| **Lesson Planner Template (Launch, Explore, Summarize)**Topic: Anatomy Lesson: Oyster Dissection Lesson Length: 60 mins |
| --- |
| **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 importantHow oysters can survive out of the water for significant lengths of timeDiploid vs triploid broodstock and growth |
| *What will students know or be able to do when this investigation is completed?* |
| Shuck an oysterIdentify major organs and their functionStudents will know how long oysters can survive out the water in different conditionsStudents 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 oysterWhat 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?* |
| TeacherAre there any shellfish allergies?Know and recognize oyster anatomy and organ functionKnow the difference between diploid vs triploid oysters, how triploids are created, and why they are usedHow to shuck an oysterPest management in oyster farmingStudentLife cycle of an oyster (how the reproduce, where they live, what they eat)Body systems- how do various organs work, why are they importantReproductive 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 anatomyStudents 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 oysterAfter 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 oysterHow 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 timeWhat 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 triploidHow can we engage in bioremediation of water quality by oysters through filter feedingHow 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) |