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**INDIANA
AMERICAN WATER**

Ancient Writings to Current Laws

Historical Events and
the Establishment of Drinking
Water Regulations

- **Grade Level:** 5 -12
- **Objective:** Students will establish a timeline of key events in the history of drinking water regulation
- **Subjects:** History, Law and Policy, Public Speaking, Environmental Science

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INTRODUCTION

Clean, potable water is perhaps the most fundamentally important resource for a population. Access to reliable water supplies have shaped the history of settlement and human migration, the rise and fall of cultures and civilizations, strategic battles and land controversy and the success of the agricultural and industrial revolution.

Knowledge of water quality and access has evolved over time and in particular, advancement and technologies over the past couple of centuries have allowed human populations to thrive and endeavors to develop and expand. Despite the achievements made, consistency regarding regulation, treatment and quality has been a very recent occurrence. Bringing together federal, state and local agencies to agree upon, establish and enforce water quality standards was the integral step in ensuring adequate access for all Americans. Even today, there are new threats, technologies and circumstances that require continuous attention so that standards are updated and upheld. Scientific data must be embraced to this end as water supplies and quality are strained society's need for water.

A review of water treatment milestones offers a perspective on the history of drinking water, and a review of past practice reveals some of the inherent problems facing water supplies over the last several decades. By investigating the threats, one can itemize key aspects of modern water laws and become an advocate for the policies that have been established to maintain the health of our surface and groundwater supplies.

DID YOU KNOW?

The Safe Drinking Water Act applies to more than 170,000 public water systems across the United States.

MATERIALS NEEDED

- Piece of paper
- Pen or pencil
- Calculator
- Enclosed data sheets

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EXERCISE: PART ONE

There are many surprising details in the history of water quality practices. On the next page is a timeline punctuated by specific year references. By researching the history of water treatment and quality, events and milestones can be entered on the timeline and then described in detail. Small student groups can complete the research and then share their findings and timeline with the class.

TASKS: Timeline

1. For each year shown on the timeline on the following page, insert a brief statement about the milestone or event that occurred around that time. There may be more than one entry per year.
2. On a separate sheet of paper, develop your timeline to include details about each event.

EXERCISE: PART TWO

Prior to the 1970s, a wide range of abuses on fresh water resources were frequent and in some cases flagrant. As the timeline exercise will reveal, not until the 1970s did laws exist that were solid enough to establish strong and consistent regulations. Several incidents are described below. A review of each case will result in an itemization of potential pollutants and the practices that have resulted in serious degradation of water supplies. A comprehensive itemization will allow students to recommend policies that, if established, will reduce the impact of particular pollutants and change the way certain human activities occur.

TASKS: Water Pollution Issues pre-1970

1. For each scenario described to the right, identify the potential pollutants involved, the impact on human health and the environment. Then, establish a policy on each behavior that works to reduce or eliminate the problem and provide alternative ways/options to perform the existing functions you eliminated or altered. Research on each scenario will be necessary to complete this task.
2. For each description, imagine that the occurrence is before 1970 (the timeline exercise above will reveal the importance of this threshold year).

Scenario 1: A landfill in Pennsylvania has been in operation since the late 1940s. There has been no monitoring or identification of waste coming into the site other than the general identity of “municipal solid waste.” The landfill has no liner underneath and no program of monitoring groundwater or the contamination of nearby streams.

Scenario 2: On the edge of a farm in Iowa, several drums of unused pesticide lie in a drainage ditch along a road. A worn label of one of the containers reads dichlorodiphenyltrichloroethane. The ditch empties into an extensive wetland, which is a habitat for several species of birds, salamanders and frogs.

Scenario 3: In California, rainwater washes down a steep road carrying debris, sediment and oily residue into a storm sewer that drains into a concrete basin that flushes to the river during heavy downpours.

Scenario 4: A barge carrying mining waste is towed from a small harbor town in Michigan. When the barge arrives at its next port, it is empty.

Scenario 5: In Delaware, sewer pipes in converge into a main that leads to a large screen grate that gives way to the Delaware River. A continuous stream of effluent empties and flows down river.

Scenario 6: Along a 10-mile stretch of interstate in Georgia, construction crews have dumped large mounds of soil and sand. Without a cover or any adjacent barriers or containment, the rainfall has eroded the mounds and carved steep channels into their sides.

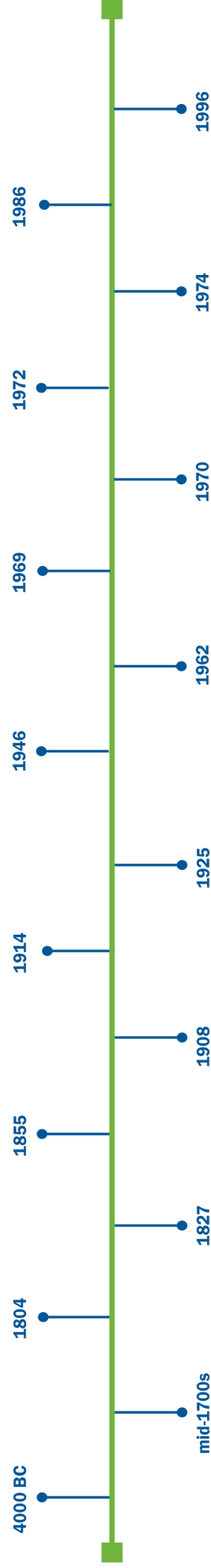
Scenario 7: A few miles away from a municipal drinking water well in New Jersey, a chemical company begins a deep well injection operation that disposes of hazardous waste from industrial activities.

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QUESTIONS

1. What events from the timeline do you deem most critical in the development of effective water protection? Establish your top three and provide justification.
2. What are the key components of the Clean Water Act and Safe Drinking Water Act?
3. What were the significant amendments to these acts?
4. From the seven scenarios presented, are any of them not covered by the current acts? Explain.
5. If you were asked to prioritize the scenarios as legislation is established, what would be the first issue addressed? Rank the remaining six in order of importance. Support your ranking.
6. Which of the scenarios would be easiest to enforce? Hardest? Explain.
7. There are state laws regarding surface water and drinking water. Which law, state or federal takes precedence? Explain.

EXTENSIONS

- As part of a class activity, prepare a poster presentation that lobbies for the elements of legislation you feel are most important. The members of your class may present to another who will vote on the most effective and persuasive presentation.
- Contact your local politicians and inquire about new or modified laws affecting water quality or any other environmental issue. Research which politicians most actively support environmental initiatives and get involved in the political process.

RESOURCES

- Water- A Natural History by Alice Outwater
- <http://water.epa.gov/EPA Office of Water>

COMMENTS

We want to know what you think. Feedback and/or suggestions for improving this lesson plan can be e-mailed to joi.corrado@amwater.com.

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NOTES

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DEFINITIONS

- **Clean Water Act of 1972 (CWA):** The primary federal law in the United States governing water pollution. The act established the goals of eliminating releases of high amounts of toxic substances and other pollutants into water.
- **Dichlorodiphenyltrichloroethane (DDT):** A chlorinated hydrocarbon that has been widely used as a pesticide but is now banned in some countries.
- **Landfill:** A site used for the disposal of waste materials by burial and is the oldest form of waste treatment.
- **Pollutant:** A particular chemical or form of energy that can adversely affect the health, survival or activities of humans or other living organisms.
- **Municipal Solid Waste (MSW):** Also called urban solid waste, this waste type includes predominantly household/domestic waste, as well as any commercial wastes collected by a municipality within a given area.
- **Safe Drinking Water Act of 1974:** The principal federal law in the United States intended to ensure safe drinking water for the public.
- **Environmental Protection Agency (EPA):** Federal agency responsible for managing federal efforts in the US to control air and water pollution, radiation and pesticide hazards, environment research, hazardous waste and solid-waste disposal.
- **Hazardous Waste:** Waste that poses substantial or potential threats to public health or the environment.
- **Deep Well Injection:** A vertical pipe in the ground into which water, other liquids or gases are pumped or allowed to flow in order to dispose of various hazardous materials.
- **Groundwater Monitoring:** Program and infrastructure established to monitor and detect contaminants found in groundwater. This includes reporting any incidence to internal and external stakeholders to help them understand the complex interactions affecting the quality of the groundwater in these areas.
- **Water Quality Standards:** The foundation of the water quality-based pollution control program mandated by the Clean Water Act. Water Quality Standards define the goals for a water body by designating uses and setting criteria to protect those uses. It also establishes provisions such as anti-degradation policies to protect water bodies from pollutants.
- **Water Treatment:** Processes used to make water more acceptable for a desired end-use, i.e., drinking water, industrial processes, medical and many other uses.

In a world where everything we touch frequently changes, water is our constant. We've never stopped needing it to drink, to cook, to clean, to live. We'll always need it for sanitation, for fire protection, for watering our lawns and washing our cars.

It's easy to take water for granted. And because so many do, we don't.

We are scientists, environmentalists, innovators, and protectors. We are also residents and employees in the communities we serve. We understand how important, how precious, and how critical water is to daily life.

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Visit www.amwater125.com to learn more about our company and our years of tradition of reliability, responsibility, service, innovation and excellence.

A special thanks to Ron Smith for developing the core content of this lesson plan. Ron Smith, a science educator from NJ, has been teaching biology, environmental science and interdisciplinary studies in the classroom, lab and field for 18 years. It was important for us that our lesson plans be crafted by an educator for educators. We appreciate his hard work.

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