Handout #3

CAP and Colorado River
Facts & Figures

The Colorado River is 1,450 miles long. It flows across 1,360 miles in the U.S. and 90 miles in Mexico.

1922 – The Colorado River Compact divides water from the Colorado River among seven states. Wyoming and New Mexico receive water because they have rivers that flow into the Colorado.

Upper Basin States	Colorado, New Mexico, Utah, Wyoming	7.5 million acre-feet annually
Lower Basin States	Arizona, California, Nevada	7.5 million acre-feet annually

How much is an acre-foot?
An acre-foot covers 1 acre of land 1 foot deep
1 acre-foot = 325,851 gallons
1 acre-foot is the amount used by a family of four in one year

1944 – Arizona became the last state to approve the Colorado River Compact. Today, the Lower Basin States divide up their annual 7.5 million acre-feet as follows:

State	Number of acre-feet
Arizona	2.8 million
California	4.4 million
Nevada	300,000

August 26, 2002 – The CAP water in Arizona is allocated each year to cities and industries as follows:

	Number of acre-feet
Phoenix	113,914
Phoenix area cities: Chandler, Gilbert, Glendale, Mesa, Peoria, Scottsdale, and Tempe	135,327
Tucson	138,920
Other cities and industries	166,870
Total	**555,031**

Today – CAP water is sold to three groups of costumers: municipal and industrial, agricultural, and Indian users. The municipal and industrial customers include cities and water utilities, which treat the water for drinking and deliver to people's homes and businesses. CAP contracts 338,906 acre-feet of water to the following Indian tribes: Ak-Chin, Yavapai-Apache, Pascua Yaqui, San Carlos Apache, Tohono O'odham, San Xavier, Schuk Toak, and Tonto Apache.

Handout #4

CAP and Colorado River
Problems

1. Calculate the fraction, decimal, and percent of water allocated to the Upper and Lower Basin states.

	States	Amount of acre-feet in standard notation	Fraction of total	Decimal	Percent
Upper Basin					
Lower Basin					

2. Calculate the fraction, decimal, and percent of water allocated to the three states in the Lower Basin. The total amount of water allocated to the Lower Basin states is 7.5 million-acre feet.

States	Amount of acre-feet in standard notation	Fraction of total	Decimal	Percent
Arizona				
California				
Nevada				

3. How much more water does California get than Nevada? Do you think this is reasonable and fair? Why or why not?

4. Do you think the amount of water allocated to Arizona is fair? Why or why not?

Handout #4 (cont.)

5. Calculate the fraction, decimal, and percent of water allocated to each group out of the total allocated to Cities and Industries of Arizona (555,031 acre-feet).

	Amount of acre-feet in standard notation	**Fraction of total allocated to cities and industries**	**Decimal**	**Percent**
Phoenix				
Other cities around Phoenix				
Tucson				
Other cities and industries				

6. Calculate the fraction, decimal, and percent of water allocated to Indian Reservations and Cities and Industries out of the total allocated to Arizona (2.8 million acre-feet).

	Amount of acre-feet in standard notation	**Fraction of total allocated to Arizona**	**Decimal**	**Percent**
Indian Reservations				
Cities and Industries				

7. What is the total percent of water allocated to Cities, Industries, and Indian Reservations? Where does the remaining water of Arizona's allocation go?

8. Do you think this is a reasonable and fair way to distribute water in Arizona? Why or why not?

9. Do you think these allocations will change in the future? Why or why not? If you think they will change, who will get more water? Who will get less?

Handout #5

Student Name _____

Date _____

CAP Quiz

1. The Colorado River flows through or on the borders of
   a. Arizona, California, New Mexico.
   b. Colorado, Arizona, Utah.
   c. Colorado, Arizona, New Mexico, Utah, California.
   d. Colorado, Utah, Arizona, Nevada, California.

2. The Colorado River Compact is
   a. a mountain in Colorado.
   b. a formal agreement between seven southwestern states and the U.S. government.
   c. a document that tells how much water should go to Tucson and Phoenix.
   d. an act passed by Congress stating where the Colorado River legally begins.

3. An acre-foot is
   a. the amount of water used by a family of four during a year.
   b. the amount of water needed to fill an acre one foot deep.
   c. equal to 325,851 gallons.
   d. all of the above.

4. Imagine there is a drought one year and Arizona receives only one million acre-feet of water from the Colorado River. If the allocation to cities and industries remains at 555,031 acre-feet, about what percent of the total Arizona allocation would go to cities and industries?
   a. About 10% b. A little more than 50% c. More than 75% d. not here

5. The CAP aqueduct flows near
   a. Los Angeles and Las Vegas. b. Flagstaff and Prescott.
   c. Yuma and Nogales. . d. Phoenix and Tucson.

6. Arizona receives a larger allocation of Colorado River water than Nevada. Its allocation is
   a. almost 10 times the amount of Nevada's.
   b. about twice as much as Nevada's.
   c. about 50% more than Nevada's.
   d. almost the same as Nevada's.

7. The Gila River Indian Community receives 173,100 acre-feet of the 338,906 acre-feet subcontracted to Indian tribes. About what fraction of the total Indian contract goes to the Gila River Indian Community?

a. Less than $\frac{1}{4}$ b. More than $\frac{9}{10}$

c. A little more than $\frac{1}{2}$ d. About $\frac{1}{8}$

Handout #5 (cont.)

8. About what percent of the water allocated to the Lower Basin states goes to California?
   a. 60% b. 50% c. 80% d. 40%

9. Why do New Mexico and Wyoming receive some of the Colorado River water?
a. They have rivers that flow into the Colorado.
b. They are states that have large populations.
c. They have large populations that need water.
d. They are close to Arizona.

10. What might happen with water issues in Arizona in the future?
a. People might have to conserve water more than they do now.
b. Water might become more expensive if it becomes scarcer.
c. Different groups of people might dispute the amount of CAP water they should receive.
d. All of the above.

CAP and Colorado River

Problems *Answer Sheet*

1. Calculate the fraction, decimal, and percent of water allocated to the Upper and Lower Basin states.

	States	Amount of acre-feet in standard notation	Fraction of total	Decimal	Percent
Upper Basin	Colorado, New Mexico, Utah, Wyoming	7,500,000	$\frac{7500000}{15000000}$	0.5	50%
Lower Basin	Arizona, California, Nevada	7,500,000	$\frac{7500000}{15000000}$	0.5	50%

2. Calculate the fraction, decimal, and percent of water allocated to the three states in the Lower Basin.

States	Amount of acre-feet in standard notation	Fraction of total	Decimal	Percent
Arizona	2,800,000	$\frac{2800000}{7500000}$	0.3733333	37%
California	4,400,000	$\frac{4400000}{7500000}$	0.5866666	59%
Nevada	300,000	$\frac{300000}{7500000}$	0.04	4%

3. How much more water does California get than Nevada? Do you think this is reasonable and fair? Why or why not?
California gets about 15 times as much water as Nevada (15 x 4% = 60%). Students might bring up the fact that California has as lot more people than Nevada. Teachers should also point out that California has a large amount of agriculture, and that much of our produce comes from California. Whether this is fair or not is the student's opinion. It benefits the entire country to grow produce in California.

4. Do you think the amount of water allocated to Arizona is fair? Why or why not?
This subject is open to debate. Another issue the teacher might want to bring up is the fact that these allocations have greatly reduced the amount of Colorado River water that still reaches Mexico. Another question is whether it is wise to have so many people living in the middle of the desert in the first place. What makes people want to live in a place with no water?

5. Calculate the fraction, decimal, and percent of water allocated to each group out of the total allocated to cities and industries of Arizona (555,031 acre-feet).

	Amount of acre-feet in standard notation	**Fraction of total allocated to cities and industries**	**Decimal**	**Percent**
Phoenix	113,914	$\frac{113914}{555031}$	0.205238987	21%
Other cities around Phoenix	135,327	$\frac{135327}{555031}$	0.243818814	24%
Tucson	138,920	$\frac{138920}{555031}$	0.250292326	25%
Other cities and industries	166,870	$\frac{166,870}{555031}$	0.300649874	30%

6. Calculate the fraction, decimal, and percent of water allocated to Indian reservations and Cities and Industries out of the total allocated to Arizona (2.8 million acre-feet).

	Amount of acre-feet in standard notation	**Fraction of total allocated to Arizona**	**Decimal**	**Percent**
Indian Reservations	338,906	$\frac{338906}{2800000}$	0.121037857	12%
Cities and Industries	555,031	$\frac{555031}{2800000}$	0.198225357	20%

7. What is the total percent of water allocated to Cities, Industries, and Indian Reservations? Where does the remaining water of Arizona's allocation go? *Although Arizona is allocated 2.8 million acre-feet annually, the CAP aqueduct only carries 1.5 million acre-feet of water. The remaining 1.3 million acre-feet (about 46% of the total) are used by organizations and Native American communities directly off the river on the state's western border. About 32% of the total is subcontracted to municipal and industrial consumers, and Indian tribes in the southern part of the state. This leaves about 22% of the total for agriculture.*

8. Do you think this is a reasonable and fair way to distribute water in Arizona? Why or why not?
Students may be surprised to learn that so much water is used for agriculture or sold to Indian reservations. They may question whether or not it is really productive to grow crops in the desert. On the other hand, they may question why there are not more limits on water consumption by residential and industrial customers.

9. Do you think these allocations will change in the future? Why or why not? If you think they will change, who will get more water? Who will get less?
It is almost certain that there will be further debate over water allocations in the future with growing populations in all three of the lower basin states. The amount of water dedicated to agriculture or to reservations may have to decrease in the future, and more food imported from other places. On the other hand, the water to cities may be decreased and people will have to use less water or the growth of Phoenix, Tucson, and other cities may come to a halt.

CAP Quiz Key

1. d (geography)
2. b (geography)
3. d (math)
4. b (math)
5. d (geography)
6. a (math)
7. c (math)
8. a (math)
9. a (geography)
10. d (geography)