

Ecology • Food Chain • Biotic/Abiotic •  
Organisms • Energy Sources



## STEAM MODULE DESCRIPTION

In this series of STEAM activities, students will analyze the ecosystem by using tableaux to dramatize roles of various plants and animals in the food chain. Students will then write in-role as their plant/animal, arguing why they are important to the ecosystem. The class will use these writings in a role drama, where students will debate which plant or animal is most important to the ecosystem. Finally, the class will discuss the interdependence of each plant and animal in the ecosystem.

In the second part of this module, students will analyze the *Water Lilies* series by Claude Monet and his garden in Giverny, France. Students will then create their own oil based paintings that depict the ecosystem. Students will be asked to visually represent the roles of consumers, producers, and decomposers, as well as their energy sources, through their artwork. Students will be asked to reflect on how they synthesized their knowledge of the ecosystem in their impressionistic paintings.

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Modules provide differentiated ideas and activities aligned to a sampling of standards. The modules do not necessarily imply mastery of standards, but are intended to inspire and equip educators.

Description	Learning Targets
<p>In this series of STEAM activities, students will analyze the ecosystem by using tableaux to dramatize roles of various plants and animals in the food chain. Students will then write in-role as their plant/animal, arguing why they are important to the ecosystem. The class will use these writings in a role drama, where students will debate which plant or animal is most important to the ecosystem. Finally, the class will discuss the interdependence of each plant and animal in the ecosystem.</p> <p>In the second part of this module, students will analyze the <i>Water Lilies</i> series by Claude Monet and his garden in Giverny, France. Students will then create their own oil based paintings that depict the ecosystem. Students will be asked to visually represent the roles of consumers, producers, and decomposers, as well as their energy sources, through their artwork. Students will be asked to reflect on how they synthesized their knowledge of the ecosystem in their impressionistic paintings.</p>	<p>“I Can...”</p> <ul style="list-style-type: none"> <li>● Identify consumers, producers, decomposers and their energy sources</li> <li>● Apply impressionistic techniques while painting an ecosystem landscape</li> <li>● Analyze the relationships of the different roles in the ecosystem</li> <li>● Dramatize the roles of consumers, producers, and decomposers</li> <li>● Interpret the various roles in the ecosystem by making body movement and voice choices</li> </ul>

**ESSENTIAL QUESTION(S)**

<ul style="list-style-type: none"> <li>● How can the artistic process of theatre &amp; visual arts synthesize my overall understanding of the interworking of an ecosystem?</li> <li>● How can tableau and role drama be used to explore the food chain and its effect on the ecosystem?</li> </ul>
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**STANDARDS**

Curriculum Standards	Arts Standards
<p><u>GA Performance Standards:</u>  <b>S4L1.</b> Students will describe the roles of organisms and the flow of energy within an ecosystem.  <b>a.</b> Identify the roles of producers, consumers, and decomposers in a community.  <b>b.</b> Demonstrate the flow of energy through a food web/food chain beginning with sunlight and including producers, consumers, and decomposers.  <b>d.</b> Predict effects on a population if some of the plants or animals in the community are scarce or if there are too many.</p> <p><u>National Standards:</u>  <b>NS.K-4.3. LIFE SCIENCE</b>            As a result of activities in grades k-4, all students should develop understanding of the characteristics of organisms and their environments.</p>	<p><u>GA Performance Standards:</u>  <b>TAES4.3.</b> Acting by developing, communicating, and sustaining roles within a variety of situations and environments.</p> <p><b>VA4CU.2.</b> Views and discusses selected artworks.  <b>a.</b> Identifies elements, principles, themes, and/or time period in a work of art.</p> <p><b>VA4PR.1.</b> Creates artworks based on personal experience and selected themes.  <b>e.</b> Creates representational artworks from direct observation (e.g., landscape, still life, portrait).</p> <p><b>VA4PR.2.</b> Understands and applies media, techniques, and processes of two-dimensional art processes (drawing, painting, printmaking,</p>

	<p>mixed-media) using tools and materials in a safe and appropriate manner to develop skills.  <b>e.</b> Creates paintings with a variety of media (e.g., tempera, watercolor, acrylic).</p> <p><u>National Standards:</u>  Theater Arts  <b>Standard 2.</b> Acting by assuming roles and interacting in improvisations.  <b>Standard 5.</b> Researching by finding information to support classroom dramatizations.</p>
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## KEY VOCABULARY

### Content Vocabulary

- **Bacteria:** Microorganisms that can make you sick, but also can help you digest food; found everywhere in nature
- **Carnivore:** An animal that eats only other animals
- **Camouflage:** Process of animals changing their colors, patterns, and shapes to disguise themselves from predators or prey
- **Community:** All the organisms in an ecosystem
- **Consumer:** An animal that gets its energy by eating plants or other animals
- **Decay:** To break down into simpler materials
- **Decomposers:** A living thing that breaks down the remains of dead organisms
- **Ecology:** The study of how living and non-living factors interact
- **Ecosystem:** A system made up of an ecological community of living things interacting with their environment especially under natural conditions
- **Energy source:** A source from which useful energy can be extracted or recovered either directly or by means of a conversion or transformation process (e.g. solid fuels, liquid fuels, solar energy, biomass, etc.)
- **Extinct:** A species that is gone forever because all of its kind have died
- **Food chain:** The path of energy in an ecosystem from plants to animals (from producers to consumers)
- **Habitat:** The place where an animal or plant lives
- **Herbivore:** An animal that eats plants
- **Hibernate:** When animals go into a deep sleep
- **Interdependence:** When living things in an ecosystem need each other to meet their needs
- **Microorganisms:** Very small living things
- **Omnivore:** An animal that eats both plants and animals
- **Organism:** A living thing
- **Photosynthesis:** Process through which plants make food
- **Plankton:** Small organisms in water that are producers and give off oxygen
- **Producer:** A living thing (such as a green plant) that makes its food from simple inorganic substances (such as carbon dioxide and nitrogen) and many of which are food sources for other organisms

**Arts Vocabulary**

**Theatre Arts**

- **Concentration:** The ability of the actor/actress to be “in” character - that is, to be like the character she/he is portraying - in dialog, attitude, carriage, gait, etc.
- **Gesture:** An expressive movement of the body or limbs
- **Projection:** Using a “big” actor voice so that you can be heard in the very back row of a space (classroom, auditorium, theatre)
- **Tableau:** A “living picture” in which actors pose and freeze in the manner of a picture or photograph
- **Narration:** The act of telling a story
- **Storytelling:** Conveying events in words and images, often by improvisation or embellishment

**Visual Arts**

- **Background:** The area of the artwork that appears furthest away and is smallest
- **Color:** An element of art with three properties: 1. hue, or the name of the color (e.g. red, yellow, etc.); 2. intensity, or the purity and strength of the color, such as brightness or dullness; and 3. value, or the lightness or darkness of a color
- **Emphasis:** In a composition, this refers to developing points of interest to pull the viewer's eye to important parts of the body of the work
- **Subject matter:** Refers to the things that are represented in a work of art such as people, buildings, and trees
- **Texture:** This refers to the surface quality or "feel" of an object, such as roughness, smoothness, or softness; actual texture can be felt while simulated textures are implied by the way the artist renders areas of the picture
- **Impressionist:** A painter, writer, or composer whose work exhibits the characteristics of impressionism
- **Impressionism:** A painting style originating in France in the 1860s that depicts the visual impression of the moment, especially in terms of the shifting effect of light and color.

**ASSESSMENTS**

Formative	Summative
<ul style="list-style-type: none"> <li>● Class discussion, group discussions, and reflection questions</li> <li>● Anecdotal notes when observing students working in small groups</li> <li>● Tableaux created and the role drama</li> <li>● Digital ecosystems presentations</li> <li>● VoiceThread presentations and drawings</li> </ul>	<ul style="list-style-type: none"> <li>● Monet Style Ecosystem Painting</li> <li>● <b>Monet Style Ecosystem Painting Rubric</b> (see Appendix)</li> <li>● Students should accurately identify producers, consumers, and decomposers</li> <li>● Students should properly order producers, consumers, and decomposers in the food chain</li> <li>● Pieces of writing written in-role</li> </ul>

**MATERIALS**

- Theatre Arts:**  
 Anchor Chart Paper  
 Markers  
 Music  
 Index cards  
 Paper & Pencils

Charged iPad with Showme and VoiceThread apps installed

**Visual Arts:**

Stretched canvas, one per student

Oil based paints

Various sizes of paint brushes

**THEATRE ARTS:**

**Activating Strategy**

- Begin this project by letting students know that “tableau” means “frozen picture.”
- Explain to students that today we will use our bodies to create frozen pictures.
- Begin by having students stand up and create the following tableaux:
  1. 102 year old grandparent crossing the street
  2. Baseball player focusing on hitting the ball
  3. A chef that dropped a pizza

\*Discuss how creating a strong tableau requires a clear body level (low, mid, high) and big facial expressions.

- Direct students to get into small groups (3-5 students) so we can now explore creating relationships.
- Direct students to create a tableau of:
  1. A family portrait
  2. A teacher and students in class
  3. A castle (using just their bodies)

\*Draw attention to how creating a strong tableau requires establishing clear relationships between the various characters in a story/scene and making sure the audience can see our faces when we perform.

**Main Activity**

**PART 1**

- Review key terminology and concepts that are critical to understanding the food chain (producers, consumers, herbivores, carnivores, etc.).

**PART 2**

- Place students in small groups.
- Give each group 4 index cards with different animals/plants that are in a food chain. Direct the groups to create a tableau that dramatizes the food chain with each student taking on the role of the animal/plant listed on the index card.
- Each small group shares out their tableau with the class.
- Teacher will take photos of each student-generated tableau.

**PART 3**

- Teacher will demonstrate how to use Showme app on the iPad, an excellent tool to teach what the tableau illustrates and can document the presentation.
- Using Showme, teacher demonstrates how to circle, highlight and label tableau parts in a photo.
- Students participate by labeling their own tableau photos, concentrating on answering the following questions: Which animal or plant was a Producer? Consumer? Decomposer? How did you know this?

**PART 4**

- Teacher demonstrates on iPad how to use VoiceThread app, which allows students to upload, share and discuss documents presentations, images, audio files and video.
- Students have the opportunity to comment on other students' voice threads.
- Students return to their seats and write in first person as their character in their food chain. They write about why they are most important to the ecosystem.
- Students use VoiceThread to record their writing in the character role they have taken on. They can upload pictures and/or drawings to illustrate their written work.

### **PART 5**

- Students are asked to become “experts” on their ecosystems before participating in the Character Panel.
- Teacher instructs students on how to conduct research on the iPads and create a presentation. Using przi.com, students can create an engaging presentation on their ecosystem (habitat research, what animals fall into the categories of producers, consumers and decomposers).
- Suggested sites for research include:
  - o <http://kids.britannica.com/>
  - o <http://kids.nationalgeographic.com/>
  - o <http://www.pebblego.com/login/>
  - o [www.brainpop.com](http://www.brainpop.com)
- Students in each group are then placed on a Character Panel in role as their characters and the remaining students role-play as reporters who ask the panel questions. Together we all step into role and create a Role Drama that analyzes why each animal is critical to the Food Chain and the Ecosystem at large.
- Students debate why their plant/animal is important and defend it by explaining why. The reporters are charged with the responsibility to determine which character is most important. The objective is to spark a class discussion that deeply analyzes the food chain's interdependence on one another. We also discuss what ways each plant/animal can protect him/herself.

### **VISUAL ARTS:**

#### **Activating Strategy**

- The students will view 2 separate video clips of Claude Monet painting in his flower garden as well as a clip that allows the class to see many of Monet's various versions of his *Water Lilies* series.
- Share the following information with the class: *Water Lilies* is a series of approximately 250 oil paintings by French Impressionist Claude Monet. The paintings depict Monet's flower garden at Giverny and were the main focus of Monet's artistic production during the last thirty years of his life.

#### **Main Activity**

##### **Part 1**

- As a whole group, view “Claude Monet’s Garden” 4 minutes 3 seconds <https://www.youtube.com/watch?v=O2KGkK2wcbk>. In order to cut down on time, you could view the clip from the 1 minute 55 second mark till the 3 minute 6 second, as this part of the video focuses on the ponds and water lily plants.
- Pause the video clip every once in a while to ask the class what types of ecosystems they see. Create a list of the producers, consumers, and decomposers that inhabit these gardens.
- Once the list is complete, ask the students where the producers, consumers, and decomposers received their energy from? What is their energy source?

##### **Part 2**

- Discuss with the class the artistic methods Monet used in his paintings. (Big brush strokes, heavy use of oil based paint, etc.) This would be a good opportunity to ask the visual arts teacher at your school for assistance.
- Each student will receive a stretched canvas, along with paint brushes and oil based paints.
- The students will paint their own version of Monet's water lilies. They will include a water source, plants, as well as animals that may live in this type of habitat. In essence they will be creating an ecosystem with consumers, producers, and decomposers. The students must also include the energy sources as well in their painting.
- Students will create an "Artist Statement," which is a brief paragraph description written by the artist about the piece created. The statement should describe how the artist integrated the science vocabulary and concepts into the painting.
- Once the paintings have dried, host a "Gallery Walk" with the class. The students will take a tour of each painting. As they view the paintings they will discuss and identify the consumers, producers, and decomposers, as well as energy sources.

## REFLECTION

### Reflection Questions

- *How did engaging in the arts using tableau support and build upon your understanding of ecosystems?*
- *How did painting a Monet style painting help you better understand the roles/responsibilities of producers, consumers, and decomposers in an ecosystem?*
- *Why is the energy source for producers, consumers, and decomposers an important part of an ecosystem?*

## ADDITIONAL RESOURCES & EXTENSION ACTIVITIES

### Website/Video Clips

- <https://www.youtube.com/watch?v=Jdj84IVwv7w> (This Youtube video takes you on a tour of many of Claude Monet's Water Lily paintings. 6 minutes, 55 seconds)
- <https://www.youtube.com/watch?v=BJE4QUNgaeg> (This Youtube video is a real film of Claude Monet painting in his Garden in Giverny in France in 1915. 2 minutes, 45 seconds)
- <https://www.youtube.com/watch?v=O2KGkK2wcbk> (This Youtube video takes you on a tour of Monet's gardens in Giverny, France. 4 minutes, 3 seconds)
- <http://art.pppst.com/monet.html> (This link/site provides over 10 Powerpoint slideshows from Claude Monet and the Presence of Nature to Impressionism and Claude Monet.)

### Books

- *The Magical Garden of Claude Monet* by Laurence Anholt
- *Who Was Claude Monet?* by Ann Waldron
- *Linnea in Monet's Garden* by Cristina Bjork
- *Monet Paints a Day* by Julie Danneberg

## APPENDIX

- **Monet Style Ecosystem Painting Rubric**

## Monet Style Ecosystem Painting Rubric

<b>Task</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
Planning/ Explanation	Student can describe in detail during the painting process how she/he envisions the final product and how they intend to reach their goal. Extremely focused.	Student can somewhat describe how she/he envisions the final product and can describe some of the steps they will use to reach the goal. Somewhat focused.	Student can describe how she/he envisions the final product but finds it difficult to describe how they will reach that goal.	Student has thought very little about the painting. Not invested in the project.
Science Content	Student is able to identify and explain their examples for consumers, producers, and decomposers. Student is able to give a clear explanation addressing how they are all related to one another in the ecosystem.	Student can somewhat identify and explain their examples for consumers, producers, and decomposers. Explanation of how they are related is somewhat clear.	Student was able to paint examples of consumers, producers, and decomposers. Yet is unable to identify them correctly.	Student did not include examples of consumers, producers, and decomposers.
Artist Style	Paint is applied in a manner very consistent with Monet's impressionistic technique.	Paint is applied in a manner that is reasonably consistent with Monet's impressionistic technique.	An attempt has been made to apply paint in a manner that is consistent with the technique of artist studied, but is not effective.	No attempt has been made to apply paint in a manner that is consistent with the technique of artist studied.

Total Score: \_\_\_\_\_