



### Connecting FOSS to Northern Arizona

#### Materials needed:

None

**Time:** Determined by students!

---

#### Materials needed:

Art supplies

**Time:** 45 minutes

---

#### Materials needed:

None

**Time:** Give students a week for this research project.

---

“Water” Investigation 1 page 11:

## Activity 1: “How Repulsive!”

**TEACHER PREPARATION:** Explore things (natural and man-made) that repel water: duck feathers, Gore-Tex®, plant leaves, paint, wax, clay, fish scales...Be open to ideas students will come up with. Students may have had experience with something repelling water that does not seem to naturally do so. Have them explain why they think different things repel water.

### PLACE-BASED ACTIVITIES:

•**Science:** Add an extension or “homework” to make a table of things man-made that absorb and repel water. Consider dividing the table into natural things and man-made things, and going out to the schoolyard or an Environmental Study Area (ESA) to find more things that repel and absorb water.

How should you create the table? Maybe it would be better if students create the table, or if students and teacher work together to create a format that meets their needs.

•**Art:** Have students design “Monsoon Suits” using any of the above natural or man-made materials. Have students draw detailed illustrations of their suits explaining the different materials and how they repel water. These suits could be for humans or any other native animal in northern Arizona. Example: A suit to keep coyotes dry during the monsoons could have a hood of fish scales, sleeves of duck feathers and a Gore-Tex® back.

•**History:** Research what early settlers or Native Americans used to repel water, either in shelter construction or clothing construction. Did different groups of people use different materials? Why or why not? What limited the materials that people could use? Technology? Religion? Easiness?



### Connecting FOSS to Northern Arizona

#### References:

The Watercourse and the Council for Environmental Education. 1995. Project Wet. Pg. 30-34.

#### Materials needed:

Different types of soil  
(students can collect from yards, school grounds, sand pits, etc.)  
Paper cups with tiny holes punched in the bottom  
Scale or balance for weight measurements  
Large tray (or several rectangular cake pans)  
Water

**Time:** 1 hour

---

“Water” Investigation 1 page 17:

## Activity 2: “Soil Saturation”

**TEACHER PREPARATION:** This project is adapted from an extension in the “H<sub>2</sub>O Olympics” activity. Students learned about cohesion (water molecules to water molecules) and adhesion (water molecules to other molecules) and how these two phenomena affect water movement and surface tension. This activity explores how water moves through soil, and how soil holds water in.

#### PLACE-BASED ACTIVITIES:

●**Science:** Students are to design a soil that will absorb the most water when placed in a perforated cup in a tray of water.

1. “Soil Saturation”

How?: Students should inquire into which types of soil absorb water best. They will need to explain to the class why they think their soil mixture will work best using examples from the Flagstaff area.

Collect different types of soil. Dry the soil in the sun for six hours (or an oven on warm for two hours or until dry). Ask for their recipe (enough to fill a small paper cup) and their ideas for why this recipe will absorb the most water.

1. Weigh a cup (remember to punch tiny holes in the bottom), record weight \_\_\_\_\_
2. Fill the cup with soil mixture.
3. Weigh the cup and soil \_\_\_\_\_, subtract cup weight = \_\_\_\_\_.
4. Make sure to record the dry weight of the soil! Write it on each cup.
5. Place the cups in a tray filled with a shallow amount of water (2-3 in)
6. Wait 30 minutes and remove cups one at a time to be re-weighed
7. Dry the sides and bottoms of the cups and re-weigh, record new weight.



**Connecting FOSS to  
Northern Arizona**

"Soil Saturation" cont'd:

8. Subtract wet weight from dry weight to determine water weight.
9. Who won? What was their recipe? Why do they think it worked?

●**Naturalist/Inquiry:** Where might you find this type of soil? What types of plants might like this soil?



### Connecting FOSS to Northern Arizona

#### Materials needed:

Stream model (or 3-4 old rectangular cake pans)  
 Bucket to collect water  
 Wooden blocks to set the model up and change elevation  
 Different soil types (could be saved from Activity 2)  
 Rocks  
 Pieces of different types of vegetation (grass sod, tree twigs, leaves, etc.)

**Time:** 2 hours

---

"Water" Investigation 1 page 19:

## Activity 3: "Water on a Slope"

**TEACHER PREPARATION:** Think of local rivers or streams students could model. Rio de Flag is close to some local schools and could prove to be an interesting study. The Rio de Flag has been altered considerably by early Euro-American settlers and recent Euro-American settlers. Oak Creek could also be a great study area (field trips and/or maps could be helpful in this study. Students can also create their own rivers or streams using models.

#### PLACE-BASED ACTIVITIES:

•**Science:** Borrow the stream table from the NAEERC (928-526-1651), or make simple stream tables with old cake pans. Play with elevation, vegetative cover, rocks, soil types, etc. Assignment: find out as much as you can about water on slopes in the "laboratory", before moving to the sandbox, schoolyard, ESA or greater Flagstaff area. Keep a notebook and compare notes with other scientists. Are we worried about wasting water?

•**Art/Field Trip:** Find the highest places on the school grounds, ESA, or the city of Flagstaff (maybe starting close to home and broadening horizons as the concepts are solidified in the kids' minds) and try to make a map or drawing of how water flows across the area. Remember to mention infiltration, (some water sinks into the ground) because in Investigation 4 the kids explore this idea further.

•**History:** How and why was the Rio de Flag altered? A good reference for this is "Stone Landmarks" (see Book List) Discuss how most of west Flagstaff is located within the 100-year floodplain: Every 100 years there is likely to be a flood that will cover the entire floodplain area. Downtown is located in the 10-year floodplain. What else are floodplains good for? Nutrient-rich soils are washed into floodplains and make them great for farming. Why isn't Flagstaff a great farming area? (Hint: very short growing season)



### Connecting FOSS to Northern Arizona

#### References:

The Watercourse and the Council for Environmental Education. 1995.

Project WET: Curriculum & Activity Guide. Bozeman, MT: Montana State University Press. Pg. 129-132. [NAEERC has one]

#### Materials needed:

Copies of branching patterns (see page 3 of this activity)  
 Blue-colored water  
 Spray bottles  
 Newsprint  
 5 to 10 rocks  
 Aluminum trays  
 Plastic wrap (heavy duty)  
 Paper and pencils  
 Topographic map of the area around Flagstaff

**Time:** 2 hours

"Water" Investigation 1 page 23:

## Activity 4: "Watersheds"

### BACKGROUND INFORMATION:

It seems to me that there is a huge gap here...if we are studying water on a slope, should we not go outside and find slopes, observing the evidence of the movement of water around our school yard, the ESA, or extending to the watershed that encompasses the Flagstaff area?

Watersheds are a huge thing to learn about. Look for a Resource Center for Environmental Education (RCEE) program about this.

Project WET workshops should be encouraged. The Resource Center's Director, Glo Edwards, is trained as a Project Wet facilitator if you are interested in becoming trained and receiving the curriculum guide.

Watersheds are areas of topographically complex landforms that shed water into the same river system. In the case of Flagstaff, most of our water is shed from the peaks, stored in springs and groundwater supplies. This water runs through town in the Rio de Flag, fills Lake Mary and runs over the Mogollon Rim into the Upper Verde River. Many small streams originate on the Rim and become tributaries of the Verde: Pumphouse Wash into Oak Creek, Wet Beaver Creek, Fossil Creek, West Clear Creek, etc.

### TEACHER PREPARATION:

Gather the supplies and become familiar with the watershed(s) around Flagstaff.

### PLACE-BASED ACTIVITIES:

•**Science/Construction:** Construct a watershed and watch how it sheds water

1. "Watersheds"

How?: Using Project WET's activity "Branching Out" as a guide, the following activity was created. Pass out copies of the branching out sheets (last page of this activity).



**Connecting FOSS to  
Northern Arizona**

"Watersheds" cont'd:

Talk about what all four pictures have in common. Have students then build watersheds by constructing a landform out of rocks in their aluminum trays. Have students cover wrap the rocks with newsprint before placing them in the tray. Situate the rocks so that the rocks on one end of the tray are higher than the others to create the top line of the ridge of their watershed. Cover this landform tightly with plastic wrap. Have students look at their landforms and decide where they think the water will flow after a rainstorm. Tell them to start a rainstorm using the spray bottles filled with blue water. Have students look for the branching patterns on their landforms while they are spraying.



**Connecting FOSS to  
Northern Arizona**

"Water" Investigation 1 page 24:

## Supplement 1: "Liquid Treasure Trunk"

There is a "Liquid Treasure Trunk" which is available from the Resource Center for Environmental Education, 928-779-1745. The trunk includes hands-on artifacts that are meant to stimulate curiosity about the history of water use in Flagstaff. Artifacts include a piece of the redwood pipe that was part of the first water system in town (1898), dowsing rods, a model outhouse, water samples from the Lake Mary water treatment plant, a natural sponge, a dipper, etc. There are activities about water use, especially comparing present and past water uses. Historic photographs and old newspaper articles, posters, maps, and outstanding literature round out the materials in this place-based kit. The kit can be used any way a teacher desires, for as simple as enhancement of the FOSS kit or as extensive as a format for research projects and field trips.



### Connecting FOSS to Northern Arizona

#### References:

The Watercourse and the Council for Environmental Education. 1995. Project WET. Pg. 382-388 & 392-396.

#### Materials needed:

None

**Time:** 15 to 30 minutes

---

"Water" Investigation 1 page 24:

## Activity 5: "Watching our Water Resources"

This activity was modified by Debra Prichard, NAU.

#### BACKGROUND INFORMATION:

Water is an important resource to all living things such as plants, animals and humans. Animals who live in the ocean occupy 97% of the earth's water resources. Plants and land animals share the other 3% of the water. Less than 1% of that is accessible to humans. If you take this 1% and divide it by the six billion people that live on the planet, how much water would each person have? So, with this small amount of water that you do have, what do you do with it? Do you cook with it? Drink it? Bathe or shower with it? Or maybe water your grass, garden or plants? Or wash your car?

#### TEACHER PREPARATION:

Call the water Company in your area for facts on how much water is used in your community.

#### PLACE-BASED ACTIVITIES:

•**Science:** Everyone needs and uses water daily.

Investigate how much water you use in a day!

1. "Watching our Water Resources"

How?: Discuss with the class how much water is on earth.

Have students brainstorm on how much water they use in one day. Ask them how much water they drink (remind the students that some drinks like soda and Kool-Aid® are mostly water). Do their parents cook with water? Do they run the dishwasher or do dishes by hand? Do students take baths or showers? For how long? Do students leave the water running when they brush their teeth? Do they have pets who drink water, too? Have students write down what they use water for and about how much they use.



### Connecting FOSS to Northern Arizona

#### Materials needed:

None

**Time:** 15 to 30 minutes

---

#### Materials needed:

None

**Time:** 15 to 30 minutes

---

#### "Watching our Water Resources" cont'd:

•**Science/History:** What if you lived on a farm in the 1900's and had to pump your water from a well outside the house and bring it inside? Investigate how much water you would use in a day.

2. "A day in the life of..."

How?: Tell the students to imagine they are living on a farm or ranch in the 1900's and that they have to pump their own water from a well outside and bring it inside for their family to use. Show the students a picture of a farm and a water pump or draw a picture on the board. This will help students explore their imagination further. Go through the same steps as in the first part of the activity. Ask students how the farmhouse and their current houses are different. Ask how much water they might use in the farmhouse and how long it would take them to carry all the water.

•**Science:** Compare and contrast. How do the two scenarios compare?

How?: Compare and contrast how much water students might use if they lived in a farmhouse in the past and a farmhouse in the present, or in a city in the past and a city in the present. Which households would use the most water and why?



**Connecting FOSS to  
Northern Arizona**

"Water" Investigation 1 page 26:

## Activity 6: "Water Music"

**Use the water music now located in this kit!**

### **PLACE-BASED ACTIVITIES:**

Target has inexpensive cassettes that are recordings of storms and water flowing...great background "music" for poetry, drawing, even creating tables and graphs, or painting with WATERCOLORS! ☺ I think it would be cool to do a comparison of water recordings and water music...what is it about some classical pieces that reminds us of water...etc.

Build in a larger art and music integration.



### Connecting FOSS to Northern Arizona

#### Materials needed:

Groundwater model:  
 borrow from the RCEE  
 (928-779-1745) or the  
 NAEERC (928-523-  
 1651)

**Time:** 1 hour

---

"Water" Investigation 1 page 27:

## Supplement 2: "Water Moves Through the Ground?!"

### PLACE-BASED ACTIVITIES:

#### •Science:

1. "Water Moves Through the Ground?!"

How?: The Resource Center for Environmental Education has groundwater models and materials to create soil columns for more "movement of water in earth materials" investigations. Tie groundwater investigations to the glacial deposit wells on the peaks (wonderful infiltration), to springs in our area (often porous basalt acting as a sponge or sieve for water to pond on clayey Moenkopi sandstone, also the huge system of cracks and fissures in the Kaibab Limestone that we tap with our wells, and that channels water from this part of the Plateau toward Blue Springs on the Little Colorado River.



### Connecting FOSS to Northern Arizona

#### Materials needed:

Limnology kit: borrow from NAEERC (928-523-1651)

**Time:** Field trips are difficult to estimate. Plan on spending at least an hour working with the limnology kit in the field.

---

"Water" Investigation 2 page 15:

## Activity 7: "Pond Pondering"

#### TEACHER PREPARATION:

Field trips are difficult to plan. To be best prepared, practice with the limnology kit before you take your students out so you understand how to use the equipment. Employees at the NAEERC should be able to tell you how to use the equipment in the limnology kit. If they do not, email Carri J. LeRoy at <CJL2>

[cjl2@dana.ucc.nau.edu](mailto:cjl2@dana.ucc.nau.edu)

#### PLACE-BASED ACTIVITIES:

After reading Science Stories, "The Pond", tie to local ponds and even lakes. Bring in the natural cycles of upwelling in lakes and ponds, Have students map, identify local water resources for wildlife, include tanks. Springs, lakes, ponds, streams, use as a basis for animal extension activities. Arizona animals and the difficulty they have surviving even in this high 'desert' Riparian areas.

Borrow Limnology Kits from NAEERC which include benthic invertebrate samplers, zooplankton/phytoplankton nets, secchi disks, and water sample bottles...take to field sites. (Penny Planeta at the FSRC has some little microscopes for teachers to borrow)

#### Field trip sites could include:

Marshall Pond  
Lake Mary  
Ashurst Lake  
Mormon Lake  
Stock tanks on Forest Service lands



**Connecting FOSS to  
Northern Arizona**

“Water” Investigation 2 page 26:

### Supplement 3: “Ice is Nice”

**PLACE-BASED ACTIVITIES:**

Research ice in northern Arizona: snowfall and snow pack are two of the most important factors in the replenishment of our water supply. Heavy snow pack followed by heavy rains are a recipe for flooding. Ice on Lake Mary affects wildlife like Bald Eagles and their migration to the lake as well as their feeding (Game and Fish has some information on this). I think the eagles were observed actually breaking the ice to get at the fish.

Regarding the ‘Ice History,’ there is information in the “Liquid Treasure Trunk”: ice tongs, some photographs, and a couple of articles.



### Connecting FOSS to Northern Arizona

"Water" Investigation 3 page 16:

## Activity 8: "Wetland Construction"

### TEACHER PREPARATION:

The Kachina Village Wetlands are private property owned by the Kachina Village Improvement District (KVID). Permission must be obtained prior to a visit when group size exceeds 5 people.

Kachina Village Wetlands were designed to deal specifically with wastewater disposal issues and wildlife issues. Pose the problem to students and see if they can decide what to do!

The community in Kachina Village is too far from Flagstaff to hook into the city wastewater treatment system. Until the 1990's Kachina Village did some preliminary treatment and sent wastewater into Pumphouse Wash, a tributary of Oak Creek. Once Oak Creek was designated a Scenic Waterway, wastewater could no longer be discharged into the drainage. At this point Kachina Village had to do some serious rethinking.

They decided to do preliminary and secondary treatments and then pump the wastewater uphill to a windswept mesa to perform 2 functions: 1. completely evaporate the water and send it back into the water cycle as water vapor, and 2. create wildlife habitat for aquatic organisms and migratory birds.

### PLACE-BASED ACTIVITIES:

•**Science:** "Wetland Construction" Explain the problem to students to see if they can come up with a reason that the wetland ponds were placed almost a mile away from the treatment plant, high on the windswept mesa. 😊 This is fun. Pose a problem for a wildlife manager or rancher who wanted to provide a constructed water resource...how would the location and the surface area of the pond or tank need to be considered before construction?



Connecting FOSS to  
Northern Arizona

"Water" Investigation 3 page 20:

## Activity 9: "Dams and Water Loss"

### TEACHER PREPARATION:

Maybe spend some time looking around on the Internet for information about Arizona reservoirs and dams. Try the Glen Canyon Institute's website: [www.glencanyon.org](http://www.glencanyon.org), or <http://www.drainit.org> for dam-removal opinions, and the Friends of Lake Powell website: [www.lakepowell.org](http://www.lakepowell.org) or another at [www.lakepowell.net](http://www.lakepowell.net), for pro-dam opinions.

### PLACE-BASED ACTIVITIES:

•**Science:** Research the Glen Canyon vs. Lake Powell issue.

1. "Dams and Water Loss"

How?: Pose a research question to class and have different individuals research different issues about Lake Powell and the move to restore Glen Canyon.

Lake Powell evaporation statistics are staggering. Ask students to think about current issues related to Glen Canyon Dam, and other lakes used for water storage and recreation in AZ. This is mentioned on the last page of this investigation, under the heading "Research Water Storage and Delivery Systems" Have students research the evaporation rates of these reservoirs. Have them try to determine how these statistics are computed. Is there any way to simplify these calculations and let kids use them in the classroom?



### Connecting FOSS to Northern Arizona

"Water" Investigation 3 page 25:

## Activity 10: "Flagstaff's Water Cycle"

### BACKGROUND INFORMATION:

Try to trace a raindrop's route from the sky to your faucet. A raindrop will do one of the following:

1. seep into the ground and become groundwater in our aquifers, then possibly get pumped out of the ground in a well field out by Woody Mountain, travel through pipe to the Lake Mary water treatment plant and then travel through pipe to your faucet.
2. run into a stream that flows to Lake Mary, go through the Lake Mary water treatment plant and then travel through pipe to your faucet.
3. Land on the San Francisco Peaks and seep into the ground, then possibly get pumped out of the ground at the wells at the top of the Inner Basin, travel through pipe to the Lake Mary water treatment plant and then travel through pipe to your faucet.

### TEACHER PREPARATION:

It would be nice to have a map of this area that you could use to trace different paths of water movement through the water cycle.

### PLACE-BASED ACTIVITIES:

#### •Science:

1. "Flagstaff's Water Cycle"

How?: Have students create a drawing, or map of Flagstaff's water cycle. Include basic information about the SF Peaks and how they "bring" weather to Flagstaff. Or have students do paintings or drawings of just pieces of the water cycle and then put them together like a mosaic total of Flagstaff's water cycle



**Connecting FOSS to  
Northern Arizona**

“Water” Investigation 3 page 27:

## Supplement 4: “Water Recycling”

### **BACKGROUND INFORMATION:**

Flagstaff has yet to design a system to completely recycle drinking water back into drinking water. Explore with your class what they actually do to recycle our water in Flagstaff.

Our drinking water comes from the Lake Mary water treatment plant. It then travels in pipes and comes out our faucets. Once it goes down the drain, toilet or tub, it leaves the house in pipes and travels to the Rio de Flag wastewater treatment plant or Wildcat Hill wastewater treatment plant. Here the sewage/waste water is treated in various processes (preliminary, primary, secondary & tertiary treatment). From the Rio de Flag treatment plant, the water is either used to irrigate lawns on NAU campus, FUSD schools, city parks and cemeteries or it is discharged into the Rio de Flag behind the county jail. The heavy sewage from the Rio de Flag travels on to Wildcat Hill and gets further treatment.

Recycling some of this water for irrigation helps Flagstaff save drinking water for other purposes. Yes! We use drinking water in our hoses, toilets and showers, too! Amazing, huh?

### **PLACE-BASED ACTIVITIES:**

Research recycling water, both in the methods used here in Flagstaff and also some methods now used in California to treat water from toilets to eventually become drinking water again (Toilet-to-Tap). A field trip to the Lake Mary water treatment plant or to the Rio de Flag wastewater treatment facility would be a great experience.



### Connecting FOSS to Northern Arizona

#### References:

Western Regional Environmental Council. 1987. Project Aquatic: Aquatic Education Activity Guide. Pg. 7-9.

#### Materials needed:

Map of world  
Globe of world  
5 to 10 gallon aquarium  
1 gallon milk jug  
Calculators  
Measuring cup  
1 quart container for every three students  
1 measuring tablespoon for every three students.

**Time:** 1 to 2 hours

"Water" Investigation 4 page 4:

## Activity 11: "The WATER Planet?"

### BACKGROUND INFORMATION:

We live on a very wet planet, but how much of that water is actually available to us? About 70% of the world is covered by water (oceans, lakes, ponds, rivers, glaciers, etc.). We seem to have an endless supply of water...but is that really true? This activity will show you just how much water we actually have access to for drinking, bathing, washing, cooking, etc.

### PLACE-BASED ACTIVITIES:

#### •Math/Science:

1. "The WATER Planet?"

How?: Make students aware of the amount of water that is shown on a map of the world and on a globe. Then write the following statistics up on the board:

#### Percentages of Water on Earth:

Oceans	97.2%
Glaciers/icecaps	2.0%
Groundwater	0.62%
Freshwater lakes	0.009%
Inland seas/salt lakes	0.008%
Atmosphere	0.001%
All rivers	<u>0.0001%</u>
Total	99.8381%

(from The Cousteau Almanac. 1981. New York: Doubleday/Dolphin, Pg. 114.)

Have students sum the freshwater available for human use. Talk about current threats to our water supply (pollution, contamination). Also ask students to discuss some organisms that need both fresh and salt water to survive (estuarine ecosystems).

Pour five gallons of water into the aquarium to show students what 5 gallons looks like. 5 gallons = 1280 Tablespoons. Have students pretend that the 5 gallons of water represent all of the water on Earth. Have them then



### Connecting FOSS to Northern Arizona

#### References:

Western Regional Environmental Council. 1987. Project Aquatic: Aquatic Education Activity Guide. Pg. 7-9.

#### "The WATER Planet" cont'd:

calculate the different water volumes in tablespoons using the given percentages.

Have students shift the decimal places in the percentages to do multiplication. For example: 97.2% should be turned into 0.972 and multiplied by 1280 tablespoons = 1244.16 tablespoons.

Here are the answers!	<u>Tablespoons</u>
Oceans	1244.16
Icecaps/Glaciers	26.24
Groundwater	7.93
Freshwater lakes	0.11 (1/10 of a Tbsp.)
Inland seas/salt lakes	0.1 (1/10 of a Tbsp.)
Atmosphere	0.0128
Rivers	<u>0.0012 (less than a drop)</u>
Total	1280

After the students have all calculated the respective numbers of tablespoons of water available, have them total all sources of water except oceans (around 34 tablespoons) to show total freshwater availability. Split the class into groups of three and have them put 34 tablespoons of water into a bowl.

Then have the students take out the amount of water for all freshwater lakes and rivers. Discuss this with the students. This is the freshwater that is visible to humans. How much of it is there?



**Connecting FOSS to  
Northern Arizona**

"Water" Investigation 4 page 15:

## Supplement 5: "Water Power into Horse Power"

When talking about the "Science Stories" *The Power of Water*" relate this to Arizona dams. Have students research dams like Glen Canyon Dam, Hoover Dam, Boulder Dam, etc. How much power do they generate? How much water do they use? What are some of the side effects? What do we get from dams?



**Connecting FOSS to  
Northern Arizona**

"Water" Investigation 4 page 16:

## Activity 12: "Steam Power"

### **TEACHER PREPARATION:**

Borrow the Liquid Treasure Trunk from the RCEE 928-779-1745.

### **PLACE-BASED ACTIVITIES:**

#### **•Science/History:**

##### 1. "Steam Power"

How?: Talk about how steam was used to create electricity as well as for steam heat in a remarkably sustainable system from 1895-1950's.

Compare this with wind power today!



### Connecting FOSS to Northern Arizona

#### References:

The Watercourse and the Council for Environmental Education. 1995. Project Wet. Pg. 242-245.

#### Materials needed:

Styrofoam cups  
Play dough  
Toothpicks  
Washers  
Straws  
Masking tape  
Large washtubs  
Other good stuff!

**Time:** 30 minutes to 1.5 hours

---

#### Materials needed:

Colored pencils  
Paper  
Pencils

**Time:** 30 to 45 minutes

---

“Water” Investigation 4 page 19:

## Activity 13: “Machines to Move Water”

This activity was modified by Debra Prichard, NAU.

#### BACKGROUND INFORMATION:

Have you ever blown bubbles in your chocolate milk to better mix the chocolate with the milk? Have you and your friends ever swum around the perimeter of a small pool to get the water moving and then let the current take you floating around in circles? Have you ever had something floating in the water that you could not reach so you put your hand in the water and starting pulling the water towards you to bring the object closer? These are some of the ways we can make water work for us. How else can we make water move to benefit our needs?

#### TEACHER PREPARATION:

Gather enough materials for the students to make several machines to help move water. Use anything else that you have if you think it would be helpful!

#### PLACE-BASED ACTIVITIES:

•**Science:** Discuss different ways to move water. This will generate some scientific thought.

1. “Machines to Move Water”

How?: Give each group a box of objects and have them design their own machine to move water somehow. Ask the students to predict the results of what their machines can do. Conduct experiments with the machines and record data. Report the final conclusions to the class. Have students take a look at all their classmates’ machines.

•**Art/Writing:** Have each student draw his or her machine and write a brief description about it. Encourage the students that finish their machines early to include lots of detail. Have students name their machines and describe how they work.