

Central Arizona Project: A Story About Water

Students will review a brief history of Colorado River water allocations, and examine current allocations using fractions, percents, and decimals.

Author	Kathryn Anderson
Grade Level	6
Duration	2 class periods

National Geography Standards

ELEMENT SIX: THE USES OF GEOGRAPHY

18. To apply geography to interpret the present and plan for the future.

Arizona Geography Strand 4

CONCEPT 5 Environment and Society GRADE 6

PO 1 Describe ways that human dependence on natural resources influences economic development, settlement, trade and migration.

Other Arizona Standards

Math Common Core Standards The Number System (NS)

AZ.6.NS.9. Convert between expressions for positive rational numbers, including fractions, decimals, and percents.

Standards for Mathematical Practice

6.MP.2. Reason abstractly and quantitatively.

Strand 1 American History

Concept 10: Contemporary United States

PO 1. Describe current events using information from class discussions and various resources (e.g., newspapers, magazines, television, Internet, books, maps).

PO 2. Identify the connection between current and historical events and issues studied at this grade level using information from class discussions and various resources (e.g., newspapers, magazines, television, Internet, books, maps).

PO 3. Describe how key political, social, and economic events of the late 20th century and early 21st century affected, and continue to affect, the United States.

Overview

The ground water and rivers of southern Arizona are not sufficient to supply water to the residents of southern Arizona at the current rate of use. This shortage will only increase in the future as the population continues to grow. The water of the Colorado River has been diverted to southern Arizona to supplement the natural supply of water. There are many political issues surrounding this diversion of water including environmental concerns,

percentage of allocations to different areas, and future water use.

Purpose

In this lesson students will learn how the Colorado River water is allocated between the southwestern states with an emphasis on the Arizona allocation. Students can then predict what might happen to these allocations in the future.

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Materials

- Handout #1: Map of Southwest Topography and Rivers
- Handout #2: Map of Central Arizona Project
- Handout #3: CAP and Colorado River Facts & Figures
- Handout #4: CAP and Colorado River Problems
- Handout #5: CAP Quiz
- Answer sheet to CAP Problems and CAP quiz
- Paper, pencil, calculators

Objectives

The student will be able to:

1. Recognize the Colorado River on a map of the Southwest and find the Central Arizona Project (CAP) Aqueduct on a map of Arizona.
2. Calculate what percent of Colorado River water is allocated to Arizona.
3. Explain how CAP water is currently allocated within the state of Arizona.
4. Express numbers as fractions, decimals, and percents.
5. Predict how water issues will impact the states using CAP water.

Procedures

Prerequisite Skills: Students should have had experience converting between fractions, decimals, and percents.

SESSION ONE

1. Ask students if they know what the Central Arizona Project is. Explain that it is a large canal crossing the state of Arizona carrying water from the Colorado River to the desert areas of southern Arizona. Ask students why the

government of Arizona would want to build such a large canal. (*Growth promotes business and state income. Growth cannot occur in the desert without water.*) Do students know of any other canals? (*Some major canals of the world include the Panama and Suez Canals.*) Where does the Colorado River begin? Where does it end? (*The Colorado River rises in the Rocky Mountains of northern Colorado. It flows southwest into Utah where it is joined by the Green and San Juan Rivers. It then flows through the Grand Canyon and forms the*

Arizona/California border south to Mexico. It then flows through Mexico and drains into the Gulf of California.)

2. Pass out or display Handout #1 – Map of Southwest Topography and Rivers. Ask students to locate the Colorado River in

Arizona, and then trace its course from Colorado, through Utah, and then into Arizona.

3. Pass out Handout #2 – The Central Arizona Project map. Ask students to locate the Colorado River and the CAP Aqueduct. Explain that water from the Colorado River is diverted at Lake Havasu into the 336-mile aqueduct (or canal), which extends to 14 miles south of Tucson. Briefly discuss the fact that CAP water is needed in places like Tucson because the ground water available is not sufficient to meet the demand for water.

4. Distribute Handouts #3 and #4 – CAP Facts and Figures and Problems worksheets. Discuss the way the river water was divided among the upper and lower basins according to the Colorado River Compact. Was the division fair? Why or why not? (*There are no right or wrong answers to these questions. Teachers should encourage students to voice their own opinions on the subject and to defend their positions.*) Ask

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students to complete problems 1 and 2 on the Problems worksheet. Discuss questions 3 and 4. (*An easy way to convert fractions to decimals is to divide the numerator by the denominator. For example, $1 \div 2 = 0.5$. Some fractions will produce long decimals, such as $1 \div 7 = 0.142857143$. The teacher should discuss with students how many digits are necessary in the answers. It may be more convenient to round off to the nearest tenth or hundredth, so that $1 \div 7 \approx 0.14$.*)

5. Instruct students to complete problems 5-8 for homework. Point out that they will use 555,031 as the denominator of their fractions in problem 5, and 2.8 million in problem 6. (*555,031 acre-feet is the total amount of water allocated to cities and industries in Arizona. The rest goes to agriculture and Indian reservations. 2.8 million-acre feet is the total amount of water allocated to the state of Arizona.*) See Answer Key.

SESSION TWO

1. Ask students to take out their completed worksheets: CAP and Colorado River Problems. Review answers to problems 5 and 6. Discuss students' responses to problems 7 - 9.

2. Pass out the CAP Quiz to students. Ask students to work individually or in small groups to complete the quiz.

Assessment

Students should be assessed with the CAP Quiz. Questions 1, 2, 5, 9, and 10 measure geography. Questions 3, 4, 6, 7, and 8 measure math skills. A score of 80% or more indicates mastery of the math and geography objectives.

Extensions

If time allows, students should create circle graphs of the data in the charts on the CAP Problems worksheet, particularly numbers 2, 5,

and 6. This will give them an even better picture of who gets how much water.

Interested students may also want to visit the CAP web site. They can find a more thorough history of CAP, as well as a complete table of allocations. The site also contains a link for teachers and students, which contains lesson plans, interesting figures and photographs, as well as a game about water.

<http://www.cap-az.com>

Sources

The information on the length of the Colorado River was taken from World Book Encyclopedia, 1994.

All other information for this lesson was taken directly from the CAP web site:

<http://www.cap-az.com> The particular links from the home page used for this lesson include: **History, Customers, Allocation, Facts, FAQ, Fun Stuff, and Just for Kids & Teachers**

The Central Arizona Project map is taken with permission from *Arizona Water Story: An Upper Elementary School Unit of Study* located in the Education Packet, which is available <http://www.cap-az.com/PublicInformation/Education.aspx>