

**WE CARE ABOUT WATER.
IT'S WHAT WE DO.®**



**INDIANA
AMERICAN WATER**

LEED by Example

Case Studies in
Water Conservation

- **Grade Level:** 5-12
- **Objective:** Students will research four innovative projects that focus on the sustainability of our water resources.
- **Subjects:** Environmental Science, Art, Mathematics



INTRODUCTION

There are a number of policies and incentives set in place by government agencies and conservation groups that are intended to secure the future of our water supplies. These are useful initiatives. There are also increasingly more unified efforts to protect and preserve our natural resources. One example is the Leadership in Energy and Environmental Design (LEED) system.

LEED is an internationally recognized green building certification system. The five main areas of efficiency and conservation that the system focuses on are energy savings, water efficiency, CO2 emissions reduction, improved indoor environmental quality, and stewardship of resources and sensitivity to their impacts. The program was developed by the United States Green Building Council (USGBC) and can be applied to commercial and residential buildings. LEED practices can be used in all stages of the project – from planning and construction to operating and maintaining the facility.

Projects like LEED can inspire people to become more involved and interested in conservation efforts, because they provide measurable impact. Every little bit helps and the more sustainability programs there are, the better the chance of people everywhere adopting the core behaviors that will lead to change. Continue to shut the water off when brushing your teeth, purchase and install water-saving devices and appliances, replace wasteful irrigation practices with drip systems. But don't stop there. Visit the school in the next neighborhood, the community golf course, the sports stadium and the apartment buildings that are going green, and see what possibilities exist and how you can help make the changes that will impact our future.

DID YOU KNOW?

The Gillette Stadium, home to the New England Patriots, uses recycled water to flush their toilets.

MATERIALS NEEDED

- Posterboard
- Pen, pencil, colored markers
- Enclosed data sheets
- Additional supplies to create the poster



EXERCISE

Four case studies will be explored in this lesson. In each location, conservation initiatives have been established to improve the sustainable use of water. Students will calculate the daily and annual water savings for each project and identify additional environmental benefits that resulted. With emphasis on education and advertising, groups of students will design and create a poster and presentation on the project they deem most innovative and sustainable. Consider having other classes and/or students and teachers in your or community vote for their favorite poster and/or project.

Below are basic descriptions for the four case studies. More details about these projects can be found at www.amwatersolutions.com (Select Case Studies). Read each overview and then complete the tasks.

Case Study 1: Gillette Stadium, Foxboro, MA

A late first half drive by the Patriots kept every one of the 69,000 fans riveted to their seats. As the last seconds ticked down and the ball crossed the plane of the goal line, the crowd erupted in cheers and whistles. It's now halftime. Almost immediately, the stadium's bathroom facilities would offer relief to droves of fans.

Gillette Stadium's wastewater reuse program recycles 250,000 gallons a day, providing a buffer to limited water supplies available in the town of Foxboro, MA – particularly during the eight home games of the New England Patriots and the roughly 10 other major events held at the facility every year. Recycled water can also be used by an adjacent economic development area and may be expanded leading to the future recycling of as much as 1 million gallons or more.

Case Study 2: The Solaire, New York, NY

Located in Manhattan, the Solaire is an apartment building providing comfortable and green living to its 1,000 residents. With rooftop gardens and an efficient cooling and heating system, the building's 293 apartments are provided with a total of 25,000 gallons of recycled water per day which is used for toilets, garden irrigation and a cooling tower. The building has received the gold LEED rating and various other environmental awards.

Case Study 3: Anthem, AZ

On the 18th hole at the local golf course, a four-some hastens back to their cart as dark clouds gather. The rain will be welcome in this often dry region, but the golf course greens are maintained even during the driest months. Rainfall is not nearly enough to supply the water needs of the town of Anthem with its industry, recreation and 8,550 inhabitants. Modest aquifer reserves would quickly be tapped should they be used as the primary water source.

Water arrives in Anthem via nine miles of canal from the Central Arizona Project supply. About 6 million gallons per day are made available to the residents, businesses, industries and recreational facilities in town. Wastewater generated is treated and used principally to irrigate the region's parks and outdoor facilities, including two golf courses.

Case Study 4: Copper Hill School, Raritan Township, NJ

Copper Hill School is a K-5 elementary school that maintains an outdoor learning center and a green water recycling system. The school's 850 students and 65 faculty members teach and learn in a building that uses 12,000 gallons of recycled water per day with an additional 3,000 gallons treated and released underground for aquifer recharge. A green school with the opportunity to fuse education and environmental sustainability, the facility earns high marks for this initiative.

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TASKS

- Create a column graph in Excel for the number of recycled gallons per day that are used for each case study.
- Create a column graph for the number of people that participate in each project.
- Calculate the ratio of gallons to population and create a column graph comparing each project.
- From the descriptions above and a more detailed review of each project (visit American Water web site referenced in the Exercise section), create a column graph of the number of different uses for the recycled water generated at each site.
- Establish a chart that highlights additional environmental or other benefits that have come about as a result of each project.
- Choose one of the four projects and design and construct a poster presentation that advertises the case study, emphasizes the environmental and other benefits and encourages others to invest in such ideas.
- Present your poster to the class and participate in a vote for the best presentation and project.

QUESTIONS

1. If the cost of one of these projects was more expensive than a less environmentally sound solution, how might you convince the residents, investors or participants to agree undertake the endeavor?
2. Water use in some facilities that use conservation technologies and LEED initiatives may still be over the amount provided by recycled systems. What recommendations would you suggest for reducing water use at each of these sites?
3. Look up the LEED program. Other than water conservation, what are five other initiatives that can be implemented in a LEED building? Describe them.

NOTES

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EXTENSIONS - AT HOME

- Visit the American Water Web site and search under Case Studies. Provide a review of other examples of water conservation projects occurring around the country.
- Find out about LEED projects and other sustainable initiatives underway in your community. Visit the sites and try to get your school, recreation center or local businesses involved.

DEFINITIONS

- **LEED (Leadership in Energy & Environmental Design):**
An internationally recognized green building certification, providing third party verification that a building or community was designed and built using strategies intended to improve performance in metrics such as energy savings, water efficiency, CO2 emissions reduction, improved indoor environmental quality and stewardship of resources and sensitivity to their impacts.
- **Sustainable Resource Use:** It is a pattern of resource use that aims to meet human needs while preserving the environment so that these needs can be met not only in the present, but also for generations to come.
- **Green Building Design:** The practice of creating structures and using processes that are environmentally responsible and resource-efficient throughout a building life-cycle; from siting to design, construction, operation, maintenance, renovation, and demolition.

RESOURCES

- American Water Home Page: www.amwater.com
- United States Green Building Council: www.usgbc.org

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.

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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Join us this year as we celebrate 125 years of service to our customers and our communities.

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.