NY Sea Grant .....	<a href="https://seagrant.sunysb.edu/articles/t/seafood-safety-and-technology-publications">https://seagrant.sunysb.edu/articles/t/seafood-safety-and-technology-publications</a>
Ontario Aquaculture Association .....	<a href="https://ontarioseafoodfarmers.ca/">https://ontarioseafoodfarmers.ca/</a>
Ontario Ministry of Agriculture, Food and Rural Affairs .....	<a href="http://www.omafra.gov.on.ca">www.omafra.gov.on.ca</a>