PASS THE JUG

Objectives: Students will be able to:

1. define and discuss water rights,

2. understand historical aspects of water rights, and

3. understand why water rights are needed to allocate water.

Materials:

* paper cups of glasses (one per student)

* water jug

* food coloring (Optional)

* sugar or salt (Optional)

Group size: any

Overview

Water rights are used to allocate water in an organized and systematic manner. A water right allows an individual, business, community, or agency to use a specified amount of water. People may own the water right; but never the water.

The history of water rights is closely related to settlement and land ownership. If a person owned the land, he or she could readily make use of water on or adjacent to their property. Over time, however, this simple allocation didn't work well because people began to settle areas alone, rivers upstream of the first settlers. These new settlers, although arriving later in time, now began to use water once only used by those downstream. In times of water scarcity, the downstream user might receive less water than they felt entitled to. The conflict that emerged pitted neighbor against neighbor in a fight for water, and ultimately resulted in a fight for basic survival.

A region's water rights doctrine is the result of many human and environmental factors. The successful settlement of the west was as closely tied to water as to any other factor. Limited water quantity is usually not the only issue. How people use water is also critical. For example, in the past few decades many changes have occurred that have added new dimensions to water rights and water allocation programs. Irrigated agriculture is one large consumer of water. Individuals and corporations invest millions of dollars in irrigation systems to grow crops and to produce forage for livestock which feed a hungry world. Cities also need water to meet the needs of residents, businesses, and industry. Water for

recreation, fish and wildlife is receiving growing attention and is pressuring policy makers to reshape traditional water allocation patterns. The old saying, "a fish out of water" takes on new meaning in the context of this discussion. Instream flows describe the amount of water needed to sustain fish, recreation, wildlife, or designated base flow needs. it is important to all water users to be assured of a supply of water. The nation's system of water rights allocation exists to resolve differences which arise from many different needs and water uses.

Water rights doctrines generally fall into four categories:

1. **Riparian or Common-Law Doctrine:** In most cases, the person who owns land on top of or next to a water source, has the right to use this water without amount limitations.

2. **Reasonable Use Doctrine:** This doctrine is very similar to that of the Riparian Law, but restricts the right of use to "reasonable". A landowner's rights would not be limited until the available supply was not enough to meet the immediate demands of priority uses.

3. **Prior Appropriation Doctrine:** This rule is "first come, first serve" or "first in time is first in right". The first to use the water has first right to available water when it is limited. In the case of groundwater, this would mean that new wells could be prohibited in areas that are already developed. In reality, no more people, businesses or industry would be allowed to develop in this area. This also relates to rivers and streams. If all the water in a stream is allocated, no new users will be allowed. Prior Appropriation protects existing and future users by regulating excess water use.

4. **Correlative Rights Doctrine:** This doctrine combines aspects of both the Appropriation and Riparian Doctrines. It recognizes the watershed as a basic water management unit. For example, all landowners have the same rights to the groundwater they need to supply land that lies on top of the water supply. If too many people are trying to use the available water supply, the courts have to decide how to divide the available water. This is called "Shortage Sharing".

5. **Overriding Rights:** In some special cases, other rules apply.

a. Water found on land reservations and water that has been designated for national security purposes is governed by federal rights.

b. Indian rights to water on Indian reservations.

c. Pueblo rights to water supplies in former Spanish territories.

Water managers at the local, state, and national levels have invested considerable amounts of time and money in establishing monitoring systems to determine atmospheric, surface, and groundwater quantities and characteristics. This information serves as the foundation for setting, water policy and water allocation. Water managers must know how much water is available, yearly and seasonal fluctuations, and any other natural or human factor that might influence water availability. Quantifying water is also important for individual water users. Water meters and other flow measuring devices are used to determine how much water individual users use.

Activity

Understanding water rights can be more fun than you might think. "Pass the Jug" is a staged activity. **The key to its success is thirsty students!**

1 . Prepare for this activity by reviewing the background section on water rights. On the day you use "Pass the Jug", ask your students not to drink water during breaks or recesses thus creating, not only a physical need for water but a philosophical need also.

2. Use the following schedule to introduce the concept of water rights:

Day One - The first exercise will take place with no instructions other than just having each student taking, a seat, pouring themselves a drink of water and passing the jug to the next student. Make sure the jug does not have enough water for all students. Pay close attention to the look on your students' faces and the remarks made by those that did not get a drink. The message you are trying, to convey is that sometimes a water supply cannot meet all needs.

Discuss the water rights' doctrines. Ask your students why water managers need to allocate water, rather than allowing, everyone unrestricted use. Explain that in areas of limited water supplies, water allocation is the only method of meeting all water needs. Have your students debate this issue.

Day Two- Remember to restrict drinking privileges. On the first day, your students ran out of water. They are now experienced in water shortage and will automatically try to conserve and gage their water use. The second day's activities should utilize the same amount of water, however, give your students these instructions with the following in mind:

a. Based on Day One water use, your students already know they will run out of water if consumption amounts are not monitored. When you pass the jug, this time, reverse the order in which you begin. Those who were first the day before, are now last. Ask the students who did not g et water this time, how they feel about those who did. How do they feel about the supplier, the teacher?

b. Discuss prior appropriation water rights and the fact that they are allocated on first come, first serve basis. To demonstrate how this works, have the students line up from oldest to youngest. The oldest student will pour as much water into his or her class as wanted, then pass the jug on down the line. With this self imposed water right in use, students will get a "taste" of the prior appropriation doctrine.

Extensions

1. **Precipitation Fluctuation** -If you run this activity more than two days, you could change the amount in the jug to simulate fluctuations in streamflow from year to year. Some years have heavy streamflow while other years, rivers run dry.

2. **Pollution** - If you would like to discuss how pollution can impact water users, add a drop of food coloring about half way through the jug passing exercise. You could add a sugar

lump to symbolize the invisible chemicals that are carried in water or add salt to demonstrate how used water accumulates salts. Introduce water contamination. When given amounts of contaminant are found in water, the amount is expressed in parts per million (PPM) or parts per billion (PPB). As the volume of water in a river increases, the PPM or PPB will decrease. If the volume of water decreases, the concentration of contaminant will then increase. This concept fostered the saying "the solution to pollution is dilution". The idea is to prevent pollution before it gets started. Have your students list ways on how water quantity can affect water quality.

3. **Snow Pack** - Add ice cubes to extend the amount of time water is available for consumption. How does this experiment relate to snow pack? How does an area snow pack affect stream flow?

4. **Instream Flow** - Place a fish bowl at the end of the last row of students and again pass the water jug. The goal is to have enough water left in the jug to sustain the fish. In reality, why will this most likely be a difficult feat to accomplish?

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