

Anatomy & Life Cycle

Summary: In this hands-on lesson, students observe and draw the external and internal anatomy of an oyster - with the option to use video and images, or dissect an oyster. They use informational cards to help them identify each body part, and build an understanding of each structure's unique job. In the end, students synthesize in writing how the different parts of the oyster's anatomy work together to help its body function.

Outline

- **Activate prior knowledge about oysters (5 min)**
- **Observe oyster external anatomy (10 min)**
- **Observe & gather information about oyster internal anatomy (30 min)**
- **Discuss how structures interact (30 min)**
- **Write to explain how oysters' organs work together. (15 min)**

LESSON OVERVIEW

Objectives (Students will be able to...)

- Create a labeled model of an oyster's organs in order to identify how they work together in systems with specific functions.

Standards

- HS-LS1-2: Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms

BOP Connections

- ORT or ORS: Your oysters will generally have their shells shut. This lesson can help students explore what's going on inside the shells.
- Ecosystem Engineers Unit: The lesson "[What Happens When Oysters Eat](#)" goes into more depth about the digestive system and process.
- Spat Tag: This [game](#) is a variation on freeze tag, that models the oyster life cycle and how it is able to survive at each stage.
- Living Breakwaters Unit: The lesson "[Why do young Living Breakwaters Creatures Look so Strange?](#)" explores different species' life cycles. "[Metamorphosis](#)" explores the evolutionary benefits and drawbacks to different stages

BEFORE YOU GET STARTED

Supplies

- [Grades 9-12: Slides](#)
- [Grades 9-12: Handout](#)
- [Grades 9-12: Anatomy Structure Cards](#)
- If doing dissection:
 - Plates
 - Toothpicks
 - Paper towels
- If doing paper model:
 - Scissors (if doing paper model)
 - Brass fastener

Tips for Teachers

- Review with students:
 - The hierarchical organization of living things (cell - tissue - organ - organ system - organism). This lesson focuses on how organs work together as systems, but does not touch upon the structure at the cellular or tissue level.
- Decide:
 - Do you want students to do a dissection in small groups, watch you do a demo dissection, or not at all? The Anatomy Structure Cards can also be used by just looking at the images on each card, rather than an accompanying live oyster. If you do not want students to do a dissection, here are some alternatives to exploring oyster anatomy:
 - [Guided Oyster Dissection video](#) (start at 0:21)
 - [Virtual Anatomy Lab](#) (by Maryland Sea Grant)
 - [Paper Oyster Anatomy](#) - make a paper model using simple materials
 - What are your expectations for how students will interact with the oysters? There are some examples on the slides, or come up with your own or co-create with students.
- Heads up:
 - Students may be surprised that oysters are alive, since they seem like rocks and don't move or have many recognizable body structures. They may also be surprised that oysters share many structures and types of body systems with humans..
 - Oysters have gonads, an anus and a rectum, just like humans. Some students may find this funny to talk about. Consider naming this up front, acknowledging any feelings students may have (silliness, discomfort, etc), and establishing a focused tone.
 - Check for shellfish allergies! Some students are allergic only when eating shellfish, while others may be allergic by contact.
 - If you choose to dissect oysters, practice shucking one yourself and exploring the anatomy ahead of time. When shucking, separate the tissue from the flatter shell and remove it. The oyster internal body will sit inside of the cupped shell.

Materials Preparation

- You may want to shuck the oysters ahead of time, and leave one shell on top during the external observations.
- Print and cut out enough copies of the Anatomy Structure Cards for each small group. You may want to laminate them, especially if you do a dissection.

Vocabulary

- Organ: a body structure made of tissues that does a specific function (job)
- Organ system: a group of organs that work together to perform a specific function (job)

INSTRUCTION PLAN

OPENING:

Activate prior knowledge about oysters. (5 min)

1. **Show:** An image of an oyster or hold up a real one. [slide 2]
 - **Ask:** *What do you think this is?*
2. **Explain:** This is an oyster! **Ask:** [slide 2]
 - *What do you think the oyster looks like inside of the shell?*
 - *What body parts do you think oysters have?*
 - *Do you think humans have anything in common with oysters?*
 - *Are oysters alive? Why do you think that?*
3. **Frame:** Today we'll learn more about oysters' anatomy, and the different parts of their body and how they work together. We'll start with the outside of the oyster.
 - **Define:** Anatomy - the structure (body parts) of living things and how they interact as a whole system [slide 3]

ACTIVITY:

Observe oyster external anatomy. (10 min)

1. **Share:** Expectations for how to safely engage with the oyster, or co-create them with students. [slide 4]
2. **Facilitate:** Distribute an oyster (alternatively, play the beginning of the dissection video or distribute images of the outside of an oyster) to each small group of students only after they understand what they need to do for Part 1 of their [Handout](#). [slide 5]
 - Students carefully touch and closely observe the outside of the oyster
 - Record external observations and make a sketch of both sides of the oyster
 - Answer the "Consider" questions on the handout
3. **Discuss as a whole group:** After students complete Part 1 of their handout...[slide 6]
 - *What do you notice about the external (outside) part of the oyster?*
 - *Does it remind you of anything?*
 - *Do both sides look the same or different? How so?*
4. **Distribute:** 1 "Shell" card from a set of [Anatomy Structure Cards](#) to each small group. [slide 7]

- **Record:** Students complete the “Action” and read the “Information” on the card to learn more about the shell. Then, label the structures’ listed on the card on their external anatomy sketch.

Observe & gather information about oyster internal anatomy. (30 min)

1. **Frame:** There’s a lot going on inside this hard external shell!
 - **Ask:** *What do you think you might see inside?*
2. **Facilitate:** Remind students of expectations for interacting with the oyster. Distribute a shucked oyster (alternatively, display or provide a photo or continue playing the dissection video) only after they understand what they need to do. Students carefully observe the inside of the oyster, and record observations and make a sketch of the internal anatomy on Part 2 of their handout. [slide 8]
3. **Discuss as a whole group:** After students complete Part 2 of their handout...[slide 9]
 - *What do you notice about the internal (inside) part of the oyster?*
 - *Does it remind you of anything?*
 - *How is it different from the external anatomy?*
 - *Do you notice any distinct structures (body parts)?*
4. **Distribute:** The one set of the rest of the Anatomy Structure Cards to each group.
5. **Facilitate:** With their small groups, students read and follow the instructions on each card in order (Card 2, Card 3, Card 4, etc. to guide them through dissecting and identifying different parts of the internal anatomy. Each card will have an instruction, and at least 1 question. Each card will prompt students to update their sketch with labels and answer corresponding questions on Part 3 of their handout. [slide 10-11]

- Suggested end of Class 1 -

Discuss how structures interact (30 min)

1. **Explain:** After students review all of the Anatomy Structure Cards and finish Part 3 of their handout, explain that each of the structures they labeled are organs. They’re made of tissues and specialized cells that help them do their jobs.
2. **Discuss as a whole group:**
 - *What part of the anatomy was most interesting or surprising to you? Why?*
 - *What do you now know about the oyster’s anatomy that you didn’t know before?*
 - *What are some organs that oysters and humans have in common?*

- *What do you think would happen if you removed any of these parts of the oyster? Why do you think that?* (the oyster needs all of its structures to survive)
- 3. **Explain:** Just like in humans, many of the oyster's organs work together as organ systems to do more complex jobs (functions) than they could do as just an individual organ. [slide 13]
- 4. **Facilitate:** Show 4 functions of the oyster's body (protecting internal anatomy, digesting food, reproducing, responding to the environment). [slide 14]
 - Ensure students understand what each function means
 - In a small group, students discuss which organs they think work together to perform that specific function, referencing information their model and information from the Anatomy Structure Cards
 - Students share their ideas and explain their thinking
 - Reveal organs that help perform each function, and have students update their handout as needed
- 5. **Extend:** Play a game where you name 2 structures, and students describe how they interact eg. gills and intestines, mantle and shell, heart and stomach), or list as many similarities and differences as you can between oyster and human anatomy.

CLOSING:

Write to explain how oysters' organs work together. (15 min)

1. **Write:** Introduce and have students complete Part 5 on their handout, where they describe how the oyster's organs work together as systems to help its body function.
 - Students may share their arguments and evidence with the group, or trade responses and compare ideas.
2. **Extend** (optional): Explore these resources about triploid oysters (that have 3 sets of chromosomes rather than 2), and how this notable change at the cellular level impacts the organism and oyster farming.
 - [Video: "Extra Chromosome lets us Eat Oysters Year Round"](#)(CNN)
 - [Article: "Tasty Mutants: The Invention of the Modern Oyster"](#) (The Atlantic)
 - Note: need a free trial
 - [University Blog Post: "A Brief Explanation about Triploid Oysters"](#) (IFAS, University of Florida Institute of Food and Agriculture)