

Estuaries

Topics: Hudson River Estuary



Department of
Environmental
Conservation

GRADE LEVEL: 2-3

Big Ideas:

- The Hudson River is unique.
- There is a difference between salt, fresh and brackish water
- The Hudson River begins in the Adirondack Mountains and empties into the Atlantic Ocean.
- The Hudson River is an estuary.

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

- Identify important characteristics of the Hudson River.
- Identify an estuary.
- Compare and contrast the three types of water in the Hudson River.

New Your State Science Learning Standards:

2-ESS2-2. Develop a model to represent the shapes and kinds of land and bodies of water in an area.
3-ESS2-3. Plan and conduct an investigation to determine the connections between weather and water processes in Earth systems.

Key Understandings:

- Maps are used to show the shapes and types of landforms and water in an area.
- Water transports material through the Hudson River watershed and estuary.
- Water is made up of particles whose properties determine its observable characteristics.
- An estuary is a unique habitat with fresh, brackish and salt water.
- Salt water is denser than freshwater.

Essential Questions:

- What is an estuary?
- What are the characteristics of estuaries that make them so important to living organisms?
- How is the Hudson different from other rivers?
- What makes an estuary so unique?
- What are the differences between salt water, fresh water and brackish water?

Students will know...

- Key vocabulary terms
- The difference between fresh, brackish, and salt water.
- What an estuary is, and the characteristics that make them important.

Vocabulary:

- Brackish water: mixture of fresh and salt water.
- Estuary: a body of water in which fresh and salt water meet.
- Fresh water: water that is not salty.
- Salt water: seawater or other water that contains salt.
- Watershed: the area of land from which water drains into a body of water.

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: What makes the Hudson River so unique? Use K-W-L to assess students' prior knowledge, have students write or draw in response to the essential questions.

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: What is an Estuary? Students watch videos, then read a story about the Hudson River and create their own map of the Hudson.

- Video: [What is an Estuary](#)
 - Video: [Source to Sea](#)
 - Conservationist for Kids Magazine: [Explore the Hudson River](#)
 - [Meet the Hudson River](#) student worksheet
 - [Watershed Map](#)
 - [Extension: From the Mountains to the Sea](#) student reading
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Lesson 2: Brackish Water Density- Students learn about where the Hudson River Estuary gets its water from and conduct an experiment to explore the differences between fresh, salty and brackish water. Note: have students watch estuary demonstration then do the activity. Follow up with a video recording of the book [River](#).

- Video: [Salt Front](#)
 - STEM Activity: [Brackish Water Density](#) & [Spanish Version](#)
 - River Storytime: [River](#)
 - Extension activity to do at home: [Exploring and Estuary in your Kitchen](#) & [Spanish Version](#)
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Lesson 3: Explore the Hudson River- Students watch live footage collected in three geographic areas of the Hudson River estuary and use the accompanying worksheets to explore the Hudson. Students can follow along with data collection and take a deeper dive with a guest scientist. Watch one or all three.

- [New York Harbor: Day in the Life of the Hudson and Harbor](#) and [Data Sheet](#)
 - [Lower Estuary: Day in the Life of the Hudson and Harbor](#) and [Data Sheet](#)
 - [Upper Estuary: Day in the Life of the Hudson and Harbor](#) and [Data Sheet](#)
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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:

Children's books:

- [Rain Rain Rivers](#) by Uri Shulevitz
 - [River](#) by Elisha Cooper
 - [Where the River Begins](#) by Thomas Lochner
 - [Riparia's River](#) by Michael J. Caduto
 - [Song of the River](#) by Joy Cowley & Kimberly Andrews
 - [Over in a River flowing out to the Sea](#) by Mairanne Berkes
 - [River Story](#) by Meredith Hooper
 - [River of Dreams: The story of the Hudson](#) by Hudson Talbott
 - [Hudson River: An Adventure From the Mountains to the Sea](#) by Peter Lourie
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Websites:

- [Estuaries Tutorial NOAA](#)
- [Hudson River Park Environmental Education](#)
- [Sarah Lawrence College Center For the Urban River at Beczak Educational Resources](#)
- [River of Words](#) - annual international poetry and art contest for K-12 students.
- [Hudson River Lesson plans](#)
- [Education Resources Guide for Parents and Teachers](#)- Hudson River Foundation