

## Sustainability: The Grand Canyon as a Case Study

<b>DURATION</b>	60-90 Minutes (depending on activities chosen)
<b>LOCATION</b>	Classroom and/or computer lab
<b>KEY VOCABULARY</b>	<p>Ecosystem: the complex of a community of organisms and its environment functioning as an ecological unit</p> <p>Sustain: to give support or relief to; to supply with sustenance</p> <p>Sustainability: a condition that can continue indefinitely</p>
<b>TRUNK MATERIALS</b>	<p>Master Copies:</p> <ol style="list-style-type: none"><li>1. Article: "A Study of Seeps and Springs"</li><li>2. Reading Guide: "A Study of Seeps and Springs"</li><li>3. Current Event Worksheet</li></ol>
<b>ADDITIONAL MATERIALS (NOT SUPPLIED)</b>	<p>Copies of the following for each student:</p> <ol style="list-style-type: none"><li>1. Article: "A Study of Seeps and Springs"</li><li>2. Reading Guide: "A Study of Seeps and Springs"</li><li>3. Current Event Worksheet</li></ol> <p>One computer per student if possible.</p>
<b>ENDURING UNDERSTANDING (BIG IDEA)</b>	<p>Water is one of the most, if not the most, vital resources in the American West.</p> <p>Water is essential for the survival of humans, animals, and plants. It is crucial to learn about water sources in order to preserve them for the sustainability of surrounding ecosystems.</p>
<b>ESSENTIAL QUESTION/S</b>	<ol style="list-style-type: none"><li>1. As world population increases, is there enough water to sustain everyone?</li><li>2. Why is it important to research and learn about water sources?</li><li>3. Why is water one of the key issues in the future sustainability of world populations?</li></ol>
<b>LEARNING OBJECTIVES</b>	<ol style="list-style-type: none"><li>1. Students will be able to discuss how important water is in the sustainability of communities of not only humans, but wildlife as well.</li><li>2. Through the reading of "A Study of Seeps and Springs" and the completion of the corresponding Reading Guide, students will analyze water issues at the Grand Canyon.</li><li>3. Through the use of current events, students will make connections between the water issues on the Coconino Plateau and similar problems in other regions of the world.</li><li>4. Students will pose possible solution(s) to the issues of sustainability in the articles they analyze.</li></ol>
<b>BACKGROUND</b>	<p>Most people believe that the Grand Canyon's livelihood depends on the Colorado River. Although this is partially accurate, Canyon life also depends on springs that make up 0.01% of its total area. This dependency extends beyond the</p>

## **SUGGESTED PROCEDURE**

Grand Canyon to the entire Coconino Plateau. With the extensive growth that is taking place in the Southwestern United States, it is crucial to study the water sources for the sustainability of ecosystems on the Coconino Plateau and to plan for a successful future.

### Homework Prep:

1. The last 10-15 minutes of class, the class will have a discussion on sustainability. In order to focus students on water, the instructor will ask students to name all the activities they did before class that involved the use of water.
  - A list can be made on the board of the activities
2. Ask students what “sustainability” means.
3. This short discussion will lead into the reading of the article “A Study of Seeps and Springs” (done as homework).
4. Students will be asked to read the article and complete the reading guide for homework. This will give the students a sufficient explanation of the importance of water in the sustainability of a population.
5. The completed reading guide that was done for homework will be each student’s “ticket” into the computer lab.

### Class Period:

6. To extend students’ comprehension of water issues around the globe, they will analyze a current event. The instructor will pass out the current event worksheet to each student.
7. Students will use computers (one per student if possible) and search “sustainability” on either the CNN website or the New York Times website.
8. Students will select and analyze a current event using the current event worksheet.

## **EVALUATIONS (ASSESSMENT)**

If desired, the instructor can grade the “A Study of Seeps and Springs” reading guide and the current event worksheet.

## **EXTENSIONS**

To extend the learning in this lesson, especially for teachers who want to focus more on sustainability in Arizona, the work of Carl Hayden can be analyzed. His fight for the Central Arizona Project was key in today’s sustainability of Phoenix and Tucson. Also, Salt River Project has examples on its website that show the need for being environmentally conscious in order to sustain Arizona populations. Students can look at these examples and see what they can do in their own homes to help conserve water and electricity.

### Resources for Extension Activity:

August, Jack L., Jr. “Hydropolitics in the Southwest: Carl Hayden and the Fight for the Central Arizona Project, 1952-1968.” [A Gathering of Grand Canyon Historians: Ideas, Arguments, and First-Person Accounts](#). Comp. and ed. Michael F. Anderson. Grand Canyon Association, 2005. 163-170. Grand Canyon Association.

**RESOURCES**

[http://www.grandcanyon.org/booksmore/epubs/historians/pdfs/chapter\\_28.pdf](http://www.grandcanyon.org/booksmore/epubs/historians/pdfs/chapter_28.pdf). Accessed 7 June 2008.

“Desertwise options for your home.” Salt River Project. Salt River Project. <http://www.srpnet.com/water/desertwise/residential.aspx>. Accessed 7 June 2008

A Study of Seeps and Springs. National Park Service. <http://www.nps.gov/grca/naturescience/seepspringstudy.htm>. Accessed 7 June 2008.

Cable News Network. <http://search.cnn.com/search.jsp?query=sustainability&type=news&sortBy=date&intl=false>. Accessed 7 June 2008.

New York Times. <http://query.nytimes.com/search?query=sustainability&srchst=nyt> Accessed 7 June 2008.

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