

American Eels



Department of
Environmental
Conservation

Topics: Life cycle, migration, community science, adaptations, research

GRADE LEVEL: Middle School

Big Ideas:

- Animals adapt over time.
- Organisms require a supply of energy and materials for which they are often dependent on or in competition with other organisms.
- American eels are an important part of the ecosystem.
- American eels have multiple habitat requirements throughout their life cycle.

Learning Objectives: *students will be able to...*

- Analyze and interpret data to plot the migratory path of glass eels.
- Identify the behaviors and adaptations that allow animals to survive in their environment.
- Analyze and construct scientific explanations that changes to physical or biological components of an ecosystem affect populations.
- Model how eels use resources in their environment for every part of their life cycle.

New York State Science Learning Standards:

MS-LS1-4. Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants, respectively.

MS-LS2-1. Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.

MS-LS2-2. Construct an explanation that predicts patterns of interactions among organisms in a variety of ecosystems.

MS-LS2-4. Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.

MS-LS4-4. Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.

MS-LS4-6. Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.

Key Understandings:

- Organisms are dependent on their environmental interactions both with other living things and with nonliving factors.
- Organisms engage in characteristic behaviors that increase the odds of reproduction.
- Multicellular organisms have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction.
- Organisms can change their physical structures and their behaviors over their life cycle to better adapt to their

Essential Questions:

- How do animals adapt to their environment to survive?
- How does an animal's external structures help it survive?
- How can disruptions to an ecosystem lead to shifts in populations?
- How can populations change over time?
- Why do some animals migrate throughout their lives?

environment and to meet their basic needs.

- The shapes and kinds of land and water in any area can be mapped.
 - American eels use different habitats throughout their life cycle and travel long distances.
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Students will know...

- What a life cycle is, and the sequential life stages of the American eel.
- Key vocabulary terms.
- Eels rely on many different habitats during their life.
- The migration patterns of the American eel.
- How to read graphs and analyze trends over time.
- Scientists, including students and their teachers, contribute valuable data that helps scientists study changing eel populations.

Vocabulary:

- **Adaptation:** a feature that allows an organism to deal with environmental conditions.
 - **Behavioral adaptation:** an adaptation involving the way an animal acts.
 - **Physical adaptation:** an adaptation involving the form of an organism.
 - **Estuary:** a body of water in which fresh and salt water meet.
 - **Habitat:** the place where a given plant or animal lives,
 - **Life cycle:** the stages of form and activity through which a living thing passes as it develops from a beginning stage to an adult able to reproduce and restart the cycle.
 - **Migration:** the movement from one place to another.
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Learning Plan: We recommend doing these lessons in sequential order; however, they can be done as individual lessons. Lessons have multiple links (videos, songs, diagrams, activities) that can be used at the teacher's discretion depending on class time.

Pre-assess: How do eels know where to migrate to? Use informational surveys/questionnaires/inventories, K-W-L or I notice/I wonder to assess students' prior knowledge, have students write or draw in response to the essential questions. Use [the eel poster](#) to show students the migration, and life stages of the American eel. Have students discuss and make a T-chart about which challenges eels might have in their migration and hypothesize what structures/behaviors could help with that migration.

Progress Monitoring: Formative assessment and teacher feedback should be ongoing throughout the lessons. Teachers should develop assessments based on their individual class needs. Think-pair share, exit tickets, interactive discussions, questions and listening, informal observations, quizzes and student work samples can all be used.

Lesson 1: Community Science in Action- Students watch a video and PowerPoint presentation about the Eel project, then complete a worksheet on eel biology.

- [Hudson River Eel Project](#)
 - Migration of the [American Eel Presentation](#) & [Student Worksheet](#)
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Lesson 2: Mapping the Migration of American Eels- Students follow the life cycle of the American eel by mapping their migration routes. Using graphs and videos students pose questions about eels and their reliance on many aquatic habitats.

- Eel Life Cycle [Video](#)
- American Eel Mapping [Video](#) & [Poster](#)
- Mapping the Migration of American Eels [Activity](#), [Student Worksheet](#) & [Map](#)
- Extra: Meet the Fish Video: [American Eel](#)

Lesson 3: Eel Relay Race- Students will learn about the different life stages of the American eel through an active relay race.

- Eel Relay Race [Student Activity](#)
- Be an Origami Naturalist: American “Glassy” [Eel Craft](#)

Lesson 4: Data Trends Over Time- Students will analyze and interpret eel data trends over time at various tributaries along the Hudson River.

- Hudson River Eel Project Data Analysis [Student Activity](#) & [Student Spreadsheet](#)
- Extra: [Eel Migration in the Hudson Estuary](#)
- Extra: [Article on Eel Poaching](#)

Teachers: Would you like to visit us at Norrie Point environmental education center, or have an educator visit your classroom in-person or virtually? Contact us to schedule a program: hrteach@dec.ny.gov

Resources:

Websites:

- [The Hudson River Eel Project](#) (NYSDEC)
- [U.S Fish & Wildlife Service Eel Page](#)
- [All about American Eels](#) Infographic (PBS Nature)
- [Video: The Mystery of Eels & Eel Project](#) (PBS Nature)
- [Chesapeake Bay Program American Eel](#)

Books:

- [The Hudson: An Illustrated Guide to the Living River](#) by Stephen Stanne, Roger Panetta, Brian Forist & Maija Niemisto
- [Eels: An Exploration, from New Zealand to the Saragasso, of the World’s Most Mysterious Fish](#) by James Prosek
- [The Book of Eels: Our Enduring Fascination with the Most Mysterious Creature in the World](#) by Patrik Svensson