| **Lesson Planner Template (Launch, Explore, Summarize)**  Topic: Anatomy Lesson: Oyster Dissection Lesson Length: 60 mins |
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| **Part One: Goals and Objectives** |
| *What are the big ideas of the investigation?* |
| Organ function and systems- Where and what they are and why they are important  How oysters can survive out of the water for significant lengths of time  Diploid vs triploid broodstock and growth |
| *What will students know or be able to do when this investigation is completed?* |
| Shuck an oyster  Identify major organs and their function  Students will know how long oysters can survive out the water in different conditions  Students will be able to explain how oyster growers select traits for maximum growth (consumption rather than reproduction) |
| **Part Two: Teaching Model** |
| **Launch (5-10 minutes)** |
| *How will I launch this problem?* |
| Ask students to observe the oyster  What do you notice?   * Describe the color * Describe the textures * Is there a top or bottom? How do you know?   Now that you’ve observed the outside, what do you expect to see on the inside? |
| *What prior knowledge do my students need?* |
| Teacher  Are there any shellfish allergies?  Know and recognize oyster anatomy and organ function  Know the difference between diploid vs triploid oysters, how triploids are created, and why they are used  How to shuck an oyster  Pest management in oyster farming  Student  Life cycle of an oyster (how the reproduce, where they live, what they eat)  Body systems- how do various organs work, why are they important  Reproductive strategies |
| **Explore (15 - 45 minutes)** |
| *How will I organize the students to explore this problem?*  *(Individuals/Groups/Pairs)* |
| *What materials will students need to encourage diverse thinking and problem solving?* |
| Shucking knife, rag, sharp dissection scissors, tweezers, laminated copies of oyster anatomy, blank copies of oyster anatomy sheets, science journals, colored pencils |
| *What are different strategies I anticipate them using?* |
| Some students will draw what they see, others will label blank anatomy diagrams, based on their interest and comfort with anatomy  Students will open oysters and be asked to simply observe and gently prod.  In order to guide their inquiry, don’t offer any dissection tools until the group has discussed what they see, just using their fingers to shift parts of the oyster  After given the go-ahead to continue the dissection, some will meticulously remove each organ, others will not want to touch it, and some will cut things apart randomly- provide a dissection diagram. |
| *What kinds of questions can I ask?* |
| What do you notice/see? Ask each group to tell everyone something they notice- without worrying about identifying the organ. Help each group/have them help each other find that ‘object’ on their oyster  How do we know if something is made of concrete? What does concrete do? Knowing that, what evidence do you see that oysters ‘concrete’ together? How could that benefit the oysters?  Do you think you have a diploid or triploid oyster? Based on what evidence?  Can you trace how food moves through the digestive system? How is that similar to you? How is it different?  What part of an oyster do we eat? What parts don’t we eat? Why? |
| **Summarize (15-25 minutes)** |
| *How can I orchestrate the discussion so the students summarize the thinking in the problem?* |
| What similarities and differences in body systems exists comparing people and oysters?  How do their adaptations help them survive in their habitat? How does it help them survive out of the water for periods of time? How does this adaptation make it easier for farmers to grow oysters and help deal with biofouling?  How do oysters reproduce? |
| *What scientific knowledge and processes need to be drawn out and emphasized?* |
| Can survive out of the water for extended time  What conditions do they need to grow? (Be in the water, in certain temperature ranges, with access to oxygen and food)  Organ Identification and how to perform a neat dissection? |
| **Next Steps - additional problems, homework, independent projects** |
| *Which investigations are appropriate for my students to do after the investigation?* |
| Study population growth and doubling time of bacteria and growing conditions for food condiments. How can this affect human health?  Investigate crossing a tetraploid with a diploid to get a triploid  How can we engage in bioremediation of water quality by oysters through filter feeding  How can oysters be used to rebuild physical coastal structures? |
| **Resources:**  Billion Oyster Project: [Ecosystem Engineers](https://static1.squarespace.com/static/5c5604249b8fe80245a0d052/t/5e3af96365c5eb6706ce0fd2/1580923270611/BOP-ConEd-Workbook.pdf) (Background Information and Dissection Instructions)  North Carolina Environmental Quality: [Interest in Shellfish Aquaculture Leads to Misconceptions about Triploid Oysters](https://www.deq.nc.gov/about/divisions/marine-fisheries/news-media/insight-newsletter/may-2018/interest-shellfish-aquaculture-leads-misconceptions-about-triploid-oysters#:~:text=The%20benefits%20of%20triploid%20oysters,expend%20any%20energy%20in%20reproducing.) (Background Information)  Pacific Shellfish Institute: [What are the body parts of an oyster?](https://www.pacshell.org/pdf/ACTIVITY_OysterAnatomy.pdf) (Dry Dissection)  Harte Research Institute: [Oyster Anatomy and Aquarium Demonstration](https://www.harteresearch.org/sites/default/files/inline-files/Oyster-Anatomy.pdf) (Dry Dissection) |