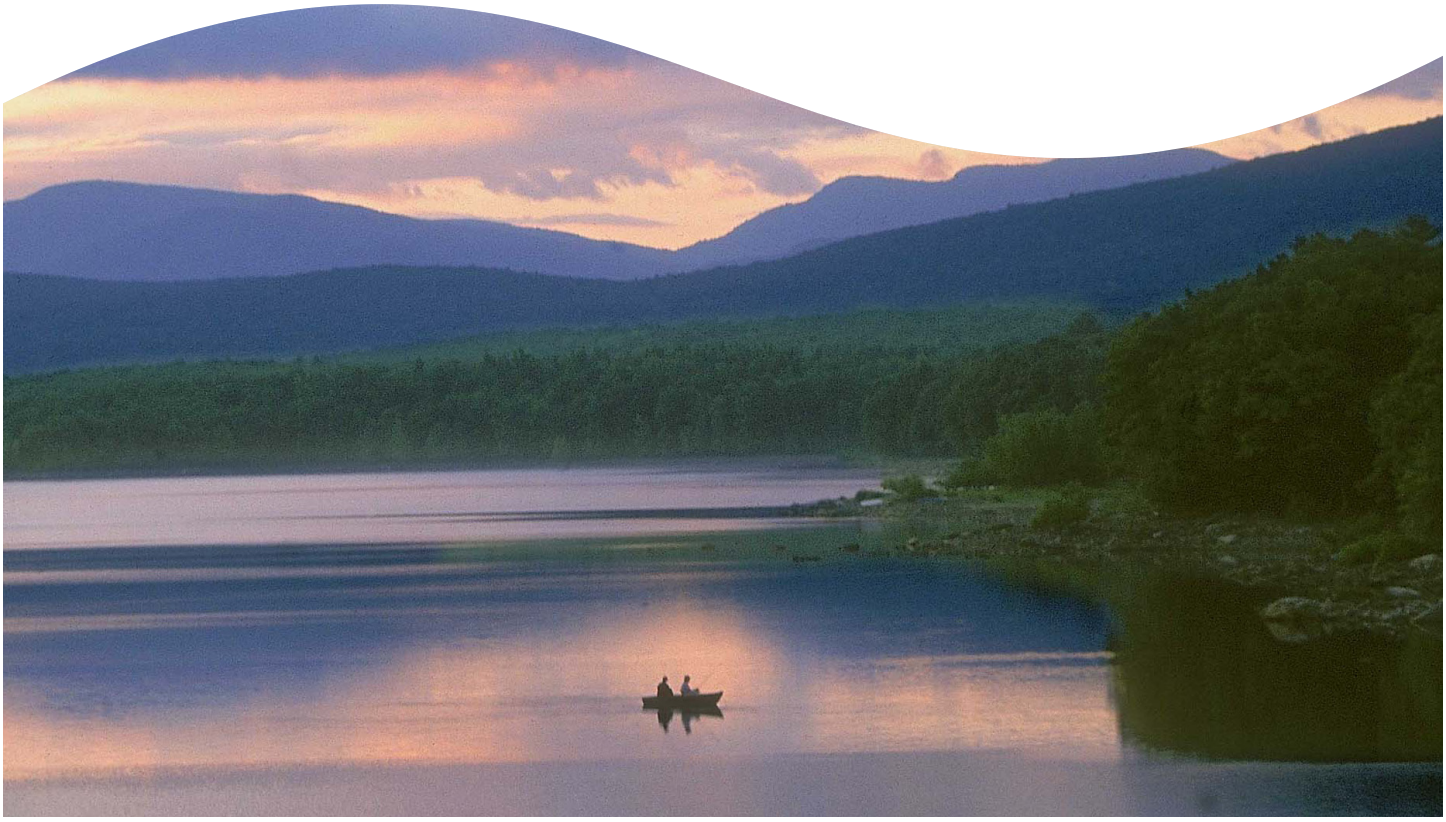
NYC Environmental Protection

Investing in the Catskills' Future
CATSKILL WATERSHED CWC CORPORATION

CITY THAT DRINKS THE MOUNTAIN SKY
Arm-of-the-Sea Theater

Study Guide for Educators



INTRODUCTION

New York City's water supply system is one of the engineering wonders of the world. Rain and snow drain into reservoirs from watershed streams high in the Catskill Mountains. Aqueducts and water pipes then transport water by gravity to the faucets of one million people in upstate communities and eight million people in NYC. **City that Drinks the Mountain Sky** is a docu-drama that uses the enchanting devices and symbolic visual language of mask and puppet theatre to tell this epic story of the New York City water supply system. You will be taken into the very heart of a watershed. You will see how forests are like kidneys, filtering water as it moves towards streams and reservoirs. You will meet the people who built the dams, reservoirs and aqueducts and you will discover how this enormous water project brought profound changes to Catskill communities and New York City.

YOUR CURRICULUM, LESSONS AND RESOURCES

City that Drinks the Mountain Sky will provide your students with a unique experience in the performing arts. They will also have an opportunity to observe our natural and social history unfold throughout the play's 55 minutes. This study guide can help prepare your class for the experience of live theater as well as the multi-disciplinary themes and storyline that takes us from the ice ages, to the settlements of the Native Americans, Dutch and British, water use, the building of the New York City water supply system and watershed protection. Please note that important terms and events that can be researched individually or discussed in class are in bold print.

Before you see the performance, look at a New York State map, water supply map, Google Earth or Google Map with your students to become familiar with the region. Go to www.nyc.gov/dep for maps of the New York City Water Supply System and additional background information. You can also use photographs to provide a visual perspective of watersheds, reservoirs, tunnels, and other aspects of the New York City Water Supply System.

COMMON CORE STATE STANDARDS FOR ENGLISH LANGUAGE ARTS & LITERACY IN HISTORY/SOCIAL STUDIES, SCIENCE, AND TECHNICAL SUBJECTS

The following are some examples of standards for grades 4-12 as they relate to viewing a performance of **City that Drinks the Mountain Sky**. There are many additional standards that are relevant to pre and post activities and lesons.

- Explain major differences between poems, drama, and prose, and refer to the structural elements of poems (e.g., verse, rhythm, meter) and drama (e.g., casts of characters, settings, descriptions, dialogue, stage directions) when writing or speaking about a text.
- Compare and contrast the point of view from which different stories are narrated, including the difference between first- and third-person narrations.
- Develop personal, cultural, textual, and thematic connections within and across genres as they respond to texts through written, digital, and oral presentations, employing a variety of media and genres.
- Recognize, interpret and make connections in narratives, poetry, and drama, to other texts, ideas, cultural perspectives, personal events and situations.
- Explain how a series of chapters, scenes, or stanzas fits together to provide the overall structure of a particular story, drama, or poem.
- Describe how a narrator's or speaker's point of view influences how events are described. a. Recognize and describe how an author's background and culture affect his or her perspective.
- Use knowledge of language and its conventions when writing, speaking, reading, or listening.
- Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words
- Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric.

Since the history and present day New York City water supply system and watersheds are the main themes of the show, it is important for students to understand terms used by the narrator. The following are some common terms and their definitions.

- **Aqueduct** – A large pipe or tunnel used to convey water.
- **Bluestone** – A type of sandstone that splits easily into thin, smooth slabs.
- **Broad leaf trees** – Trees that have wide leaves, rather than slim, needle-like leaves as found in conifers.
- **Conifers** – Hardwood (deciduous) trees with needles and cones as opposed to broad, flat leaves.
- **Cow pie** – Slang for cow manure; high in fiber, will dry out in sun and crumble into healthy fertilizer.
- **Dam** – Wall-like structure designed to stop flowing river or stream to create a reservoir.
- **Devonian** – Period that brought significant diversity of terrestrial life, including the first vertebrates, the amphibians, and the first forests of trees.
- **Glaciers/Ice sheet** – Large mass of ice formed from the accumulation of snow. The ice mass may move slowly from a central location (continental glacier) or from a high valley (alpine glacier).
- **Hemlock trees** – An evergreen tree (conifer) with needle-like leaves.
- **New York City Department of Environmental Protection (DEP)** – Government agency responsible for managing the New York City water supply, providing more than one billion gallons of water to over 9 million people each day. Also responsible for the wastewater treatment system that handles approximately 1.3 billion gallons of used water each day.
- **Reservoir** – A body of water created by damming a river or stream.
- **Tan hides** – A process to remove flesh, fat, and hair from animal skins, thus making them more durable.
- **Tree roots** – A portion of the tree that typically remains below the soil. Roots absorb water from the soil, anchor the tree (or plant) to the soil, and store food and nutrients for the plant.
- **Water filtration** – To remove unwanted matter from water, especially bacteria or harmful chemicals, using chemical, physical or biologic processes.
- **Watershed** - An area of land that drains into a common body of water. As an example, cup the palm of your hand and imagine the tips of your fingers to be the Catskill Mountains. Mountain streams would form in the grooves between your fingers; their waters would join a larger river in the “valley” of your palms. This river would flow toward the sea. If you spray water on your fingertips, you will see this miniature watershed in motion.
- **Watershed regulations** – Policies, laws, and regulations to protect a specific watershed.

You may want to introduce your students to the following characters who are mentioned or who appear in the play.

- **Alphonso** – Italian construction worker.
- **Lord Cornbury** – The Royal Colonial Governor of New York.
- **John J. Delany** – NYC Water Commissioner when the Catskill reservoirs were developed.
- **King George** – King of England; he gives the Catskills to several men, including Johanis Hardenburg, who charges rent for people to settle and farm there.
- **Johanis Hardenburg** – Holder of large tracts of land; he is also known as Mr. Big Boots, the landlord and rent collector.
- **Ivan** – Russian construction worker.
- **Peter Minuit** – Dutch leader of an expedition to America where he purchased the island of Manhattan.
- **Mr. J. Waldo Smith** – Chief Engineer for the Board of Water Supply who devised and implemented plans to capture the Catskill Mountain water.

THE SHOW

City that Drinks the Mountain Sky is enacted by three masked performers, called Water Beings. They do not speak but are visible to the audience as they animate the visual elements---the props and puppet characters---of the story. A composer/musician performs original music with an array of typical and not so typical instruments. The composer/musician is also the narrator, who uses different voices for the various characters in the story.

The set is designed to represent a **watershed** and the landscape of lower New York State. Features include:

- Marine **fossils** from the **Devonian Period**, the geologic era in which the sediments of **Catskill Mountain** bedrock formed
- A series of mountains representing the Catskills are upstage center
- **Manhattan Island** is downstage left
- The **Hudson River** runs past the mountains to the ocean

SUMMARY OF SCENES

FIRST ACT

- **13,000 BC**
    - The show begins with the melting of the **glaciers**.
    - Clouds, in the shapes of large eyes, drop rain on the land; streams (made of silk) flow.
    - As the land thaws, a forest grows and the animals of the forest gather at the streams to drink.
    - Zooms in for a closer look at the forest soil where worms, insects, fungi, and other **decomposers** break down dead leaves into nutrients. These nutrients (symbolized by red fabric) along with water (blue fabric) are absorbed by tree ro**ots.**
    - Suddenly, we zoom into the leaf of a tree where a special cell called a stoma releases water vapor back to the clouds. This process is called **transpiration**.

SECOND ACT

The play moves into the human side of the story with a series of scenes from NY history.

- **1626**
    - The Catskills is occupied by Native American people who fish, hunt, and grow food to sustain themselves.
    - Sale of Manhattan Island by the Lenape Indians to Peter Minuit of the Dutch East India Company.
    - Building of New Amsterdam, which later becomes New York (Manhattan) when England takes over in 1664.
- **1706**
    - English governor of the colony, Lord Cornbury, grants a tract of land in the Catskill Mountains to a group of businessmen headed by Johanis Hardenburg.
    - Grant, known as the **Hardenburg Patent,** turns out to be 1.5 million acres of land.
    - Slowly the Catskill Mountains are cleared and settled by tenant farmers who can never own the land but must pay rent to the landlord.

- **1832**
  - Immigrants continue arriving in New York but the city well water carries diseases.
  - **Cholera epidemics** kill thousands of people while frequent fires burn down parts of the city.
- **1842**
  - First dam and reservoir on the Croton River in Westchester County brings fresh water forty miles into the city.
- **1848**
  - Time of anti-**rent wars** in the Catskills, tenant farmers refuse to pay rent to the landowners.
  - Gradually the feudal landowner system changes and people can own their farms.
  - Meanwhile, more and more people from New York City are vacationing in the Catskills.
  - The **Romantic Movement** celebrates the American landscape in painting and poetry.
- **1886**
  - New York City receives **Statue of Liberty** as a gift from the people of France.
  - The population of New York City reaches four million and is increasing at a rate of 100,000 people each year.
  - **Water shortages** are widespread.
  - In 1898, the City of Brooklyn and other areas are annexed to create the five boroughs New York City we know today.
  - The decision is made to expand the public water system.

THIRD ACT

- **1906**
  - Thousands of workers are employed in the building of the **Ashokan Reservoir** on the Esopus Creek in Ulster County.
  - Land is claimed by **eminent domain** (condemned) and cleared of all trees, houses, farms, even cemeteries.
  - An **aqueduct** is built from the Ashokan Reservoir to Westchester County, passing more than 1000’ beneath the surface of the Hudson River.
  - **Mr. J. Waldo Smith** is chief engineer of the project. The first Catskill water reaches New York City in the fall of 1917.
- **1912-1965**
  - Five more reservoirs are built in the Catskills.
  - Twenty-six villages and hundreds of farms are sacrificed.
  - Each day nine million people living in Ulster, Orange, Putnam and Westchester counties and New York City receive their water through the aqueducts.
  - One and one quarter billion gallons, filtered only by the forest and delivered by gravity, is consumed every day.

FOURTH ACT

- **1990**
  - The federal government orders New York City to **filter** its water. This would cost billions of dollars.
  - However, if New York City can implement a watershed protection plan to ensure water coming from the Catskill Mountain watersheds can be kept clean, a filtration plant will not need to be built.
  - The NYC Department of Environmental Protection---DEP---is responsible for this tall order.
  - In an effort to repair broken sewage systems, stop leaking fuel tanks, halt oil and salt from washing from roads into streams and reservoirs, and control runoff from farms, DEP proposes a new set of regulations for the Catskill Mountain watersheds.
  - This angers many mountain residents; they form the Coalition of Watershed Towns to fight what they see as an infringement on their rights.
- **1997**
  - After five years of intense debate, New York City officials and watershed communities, along with environmental groups and the governor of NY State, arrive at a set of cooperative agreements to protect the watershed.
  - Thus begins an important experiment to see how the Catskills can continue to be home for mountain residents and, at the same time, provide clean water to the **City that will drink the mountain sky** for years to come.

RESEARCH TOPICS AND LESSONS

1. What **watershed** do you live in? Is it part of a larger watershed? Learn how to read a topographic map. Locate your school on the map. Discuss how you and your classmates can be watershed stewards.
2. When you turn on your faucet, where does the water come from? Where does it go when it goes down the drain? Make a picture of the pathways that your water takes through the land.
3. Find out about **non-point source pollution**. How can non-point source pollution be reduced and what effect will it have on water quality in your watershed?
4. Research how forests are important in maintaining water quality within a watershed.
5. Create individual drawings of the water system and connect to create a large mural.
6. Research the people who helped to create the present day water supply system. Who are they? What was their role? How do they compare to the people who today are building, protecting and maintaining the water supply system.
7. Research news articles to learn about present day water supply issues in the New York City watersheds and on a national and international level.

ADDITIONAL IMPORTANT EDUCATION RESOURCES

- Cole, Joanna. **Magic School Bus at the Waterworks: Special NYC Edition**. Scholastic, New York (available exclusively from NYC Department of Environmental Protection).
- Evars, Alf. **Catskill Mountain Bluestone**. New York: Purple Mountain Press, 2008.
- Galusha, Diane. **Liquid Assets: A History of New York City's Water System**. New York: Purple Mountain Press, 1999.
- Koeppel, Gerard T. **Water for Gotham: A History**. Princeton, New Jersey: Princeton University Press, 2000.
- Sanderson, W. Eric. **Mannahatta: A Natural History of New York City**. New York: Harry N. Abrams, 2009.
- Steuding, Bob. **The Last of the Handmade Dams: The Story of the Ashokan Reservoir**. New York: Purple Mountain Press, 1989.
- Catskill Center for Conservation and Development (www.catskillcenter.org). **The Catskills: A Sense of Place**. New York: 2002.
- Catskill Watershed Corporation (www.cwconline.org) - Provides funding for education programs and projects West of the Hudson Watershed and New York City.
- NYC Department of Environmental Protection (www.nyc.gov/dep and educationoffice@dep.nyc.gov) - Provides educational materials, field trip opportunities, staff development workshops and speakers to school and community groups.
- River of Words (riverofwords.org/contest.html) - A National Environmental Poetry and Poster Contest for Students from International Rivers Network, Berkley, CA.
- Watershed Agricultural Council (www.nycwatershed.org) – Provides funding for interpretive bus trips for New York City and watershed students throughout the East and West of Hudson Watersheds; also coordinates the popular Green Connections and Watershed Forestry Institute for Teachers programs.
- **ARM-OF-THE-SEA THEATER** (www.armofthesea.org, P. O. Box 175, Malden-on-Hudson, NY 12453 (845) 246-7873, liveart@armofthesea.org) - Write and tell us what you liked -- and did not like --about the show.

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