When Is It Ever Going to Rain?
Students use rainfall maps to understand the need for water conservation in Arizona.

Author
Wayne Gorry
Grade Level
4-5
Duration
1-2 class periods

National Geography Standards
Element Five: Environment and Society
16. The changes that occur in the meaning, use, distribution, and importance of resources.

Arizona Geography Strand
Grade 4
Concept 1: The World in Spatial Terms
PO 1. Use different types of maps to solve problems (i.e., road maps –distance, resource maps–products, historical maps–boundaries, thematic map–climates).
PO 4. Construct charts and graphs to display geographic information.

Grade 5
PO 1. Interpret information from a variety of maps:
   a. contour
   b. population density
   c. natural resource
   d. historical maps
PO 4. Construct maps, charts, and graphs to display geographic information.

Concept 2: Places and Regions
PO 5. Describe how regions and places (e.g., Grand Canyon, Colorado River, Casa Grande Ruin, Canyon de Chelly, Yucatan Peninsula) have distinct characteristics.

Concept 3: Physical Systems or Science Strand
4 Concept 3
Describe uses, types, and conservation of natural resources.

Concept 6: Geographic Applications

Other Arizona Standards
Mathematics Common Core Standards
Number and Operations—Fractions
4.NF.C.7. Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model.

Standards for Mathematical Practice

Geometry
5.G.A.2. Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.

ELA Common Core Standards
Writing
Text Types and Purposes
4.W.1 Write opinion pieces on topics or texts, supporting a point of view with reasons and information.
   a. Introduce a topic or text clearly, state an opinion, and create an organizational structure in which related ideas are grouped to support the writer’s purpose.
   b. Provide reasons that are supported by facts and details.
   c. Link opinion and reasons using words and phrases (e.g., for instance, in order to, in addition).
   d. Provide a concluding statement or section related to the opinion presented.

5.W.1 Write opinion pieces on topics or texts, supporting a point of view with reasons and information.
   a. Introduce a topic or text clearly, state an opinion, and create an organizational structure in which ideas are logically grouped to support the writer’s purpose.
### When Is It Ever Going to Rain?

<table>
<thead>
<tr>
<th>PO 3. Use geography concepts and skills (e.g., recognizing patterns, mapping, graphing) to find solutions for local, state or national problems (e.g., shortage or abundance of natural resources).</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. Provide logically ordered reasons that are supported by facts and details.</td>
</tr>
<tr>
<td>c. Link opinion and reasons using words, phrases, and clauses (e.g., consequently, specifically).</td>
</tr>
<tr>
<td>d. Provide a concluding statement or section related to the opinion presented.</td>
</tr>
</tbody>
</table>

**Language**

4.L.2 Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

| a. Use correct capitalization. |
| b. Use commas and quotation marks to mark direct speech and quotations from a text. |
| c. Use a comma before a coordinating conjunction in a compound sentence. |
| d. Spell grade-appropriate words correctly, consulting references as needed. |

5.L.2 Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

| a. Use punctuation to separate items in a series. |
| b. Use a comma to separate an introductory element from the rest of the sentence. |
| c. Use a comma to set off the words yes and no (e.g., Yes, thank you), to set off a tag question from the rest of the sentence (e.g., It’s true, isn’t it?), and to indicate direct address (e.g., Is that you, Steve?). |
| d. Use underlining, quotation marks, or italics to indicate titles of works. |
| e. Spell grade-appropriate words correctly, consulting references as needed. |

---

### Overview

In 2002, Arizona suffered through one of its driest years in recorded history. As part of a more extended period of drought, conditions in Arizona became as dry as when the Anasazi left the area in 1400 A.D. In this lesson, students will look at rainfall maps of Arizona representing normal rainfall and rainfall in 2002. These maps will be used as a springboard for discussing the results of drier weather on the state, including increased risk of forest fire, insect infestation of the national forests, water shortages, and the need for water conservation. Students make decisions about how they can help conserve water in their own homes.

### Purpose

This lesson will help students understand the impact of weather variations on both the natural environment and all life within it. When the natural environment does not provide its usual resources, people must be willing to conserve what is available. After consulting a chart of average annual rainfall compared to rainfall in 2001-2002, students will make decisions about the need to conserve water.

### Materials

- When is it Ever Going to Rain? Average Yearly Rainfall in a Normal Period map
- When is it Ever Going to Rain? Rainfall Totals for the Drought Year Oct. 1, 2001 to Sept. 2002 map
When Is It Ever Going to Rain?
• Student Worksheet and Answer Key
• When Is It Ever Going To Rain chart
• Student Assessment Instructions
• Assessment Checklist
• Line Graph of Rainfall Data for ____ City
• Pencil and Colored Pencils
• Graph paper for assessment

Objectives
The student will be able to:

1. Read maps to identify differences between average rainfall and rainfall for 2001-2002.
2. Analyze data to draw conclusions about rainfall resources and the need to conserve water in Arizona.

Procedures
Students should have experience with decimals so they will understand the meaning of the rainfall data.

Note: The table and worksheet used in step two can be copied on the back of the maps used in step one to save paper.

1. Distribute the two maps: When is it Ever Going to Rain? Average Yearly Rainfall in a Normal Period and When is it Ever Going to Rain? Rainfall Totals for the Drought Year Oct 1 2001 to Sept. 2002. Have students identify areas on the 2001-2002 map where the amount of rain fall is different from average rainfall. Discuss the impact this lower than average rainfall had in the state of Arizona in 2003: forest closures, forest fires, loss of trees to insects, water shortages in rural communities, and water restrictions.

2. Distribute the When Is It Ever Going To Rain chart and the student worksheet. Have students analyze the data in the table to answer the questions.

3. Discuss how the shortage of the natural resource, water, can be partially offset by conservation efforts.

Assessment
The assessment would require an additional class period. Have students refer to the “Table of Average Annual Rainfall and 2001-2002 Rainfall” to create a line graph of the monthly rainfall for ONE city. Have the students write a paragraph describing how their graph shows a need for people to conserve water in their community. Student directions and an Assessment Checklist are included. Mastery is 8 out of 10 or 80% on the checklist.

Extensions
Students can explore actual ways of reducing water consumption. Several sources on the web would be helpful in this investigation:

Salt River Project:

City of Phoenix Water Conservation Resources for teachers:
http://phoenix.gov/waterservices/wrc/index.html

USGS Water Science for Schools:
http://ga.water.usgs.gov/edu/

Have students compare data from 2001-2002 to today’s data for the same cities in Arizona. This could be done in a writing assignment or as a graphing assignment. A website that would be helpful is