Farming a Plateful

Integrated Multi-trophic Aquaculture (IMTA)

Wow – that's a fancy term that simply means farming species together that are from the same food chain. Researchers and aquaculture technicians are developing more sustainable aquaculture that is based on the idea of closed loop farming. In the water, it means farming species in combinations that help each other to grow and Innovations in Canada to keep their environment in balance. The species that are grown together are decided by normal food chains. One species provides food or benefit for another. For example, fish, algae, oysters. The farmer feeds the salmon, the algae consume the fish waste, the oysters are filter feeders that eat the algae and keep the water environment clean.

In Canada, IMTA is still being researched because, while it's a great idea, it is not easy to keep the system in perfect balance. The systems need enough of each species to keep the water clean and to keep each thing fed – but small changes (*like temperature, rain, and growth*) can throw it out of balance.

Design Challenge

Design your own example of a multi-trophic aquaculture system

Tools and supplies you need: Paper, markers, various craft supplies (optional)

Directions:

Step 1 – Get together in a small group of 3-4 people.

Step 2 – Consider some popular fish and seafood (or freshwater) products what we eat and use. Do some research to find out what other species are part of the food-chain and what species help to keep the environment in balance

Step 3 – Pick at least three different species that are part of the natural food chain (may include fish, shellfish, sea plants and bivalves). These will be the basis of your IMTA environment

Step 4 – Create a prototype of your IMTA, this could be a drawing, an illustration on a computer, a 3D model in a shoe box, or clay figures in a plastic pop bottle. Use your imagination and a medium that best shows off your design.

Step 5 – Once you've got your design share it with another group and ask each other questions. Some good ones to start might be:

Why did you choose those species?
What is the food chain of your system?
What are some of the ways the system might get out of balance?
How might you be able to prevent or solve that if it happens?

Step 6 – Designing a solution is all about "iteration" or repeating the process with small improvements. Based on your conversation with the other group, try to adapt your design to include some of the ideas that you learned and discussed.

Step 7 – If you have time, it's a great idea to repeat steps five and six with other groups to improve your design

Step 8 – Once you're happy with your design it's time to "pitch" your idea to the class and explain your design and the reasons behind it.

For more design challenges and activity ideas check out the COVE website at: https://coveocean.com/learning-tools/

Curriculum Outcomes

Technology 7 & 8- Renewed:

Outcome: Learners will implement the design process in relation to the concept of Netukulimk
Outcome: Learners will construct a solution to a design challenge

Technology 9:

GCO1: Outcome: Learners will construct a solution to a design challenge
5.1 work independently, co-operatively, and collaboratively to solve technological problems

Science GCOS:

GCO1: Students will develop an understanding of the nature of science and technology, of the relationships between science and technology, and of the social and environmental contexts of science and technology.

GCO2: 2. Students will develop the skills required for scientific and technological inquiry, for solving problems, for communicating scientific ideas and results, for working collaboratively, and for making informed decisions.

Grade 7 Specific Outcomes

•Identify the roles of producers, consumers, and decomposers in a local ecosystem and describe both their diversity and their interactions (304-2)
•Describe how matter is recycled in an ecosystem and evaluate potential applications of energy transformations (306-2, 210-2)

Grade 8:
• survey and generalize strengths and weaknesses of science and
technologies, including Canadian,
that have improved and that support research and development {110-8, 112-5, 210-3, 113-10)