



Farming the Ocean

**Perry Raso
Matunuck Oyster Farm
Rhode Island**

Perry Raso started digging for clams when he was just 12 years old. “I knew that the harder I worked, the more money I’d make,” he says. “I liked being able to determine how much I made by how hard I worked.” When it was time for him to go to college, he knew he wanted to learn how to provide seafood for people. So he studied aquaculture and fisheries technologies at the University of Rhode Island; after that, he was ready to start his own business. He started small, with a one-acre sustainable farm where he grew oysters and sold them at the local farmers’ market. His business grew by leaps and bounds: today, in addition to running an oyster bar, Perry devotes a lot of his energy to teaching young people about sustainable aquaculture. “Many people see it as a niche industry,” he says. “But I want to change that. It should be viewed in the same way as sustainable agriculture. Then we can really make an impact.”

Values : Entrepreneur Sustainability Initiative Education Environmentalist

Lessons Learned

- Hard work, passion, and creativity lead to innovation. And innovation can make it possible to be both professionally successful and environmentally responsible.
- Hard work and a dream are not enough to achieve success. You have to educate yourself, and not be afraid to innovate in your field.
- You can build a successful business by working to preserve the environment and using the natural resources available in your community responsibly, instead of depleting them.

Language Arts

- What type of business would you like to be in? Think of ways you might want to open a business, and do it in a sustainable and environmentally friendly way. Write a cover letter introducing yourself to potential investors. Include information about the type of business you plan to start; the skills and experience you have that will be necessary for the business to succeed; and what will make your company better than any other company in the

same field. It's important to cover all these points, but the people who will be reading it are probably very busy.

So it must also be brief.

- After reading this article <https://blog.pandadoc.com/how-to-write-a-proposal/> write your own business proposal. It should include the cover letter you wrote for the previous activity. Then, for this exercise, focus on creating the following: Table of Contents, Executive Summary, and body of the Proposal, as explained in the article.
- Create a presentation on aquaculture: what it is, the preferred methods used in aquaculture, and why it is considered a sustainable practice.

STEM Activities

- For this activity, students will learn the importance of aquaculture in the sustainable fishing industry by playing [Eco Ocean](#): an overfishing simulation game. They will need to answer the following questions:
 - What was your goal during this simulation? How did you attempt to accomplish your goal? How could you change your fishing technique to increase the number of fish you caught?
 - There was a surprise factor that you didn't know about before you started fishing. What was this factor? How did this factor impact your fishing success?
 - Now that you know about this additional factor, complete the fishing simulation again. How will you change your fishing practices this time?
 - How many fish did you catch in your second simulation? How did you place in comparison to the other boats?
 - Why do you think it is important to consider both the number of fish that you caught and your sustainability rating when scoring this game?
- This resource, from the [AQUA Project](#), will give students a hands-on introduction to aquaculture. In this activity, students will design, create, and maintain an aquaculture farm. The activity starts on Section 3, page 11. (Note: This is a long-term project.)
- Coastal erosion is the process by which wave action wears away beaches and shorelines; it results in loss of property for landowners, and millions of dollars' worth of damages each year. In this activity, students will develop a cost-effective and environmentally safe engineering solution to show how aquaculture operations can be strategically developed to reduce shoreline damage. Link: <https://extension.umaine.edu/4h/stem-toolkits/innovations-in-aquaculture/activity-5/>

Sustainability Innovations

- Perry had the perfect storm of drive and determination, along with an ideal geographical location to give him the opportunity to succeed with the Matunuck Oyster Farm. Some individuals are not as lucky; but they can still take advantage of created aquaculture systems to cultivate shrimp, fish, and oysters. There are many challenges with this process, including water organism diseases. [Viaqua Therapeutics](#) is one of the leaders in the delivery of oral vaccinations to prevent disease in fish.
- Due to lack of area and space for aquaculture and the threat of waste, [Better Fish Farming](#) was created as a project of the Recirculating Farms Coalition to emphasize the usage and efficiency of closed-looped fish farming. [Atlantic Sapphire](#) is one of the leaders of this project, which has created "blue houses" to farm and cultivate Atlantic salmon.
- Perry has a beautiful aquaculture farm because of his ability to use a natural setting, but others have developed the use of technologies to assist them in less conducive conditions. [Innovasea](#) is a company that has found success within open ocean aquaculture, land-based aquaculture, and aquaculture intelligence.

Sustainable Career Pathways

- **Diver.** Before he created his shellfish farm, Perry harvested shellfish by scuba diving. Divers are in demand for many other projects as well--from [building offshore wind turbines](#), to reseeding coral reefs, to helping to conduct

scientific research and archeology. If you love diving, there's potential to make a career out of it! [Read about some diving jobs here.](#)

- **Sustainable Aquaculturalist.** One of the great ways to heal the ocean is by [growing kelp and shellfish to filter and clean the ocean](#). Farming the seas, [or aquaculture](#), is a growth industry, as is working for companies that help seed aquaculture operations. An aquaculturist oversees the breeding and growing of fish, manages staff, and/or operates aquacultural systems. [Learn more here.](#)
- **Robotacist.** If you love the ocean (and robots), perhaps you should be a robotacist. Robotacists are designing autonomous underwater vehicles that will be the future of ocean exploration, aquaculture, and coral restoration. This is an exciting new sector of the Blue Economy that is growing, and that currently lacks a sufficient number of qualified employees. Even if you don't like oceans, there are dozens of fields in which robotacists are needed. Interested? [Learn more about entering the field of robotics here.](#)
- **Sustainable Restaurateur.** It's possible that it's never been harder to be a restaurateur than now, due to the COVID pandemic. But for those who love the idea of managing a restaurant, especially one that draws on sustainable ingredients and helps people understand that healthy and sustainable food is delicious, there are many leaders to draw inspiration from. For example, Alice Waters opened her [trailbreaking restaurant Chez Panisse](#) in Berkeley, California, in 1971. And in 2021, Ona, a restaurant in a small village in southwestern France, became [the first vegan restaurant to receive a Michelin star](#). Perry's restaurant, [Matunuck Oyster Bar](#), has shown how obtaining ingredients from local sources and integrating those sources into the business plan can be successful. Perry now has a Farm-(and Sea)-to-Table enterprise, drawing from his vegetable and oyster farms. Want to learn more about being a restaurateur? [Read here.](#)

Call to Action: Clean up a beach in your area and support organic farm-to-table businesses in your community. To learn about aquaculture, follow Matunuck Oyster on Twitter <https://twitter.com/MatunuckOyster?s=20> and/or Instagram https://www.instagram.com/p/ByY8TFWH_ni/?igshid=btaxwarqxpqm

Standards:

California:

- **ELA:**
- **W.11-12.1:** Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence. a. Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences claim(s), counterclaims, reasons, and evidence. b. Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant evidence for each while pointing out the strengths and limitations of both in a manner that anticipates the audience's knowledge level, concerns, values, and possible biases. c. Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims. d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. e. Provide a concluding statement or section that follows from and supports the argument presented. f. Use specific rhetorical devices to support assertions (e.g., appeal to logic through reasoning; appeal to emotion or ethical belief; relate a personal anecdote, case study, or analogy). CA
- **WHST.11-12.1:** Write arguments focused on discipline-specific content. a. Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence. b. Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form that anticipates the audience's knowledge level, concerns, values, and possible biases. c. Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims. d. Establish and maintain a formal style and objective tone while

attending to the norms and conventions of the discipline in which they are writing. e. Provide a concluding statement or section that follows from or supports the argument presented.

- **W.11-12.2:** Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content. a. Introduce a topic or thesis statement; organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension. CA b. Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic. c. Use appropriate and varied transitions and syntax to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts. d. Use precise language, domain-specific vocabulary, and techniques such as metaphor, simile, and analogy to manage the complexity of the topic. e. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. f. Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).
- **W.11-12.3:** Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences. a. Engage and orient the reader by setting out a problem, situation, or observation and its significance, establishing one or multiple point(s) of view, and introducing a narrator and/or characters; create a smooth progression of experiences or events. b. Use narrative techniques, such as dialogue, pacing, description, reflection, and multiple plot lines, to develop experiences, events, and/or characters. c. Use a variety of techniques to sequence events so that they build on one another to create a coherent whole and build toward a particular tone and outcome (e.g., a sense of mystery, suspense, growth, or resolution). d. Use precise words and phrases, telling details, and sensory language to convey a vivid picture of the experiences, events, setting, and/or characters. e. Provide a conclusion that follows from and reflects on what is experienced, observed, or resolved over the course of the narrative.
- **SL.11-12.4:** Present information, findings, and supporting evidence (e.g., reflective, historical investigation, response to literature presentations), conveying a clear and distinct perspective and a logical argument, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks. Use appropriate eye contact, adequate volume, and clear pronunciation. CA a. Plan and deliver a reflective narrative that: explores the significance of a personal experience, event, or concern; uses sensory language to convey a vivid picture; includes appropriate narrative techniques (e.g., dialogue, pacing, description); and draws comparisons between the specific incident and broader themes. (11th or 12th grade) CA b. Plan and present an argument that: supports a precise claim; provides a logical sequence for claims, counterclaims, and evidence; uses rhetorical devices to support assertions (e.g., analogy, appeal to logic through reasoning, appeal to emotion or ethical belief); uses varied syntax to link major sections of the presentation to create cohesion and clarity; and provides a concluding statement that supports the argument presented. (11th or 12th grade) CA
- **STEM:**
- **HS-LS2-7:** Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
- **HS-ESS3-3:** Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.
- **HS-ETS1-1:** Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
- **HS-ETS1-3:** Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.
- **HS-ETS1-4:** Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.

Massachusetts:

- **ELA:**
- R.PK-12.10: Independently and proficiently read and comprehend complex literary and informational texts.
- W.PK-12.2: Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
- RL.11-12.10: Independently and proficiently read and comprehend literary texts representing a variety of genres, cultures, and perspectives and exhibiting complexity appropriate for the grade/course. See information on [qualitative and quantitative dimensions of text complexity](#).
- RI.11-12.10: Independently and proficiently read and comprehend literary nonfiction representing a variety of genres, cultures, and perspectives and exhibiting complexity appropriate for the grade/course. (See more on [qualitative and quantitative dimensions of text complexity](#).)
- W.11-12.1: Write arguments (e.g., essays, letters to the editor, advocacy speeches) to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
- W.11-12.1.d: Establish and maintain a style appropriate to the audience and purpose (e.g., formal for academic writing) while attending to the norms and conventions of the discipline in which they are writing.
- W.11-12.2: Write informative/explanatory texts (e.g., essays, oral reports, biographical feature articles) to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.
- W.11-12.2.d: Use precise language, domain-specific vocabulary, and techniques such as metaphor, simile, and analogy to manage the complexity of the topic.
- W.11-12.2.e: Establish and maintain a style appropriate to audience and purpose (e.g., formal for academic writing) while attending to the norms and conventions of the discipline in which they are writing.
- W.11-12.3: Write narratives to develop experiences or events using effective literary techniques, well-chosen details, and well-structured sequences.
- W.11-12.4: Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in Writing Standards 1-3.)
- W.11-12.6: Use technology, including current web-based communication platforms, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.
- W.11-12.7: Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
- SL.11-12.4: Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, vocabulary, substance, and style are appropriate to purpose, audience and a range of formal and informal tasks. (See grades 11-12 Language Standards 4-6 for specific expectations regarding vocabulary.)
- SL.11-12.5: Make strategic use of digital media (e.g., audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.
- RCA-ST.11-12.10: Independently and proficiently read and comprehend science/technical texts exhibiting complexity appropriate for the grade/course. (See more on [qualitative and quantitative dimensions of text complexity](#).)
- WCA.11-12.1: Write arguments focused on *discipline-specific content*.
- WCA.11-12.2: Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
- WCA.11-12.2.a: Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include text features (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.
- WCA.11-12.4: Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience

- **STEM:**
- **HS.LS.2.7:** Analyze direct and indirect effects of human activities on biodiversity and ecosystem health, specifically habitat fragmentation, introduction of non-native or invasive species, overharvesting, pollution, and climate change. Evaluate and refine a solution for reducing the impacts of human activities on biodiversity and ecosystem health. * Clarification Statement: Examples of solutions can include captive breeding programs, habitat restoration, pollution mitigation, energy conservation, and ecotourism.
- **HS.ESS.3.3:** Illustrate relationships among management of natural resources, the sustainability of human populations, and biodiversity. Clarification Statements: Examples of factors related to the management of natural resources include costs of resource extraction and waste management, per capita consumption, and the development of new technologies. Examples of factors related to human sustainability include agricultural efficiency, levels of conservation, and urban planning. Examples of factors related to biodiversity include habitat use and fragmentation, and land and resource conservation.
- **HS.ETS.1.1:** Analyze a major global challenge to specify a design problem that can be improved. Determine necessary qualitative and quantitative criteria and constraints for solutions, including any requirements set by society. * Clarification Statement: Examples of societal requirements can include risk mitigation, aesthetics, ethical considerations, and long-term maintenance costs.
- **HS.ETS.1.3:** Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, aesthetics, and maintenance, as well as social, cultural, and environmental impacts.
- **HS.ETS.1.4:** Use a computer simulation to model the impact of a proposed solution to a complex real-world problem that has numerous criteria and constraints on the interactions within and between systems relevant to the problem.
- **HS.ETS.1.6:** Document and present solutions that include specifications, performance results, successes and remaining issues, and limitations.

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