



Image Credit: Melissa Mullins

# Baylor Water Festival Guide

 | Baylor University®

  
Center for Reservoir & Aquatic Systems Research

## Overview

The purpose of this guide is to provide information needed to participate in or host a Baylor Water Festival to teachers, school administrators, community partners, and volunteers. Baylor Water Festivals are sponsored by the Center for Reservoir and Aquatic Systems Research (CRASR) at Baylor University and the goal of a water festival is for school children and community members of all ages to learn about water in a fun, hands-on and active way.

## AUDIENCE

Activities of the Baylor Water Festival are aligned with Texas Essential Knowledge and Skills (TEKS) at the 4<sup>th</sup> grade level. However, the activities are suitable for adults and children of all ages. They can easily be adapted for younger and older students and for groups such as multi-generational family groups or scouts.

## LOCATION AND SPACE REQUIREMENTS

Baylor Water Festivals may be hosted at schools, or at community sites such as parks, museums or nature centers. Outdoor spaces such as grassy areas or even parking lots are ideal; large indoor spaces such as a gym may also be used. If there is a nearby water body such as a lake, stream, or river, it is desirable to set up the water festival in proximity.

There should be adequate space for 5 activities and a check-in table or area to spread out sufficiently that students and groups are not crowded. If outside, the Water Festival will bring pop-up tent canopies and folding tables that will be set up to accommodate activities and students.

Activities can be messy and are active, so areas that are carpeted or contain items that could be broken or damaged are not suitable for a water festival.

## VOLUNTEER REQUIREMENTS

Volunteers are required to lead activities at each of 5 activity stations. Each volunteer will be assigned to one station. Ideally, there will be a minimum of two volunteers per station. Volunteers may be from community groups such as Texas Master Naturalists, businesses who wish to host or support a Water Festival, teachers or other school staff, parents, Baylor students or student groups, and others. Volunteers will be trained to conduct the activities by familiarizing themselves with this guide and watching videos demonstrating each of the stations. In-person training for groups is available on an as-needed basis. All volunteers must comply with all background check and policy requirements of schools and Baylor University to work with youth.

At a Water Festival set up as a community come and go event, volunteers will not lead students through timed rotations but will still be required to facilitate participant engagement with the activity stations.

It is ideal if lunch is provided for volunteers, either by a sponsoring business, community partner, or school cafeteria.

## HOST AND SPONSOR ROLES

Schools and community partners may host a water festival. They supply or choose the site, and recruit and organize participants. They may supply some volunteers if possible. Lunch should be provided for volunteers if possible.

Businesses or other community organizations may choose to sponsor one or more water festivals. Possibilities for sponsorship include providing volunteers, purchasing t-shirts for the volunteers and/or participants (which may be branded accordingly for sponsors), and sponsoring lunch for volunteers.

CRASR is responsible for supplying all activities and training volunteers.

## CAPACITY

For school groups, activities are suitable for one class of students with a teacher to be at a station at a time, with a group size of 20-25 students, for a maximum of 100-125 students per 2.5-hour rotation. There is no capacity restriction for a come and go community Water Festival.

## PRE-WATER FESTIVAL CLASSROOM ACTIVITIES

Students should make their Passport Booklets (Appendix A at the end of this guide) to use during the water festival. Materials required:

- Booklet page (printed according to instructions), one per student
- Scissors
- Staplers

Students should complete the Warm-Up activity (page 1 of the Passport Booklet) in class to discuss water places they have been and ways that water is used.

## EXAMPLE SCHEDULE AT A SCHOOL

The schedule may vary depending on needs. But if two rounds of rotations are desired, it can make for a very long day. Depending on security of the area, it may be possible to set up the day before. It is also possible to shorten activity length and time per rotation. It is possible to reduce the number of activity stations, but this will also reduce the number of students that can participate. It is also possible to have the Water Festival go over multiple days at a school to accommodate more classes.

Activity Station Set Up	1.5 hours prior to start	7 AM
Morning Group Check-In	½ hour prior to start	8:30 AM
Rotation through 5 activity stations	½ hour each including passing time; total = 2.5 hours	9 am- 11:30 AM
Wrap Up	15 minutes	Conclude by 11:45 AM
Lunch for Volunteers	½ hour	11:45-12:15
Afternoon Group Check-In	15 minutes	12:15-12:30
Rotation through stations	2.5 hours	12:30 -3:00
Wrap Up	15 minutes	3:15
Activity Station Break Down and Clean Up	1 hour	Finish by 4:15 pm

If the Water Festival is set up as a come and go community event, the time requirements are much more flexible.

# Activity Station Descriptions

## Fish Prints

**TEXAS ESSENTIAL KNOWLEDGE AND SKILLS: EXPLORE HOW STRUCTURES AND FUNCTIONS ENABLE ORGANISMS TO SURVIVE IN THEIR ENVIRONMENT**

**STATION ACTIVITY:** At this station, students will make a fish print of a Texas native fish.

**PASSPORT ACTIVITY:** Fish Prints is found on page 2 of the Passport Booklet (at the end of this guide). Students will add any structures that they like (real or pretend) to a fish body, describe what functions those structures do, and how that helps their fish to survive.

### MATERIALS AND SET UP

- Texas native fish rubber fish replicas
- Plastic trays to set fish in
- Tables, covered in newspaper or butcher paper if possible
- Washable paints such as tempura
- Blank white paper, including some 11 x 17 sheets if large fish are used
- Sponge paintbrushes to apply the paint
- Buckets with water and sponges to clean the fish off between prints
- Clothesline and clothespins to dry the prints; these can be strung from pole to pole of the canopy
- Sharpies to label prints with names
- Rubber Stamp(s) for Passport Booklets

### NOTES TO VOLUNTEERS

There won't be a lot of time for talking points or instruction at this station, it is more about doing the activity. You should demonstrate how to make a print to each group.

You may divide the group into two, and one half makes prints while the other works in their passport booklet. Students should write their names on their print paper. Prints will be dried on clotheslines (if possible) and taken to the school office at the end of the day.

Challenges associated with this station include cleaning the fish between uses and keeping kids moving so that everyone gets an opportunity to make a print. Allow students to share out their fish structures and functions as time allows.

## The Incredible Journey

**TEKS: DESCRIBE AND ILLUSTRATE THE CONTINUOUS MOVEMENT OF WATER ABOVE AND ON THE SURFACE OF THE EARTH THROUGH THE WATER CYCLE AND EXPLAIN THE ROLE OF THE SUN AS A MAJOR SOURCE OF ENERGY IN THIS PROCESS**

**STATION ACTIVITY:** This activity is based on the Project WET activity of the same name. Students trace the path of a water drop in the water cycle through a series of stations by rolling dice and keeping track of where they travel.

**PASSPORT ACTIVITY:** The Incredible Journey is found on page 3 of the Passport Booklet. Students should make a mark in each box to track their journey and answer the questions. In some versions of this activity, students may make bracelets using various materials.

### MATERIALS AND SET UP

- Station Markers (9)
- Dice, one for each station (9)
- Rubber stamps for Passport booklet

This is an active game, and no tables or chairs are needed other than for volunteers.

### NOTES TO VOLUNTEERS

Spread students out to line up at the different stations before starting the game. Students roll the dice to see where to go to next (or stay). Explain to them how to use the Passport booklet to track their journey.

End the game with enough time to discuss the questions and have students share out about where they spent the most time as a water drop. Where did they have the most marks? Was everyone's journey the same? Why or why not? How long do you think a water drop in the ocean stays there (compared to a water drop in a cloud)? How would a water drop get from the ocean to a cloud and back again? How long do you think a water drop in groundwater would stay there, and how could it get out of groundwater or back again?

Have a few students explain the role of the sun in the water cycle.

## Backyard Bass

**TEKS: DESCRIBE THE FLOW OF ENERGY THROUGH FOOD WEBS, BEGINNING WITH THE SUN, AND PREDICT HOW CHANGES IN THE ECOSYSTEM AFFECT THE FOOD WEB.**

**STATION ACTIVITY:** At this station, students attempt to catch fish in a pond with fishing rods fitted with casting plugs. The fish represent different native Texas species.

**PASSPORT ACTIVITY:** Backyard Bass is found on page 4 of the Passport Booklet. Students draw a food web featuring one of the Texas native fish in the pond and explain the flow of energy through it starting with the sun.

### MATERIALS AND SET UP

- Fish “Pond” (can be a blue tarp, can be chalk drawn on pavement, etc)
- Rods and reels with casting plugs (20-30)
- Backyard Bass fish, with pictures and descriptions of Texas native fish taped on the back, along with what it eats and what eats it.
- Rubber stamps for Passports

This is an active game, and no tables and chairs are needed other than for volunteers

### NOTES TO VOLUNTEERS

There won't be a lot of time for talking points or instruction at this station, it is more about doing the activity. You should demonstrate how to cast using the rod and reel.

If there isn't enough room or supplies, you may divide the group into two, and one-half fishes while the other works in their passport booklet.

Challenges associated with this station include maintaining the rods and reels in working order including adjusting drag on the line and untangling or cutting tangles out of lines. Students will need on-going assistance with casting technique and keep students moving so that everyone has a chance to fish.

Try to leave enough time at the end for students to complete the food web in their Passports. If they don't catch a fish, they should just pick one of the fish from the pond to use in the food web. Discuss and have students share out their food webs as time allows. Another discussion question is: how would the food web change if there were a change in the ecosystem (such as a pollution event, or the pond started to dry up, or other changes they can think of)?

## Where Does Your Water Come From?

**TEKS: IDENTIFY AND CLASSIFY EARTH'S RENEWABLE WATER RESOURCES INCLUDING AIR, PLANTS, WATER, AND ANIMALS AND NONRENEWABLE RESOURCES INCLUDING COAL, OIL, AND NATURAL GAS, AND THE IMPORTANCE OF CONSERVATION.**

**STATION ACTIVITY:** This station uses an [Enviroscape model](#) to demonstrate how water moves through the urban water cycle, from source water to water treatment to our homes and businesses to wastewater treatment and back to a stream or river

**PASSPORT ACTIVITY:** Where does your Water Come From is found on P.5 of the Passport Booklet. Students should be able to answer the questions following the demonstration, and answers can be discussed as a group.

### MATERIALS AND SET UP:

- Enviroscape Water and Wastewater model and all associated accessories
- Table to set it on
- One bucket of water
- One empty bucket
- Towels or paper towels
- Area for students to sit during demo (tarp and/or benches)
- Rubber stamps for Passport booklets

### NOTES TO VOLUNTEERS

The model comes with an instruction book. A couple of demo videos are at <https://www.youtube.com/watch?v=GKaGojjDO-o> for the drinking water side and <https://www.youtube.com/watch?v=jbneUKEVSqk> for the wastewater part.

This model can be complicated but we will keep it as simple as possible.

Key ideas include: our water comes from Lake Waco (surface water) or the Trinity Aquifer (groundwater) or a combination of the two. Our treated wastewater is discharged into the Brazos River, or it seeps into the ground if we have a septic tank. Water has to be treated to make it safe for us to use, and safe for it to be returned to the river. Even though water is a renewable resource (we use it over and over again), it takes a lot of energy to move it around in the urban water cycle and we can all conserve water. Brainstorm ways to conserve water (passport booklet) as time allows.

Challenges associated with this station include keeping students engaged since it is a demo (ask for volunteers, ask questions, let students “make it rain”), as well as cleaning up between rotations.

## Groundwater- the Water Beneath Your Feet

**TEKS: EXAMINE PROPERTIES OF SOILS, INCLUDING COLOR AND TEXTURE, CAPACITY TO RETAIN WATER, AND ABILITY TO SUPPORT THE GROWTH OF PLANTS**

**STATION ACTIVITY:** This station has two activities, the first is a Groundwater Model used to demonstrate groundwater and water movement through aquifers, and the second allows students to make hands-on observations of properties of materials found in aquifers and the groundwater cycle.

**PASSPORT ACTIVITY:** Groundwater Beneath Your Feet is found on Page 6 of the Passport Booklet. Students record observations about four different materials (gravel, soil, sand, and clay) and predict whether they think they would hold (retain) water or support plant growth.

### MATERIALS AND SET UP

- Groundwater model and all associated accessories
- 4 large containers, labeled and containing: gravel, soil, sand, and clay
- Table to set model on
- One bucket of water
- One empty bucket
- Towels or paper towels
- Area for students to sit during demo (tarp and/or benches)
- Rubber stamps for Passport booklets

### NOTES TO VOLUNTEERS

This model comes with an instruction booklet. The groundwater model can be complicated but we will keep it as simple as possible.

Key ideas include: There is water under our feet. It occurs in places we call aquifers. The water under our feet is held in the spaces between particles in materials like gravel, sand and clay and it moves through these materials at different rates (fast vs. slow). Water infiltrates through soils to recharge groundwater aquifers. People can use groundwater by drawing it out of wells; in McLennan county many communities rely on the Trinity aquifer. Groundwater is also important to the environment because it is connected to surface water sources likes lakes and rivers. Groundwater can become polluted.

Challenges include: keeping the model demo simple and engaging, leaving time for the exploration of the materials. You will have to explain to the students what they need to record in the passport booklet.

## Appendix A. Water Festival Passport Booklet

### Instructions for Printing:

- Print Double-Sided, Flip on Long Side
- Can be printed in color or grayscale

Instructions for folding, stapling and cutting (students can do this as a craft in advance of the water festival)- teachers can demonstrate

- Only one page needed (printed as above) per student
- Fold in half so that the section labeled “front” remains in the upper right corner
- Fold in half again so that the “front” is on the front and the “back” is on the back
- Staple as close to edge of “spine” of booklet as possible- two or three staples
- Cut the edge of the pages as close to edge as possible or along creases
- You should now have a booklet with a front and back and page numbers in order!
- The passport will be stamped at each station after students complete activity

Wrap-Up Reflection

Do one of these (you choose which one!):

- Draw a picture of you or your friend doing your favorite activity at the water festival
  
- What is one thing that you learned today about water that surprised you?

BACK

4

Explain the flow of energy through your food web, beginning with the sun.



Draw a food web below that has one of the fish from the Backyard Bass pond. Draw all plants and animals that will be a part of your food web and then use arrows to show who eats who.



Backyard Bass

Water Festival Passport

Name: \_\_\_\_\_

School: \_\_\_\_\_

Teacher: \_\_\_\_\_

Date: \_\_\_\_\_



FRONT

3



2. Explain the role of the sun in the water cycle.

1. Where did you spend the most time as a water drop?

			SOIL
ANIMAL	GLACIER	PLANT	CLOUD
LAKE	GROUNDWATER	RIVER	OCEAN

Keep track of everywhere you travel as a water drop as you move through the water cycle by making marks in the boxes:

The Incredible Journey



Warm-Up

Draw your favorite water place below!

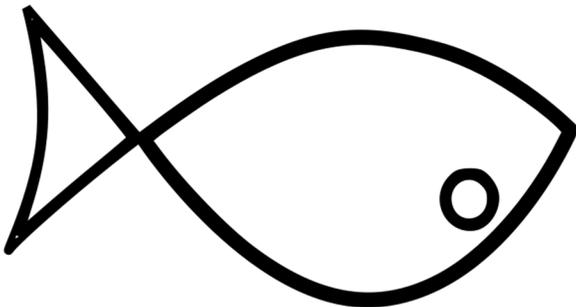
1. Who uses water at your favorite water place?
2. How do they use water?

1

2

2. How do they help your fish survive?

1. What are the functions of the structures that you added?



Create a fish! Add some structures (real or pretend) to the body of the fish below.



Groundwater Beneath Your Feet



Examine each container and record your observations

GRAVEL
Texture (what does it feel like?): Describe the Color:
SOIL
Texture (what does it feel like?): Describe the Color:
SAND
Texture (what does it feel like?): Describe the Color:
CLAY
Texture (what does it feel like?): Describe the Color:

--Which material do you think would retain (hold) the most water? (circle one): SAND, GRAVEL, CLAY, SOIL

2--Which material do you think would be best to support plant growth?: SAND, GRAVEL, CLAY, SOIL

6

5

What are some ways to conserve water?

Is water a **renewable** or **non-renewable** resource (circle one)?

Where does your water go when you flush your toilet?

Where does your water come from if you live in Waco or McLennan County?

Where does your water come from?

