



Lesson # 4

Lesson Plan
Revised 7/06

Utah Liquid History Trunk

Grade Level: 3 - 4

Teachers, this is a basic lesson plan that you may modify at your discretion.

Modifications to Video: There may have been changes to the lesson plan since the video was made. This lesson plan reflects the latest updates made as a result of suggestions from teachers who have presented the lesson during the daytime program. Please continue to send us your ideas!

Overall Educational Objective: Students will gain an appreciation for the pioneers' creative applications of water. They will understand the scientific principles applied to the many uses of water.

Associated Standard and CORE Objective:

- **3010-02** Students will describe the characteristics and uses of water.

Materials List:

- - **Wonders of Water** video
- 28- Photos
- - Washboard
- - Cactus rainstick
- - Waterbag
- - Water witching wands
- - Straight insulator
- - Petticoat insulator
- - Petticoat insulator with bumps

- - Calcium carbonate lamp
- - Eight gold pans
- - Four plastic tubs
- - Tarps
- - Sand and iron pyrite



Lesson Activities:

1. Discuss the history of water uses as covered by the photographs (read the captions on the back of the photos). Children are very interested in seeing old methods of dam building. Many of them are familiar with Lake Powell and are interested in seeing pictures of Mr. Powell.
2. Discuss the washboard. Without the scrubbing action it provides, the soap and water could not get all the dirt out of the pioneers' clothes.
3. Discuss the waterbag. Since it sweats, it allows evaporation, which cools the bag and whatever it is next to. Fill the bag so the students can see how it works.
4. The cactus rainstick is made by spiking the cactus needles inward. The rainstick has charcoal and birdseed inside. When shaken or turned upside-down, it sounds like rain!
5. The water witching wands cross when held over water. Some people believe it works, and some don't. Most people that deal with water believe it works, but cannot explain why.
6. All three insulators were used to keep the electric wires from touching the electricity poles. The first insulator used was the straight insulator. Unfortunately when it rained the water would roll to the bottom of the insulator, and work up inside the insulator. This would create a continuous wet surface that would expand as it froze and break the insulator off. The petticoat without bumps on the bottom was used next. Here the water would roll to the edge of the petticoat keeping the water away from the pole. Again, the water would not always drop off the bottom allowing the ice to build up and break off the petticoat. The

petticoat insulator with bumps on the bottom cured this problem because the water dripped off of the bumps and wouldn't collect on the insulator.

7. The calcium carbonate lamp was one of the first flashlights. Rocks containing a calcium carbonate will give off acetylene gas when water drips on it. Gas exits to a point where a spark is applied. Pioneers even made calcium carbonate chandeliers. One form of calcium carbonate is limestone, hence the expression "dancing in the limelight".
8. Pan for Gold! Fill the tubs with about 2 inches of water. Dish up some sand and water. Use a circular rinsing motion.



9. Call attention to the career fields that are related to this module. Discuss how students might prepare for occupations that interest them.
10. Allow time to clean up.

Note to Teacher: **The Wonders of Water** is an excellent video supplement to this lesson. Consider showing it if time permits.

Picture List:

#1 Workmen and horse-drawn equipment continue to place earthfill as Strawberry Dam nears completion in 1912

Bureau of Reclamation photograph

#1 Utah Governor Henry H. Blood meets with Provo city officials at the Pelecan Pumping Plant on Utah Lake to assess conditions caused by the severe drought of 1933-1934

Utah State Historical Society Photo

#2 Concrete lining of the Strawberry Highline Canal, a key unit of the Strawberry Valley Project, near Salem, Utah in 1915. Photo by George Edward Anderson.

Utah State Historical Society Photo

#2 Workmen and horse-drawn equipment on Strawberry Dam in Utah, 1912. Note the steam tractor on the dam.

Bureau of Reclamation photograph

#3 Painting of Major John Wesley Powell on his Green and Colorado River exploratory voyage of 1869. Powell is waving. Painting by Nick Eggenhofer

Bureau of Reclamation photograph

#3 A horse-drawn snow plow in Salt Lake City in 1949 shows how the process was performed in earlier times.

Utah State Historical Society Photo

#4 Construction of Mountain Dell Dam in Parleys Canyon in 1925. This dam is of an unusual multiple-arch design. Built for the Salt Lake City water works, the dam is 100 feet high and 560 feet wide.

Utah State Historical Society Photo

#4 Woodcut from the Powell report of 1875 depicts men of the Powell Expedition of 1869 running a rapid.

Bureau of Reclamation photograph

#5 Heavy equipment is used to construct Willard Dam (since renamed Arthur V. Watkins Dam). This unusual dam is 11 miles long and encloses Willard Bay. Photo taken 1959

Bureau of Reclamation photograph

#5 Crews dig an irrigation canal near Randlett, Utah in 1910. This work was part of the Ute Indian Irrigation Project

Utah State Historical Society Photo

#6 A new, higher East Canyon Dam rises just downstream from the old one. The older dam was constructed in 1913 to replace still another smaller and older dam. Photo taken November, 1965.

Bureau of Reclamation photograph

#6 A Farm irrigation ditch is lined with concrete to prevent seepage. Photograph probably taken about 1940

Utah State Historical Society Photo

#7 A farm worker laboriously directs irrigation water flowing through row crops near St. George, Utah.

Utah State Historical Society Photo

#7 Gateway Canal, a part of the Weber Basin Project, carries water from Weber Canyon toward Bountiful.

Bureau of Reclamation photograph

#8 During the construction of Glen Canyon Dam, huge 12 cubic yard capacity buckets were used to transport wet concrete from the mixing plant to the dam. One bucket could carry enough concrete for three average sized patios. Photograph taken 1962.

Bureau of Reclamation photograph

#8 A canal near Logan, Utah was cut through solid rock cliffs by pioneers in 1861 and 1862. This is the Logan-Hyde Park-Smithfield Canal.

Utah State Historical Society Photo

#9 Prior to Construction of Flaming Gorge Dam an artist's conception showed how the dam would be fitted into the path of the Green River and where the future shoreline would be. The dam was actually constructed from 1958 to 1962.

Utah State Historical Society Photo

#9 Aerial of Glen Canyon Dam under construction in 1962. The dam was built in blocks to facilitate cooling of the concrete, which heats up as the concrete cures. The mixing plant is on the canyon ledge at right. Glen Canyon Bridge, just downstream from the dam was built from 1957 to 1959.

Bureau of Reclamation photograph

#10 Water wheels are an effective, but slow, means of raising river water out of a channel and up onto the land. Only a few water wheels were built in Utah.

Utah State Historical Society Photo

#11 Major John Wesley Powell (standing, center of middle boat), and his crew prepare to depart Green River, Wyoming, on an expedition down the Green and Colorado Rivers in May, 1871. This was the second Powell Expedition, the first having been performed in 1869.

Utah State Historical Society Photo

#12 During the survey of Cataract Canyon in 1921 by the U.S. Geological Survey, one of the boats was caught by the heavy current of the Colorado River and pinned against a mid-stream boulder. Here two men on the boulder carefully unload the boat and send the supplies to shore by means of a suspended rope.

Utah State Historical Society Photo

#13 President John F. Kennedy, in Salt Lake City on September 27, 1963, starts the first generator at Flaming Gorge Dam by a remote signal.

Utah State Historical Society Photo

#14 Sketch of Mormon pioneers, assisted by Indians, building a dam in City Creek in 1847 to irrigate the Salt Lake City area.

Utah State Historical Society Photo

#15 A large flume, built in graceful curves like a piece of art, carries irrigation water around the hills and through the gullies near Mount Nebo, Utah.

Utah State Historical Society Photo

#16 The title “Measuring the Water” does not indicate the cold misery of standing in icy canal water as they surveyor’s assistants were required to do.

Utah State Historical Society Photo

#17 Upper Enterprise Dam is dedicated upon its completion by an enthusiastic group of Utah citizens in 1910.

Utah State Historical Society Photo

#18 Surveying for a water system. (Surveyors are Americans of Japanese ancestry confined at the Topaz Japanese Relocation Center in west-central Utah during World War II. Photo taken about 1943)

Utah State Historical Society Photo

#19 U.S. Forest Service officials, in 1937, inspect the closed water conduit traversing the slopes of Logan Canyon, Utah.

Utah State Historical Society Photo

#20 Map of the Cataract Canyon portion of the Colorado River in Utah, prepared by Francis Marion Bishop on the Powell Expedition of 1871.

Utah State Historical Society Photo

Extension materials are to be provided by the teacher.

Extensions:

1. Discuss how the Indians believed differently than we do. Read one of the following stories to set the tone, mood, and spirit of the activity:
 - **Arrow to the Sun-** A Pueblo Indian Tale by Gerald McDermott
 - **Dancing Drum-** A Cherokee Legend by Terri Cohlene
 - **Quillwork-** A Cheyenne Legend by Terri Cohlene
 - **Turquoise Boy-** A Navajo Legend by Terri Cohlene
 - **Where the Buffaloes Begin-** by Stephen Gammell
 - **North American Indian Stories-** by Gretchen Will Mayo
2. Allow all of the children to make their own rainstick that they can keep and take home. Use an empty paper towel tube or roll a piece of oaktag paper into a tube and fasten it with masking tape. Tear off a piece of heavy duty foil approximately the length of the tube. Fold the foil in half and then twist. Secure one end by covering it with book tape. Pour a tablespoon of rice, popcorn, beans, and spiral macaroni in the tube. Close the other end of the rainstick. The children can decorate with markers, crayons, or stickers.

Safety Precautions:

1. Keep anything electrical away from the tubs of water.
2. Please dump the water outside, not down the drain.

References:

- Bioscience v47, Feb '97, p.97-106 "Water Resources: Agriculture, the Environment, and Society" This article assesses the status of the world's resources of water. The author also gives suggestions for improving water use.
- National Geographic v184, Nov'93, p.20-37 "Sharing the Wealth of Water" This article discusses water management, water laws, and methods of water conservation through- out North America

Please make your students aware that this lesson relates to the following:

Career Fields:

Science, Technical, Social-Humanitarian

Occupations:

- **Geologist:** Study the physical aspects and history of the earth. They identify and examine rocks; study information collected by remote sensing instruments in satellites; conduct geological surveys; construct maps; and use instruments to

measure the earth's gravity and magnetic field. They analyze information collected through seismic studies. They also search for oil, natural gas, minerals, and ground water.

Education: Bachelor's Degree

- **Historian:** Search for, acquire, appraise, analyze, describe, arrange, catalogue, restore, preserve, exhibit, maintain, and store items of lasting value, so that they can be used by researchers or for exhibitions, publications, broadcasting, and other educational programs.

Education: Master's Degree

- **Hydrologist:** Study the distribution, circulation, and physical properties of underground and surface waters. They study the form and intensity of precipitation, its rate of infiltration into the soil, movement through the earth, and its return to the ocean and atmosphere. Their work is particularly important in environmental preservation and remediation.

Education: Master's Degree

Review Questions:

1. How did the pioneers use water?
2. What did they do to increase the availability and usability of water?
3. Where did they find water?
4. What is "Fool's Gold"? (Iron Pyrite)

