



Earth Camp

Scavenger Hunt



TEKS Science: 5.1(A)(B), 5.2 (B)(C)(D), 5.3 (A)(D), 5.4(A)(B), 5.7(A)(B)(D), 5.8(D), 5.9(A)(C);

Social Studies: 5.6(A), 5.7(B)(D), 5.9 (A)(B)

Reading: Students learn academic vocabulary in meaningful context, and 5.27(A), 5.28, 5.29

AISSD Essential Science Vocabulary: investigate, observe, basin (watershed), weathering, erosion, deposition, drought, environment, pollution, sediment, sedimentary rock, precipitation, channel, floodplain, fossil, nutrients, hypothesis, data, evaluate, conclusion, evidence, measure, flow
(Use the vocabulary words and identify examples during the Scavenger Hunt whenever there are meaningful opportunities.)

Concept

Introduction to the hydrology, geography, flora and fauna, natural history and landform of a watershed.

Objective - Students will:

- 1) Define a watershed
- 2) describe the boundaries of a watershed;
- 3) use the five senses to investigate and observe a natural watershed
- 4) predict the flow of water in a watershed by identifying downhill pathways and flooding using erosional and depositional clues;
- 5) use a map and compass to identify direction and locate points of interest;
- 6) closely observe limestone to discover fossils;
- 7) locate and identify mammal signs;
- 8) use a thermometer to measure temperature, and;
- 9) use the senses to observe and evaluate water quality.

Time 2.5 hours, 1 mile

Materials: Earth Camp Leader will provide:

1) Student Earth Camp Scavenger Hunt Bags with:

- Wax pencil
- Compass
- Thermometer
- Metric ruler
- "Edible Wild Plant Guide," "Wildflower Guide," "Tracks and Scat Guide"
- "Creek Observations Data Sheet"
- "Scavenger Hunt" and "Trail Map" for the park: (e.g. Blunn Creek, Walnut Creek, Slaughter Creek, Bull Creek, Colorado River Park)

2) Teacher Backpack with:

- First aid kit
- Scavenger Hunt Lesson and Trail Map

- Extra materials for student bags

SCAVENGER HUNT LESSON

Introduction *(At the entrance with the entire group.)*

1. **Watershed Definition:** Ask students to define a watershed. (Land area that drains to a creek, river, or lake.) Ask students if they are standing on a watershed. (Yes)
2. **Watershed Hand Model:** Cup your hands to form a watershed. Explain that your hands are the land (watershed). Ask students, if it rained on your hands, where would the water collect? (by the pinkie finger) When there is **precipitation** in the form of rain, it **precipitates** on all the land and runs off into the low point where it forms a creek.
3. **The Watershed We Are On:** Ask students to identify possible watershed boundaries for the watershed where you are standing. (The tops of the hills.) Ask students to identify which direction the low point in the watershed might be from where you are standing (look for the downslope of the land). The low point is a **channel** where rainwater runoff collects and forms a creek. Tell students the name of the creek, which is also the name of the watershed.
4. **Nature vs. Pollution:** Describe rainwater runoff from the natural area in the park. (Plants act as a filter for pollution, so runoff from a natural area will be cleaner as it enters the creek. Also, chemicals are not applied in a natural area.) Compare to runoff from a street or lawn. (The street and lawn could have chemical pollutants, such as oil or fertilizer, that could runoff and pollute the creek.) Tell students they have choices they will learn about at Earth Camp that will help keep rainwater runoff unpolluted.
5. **Stormdrains:** Discuss how water drains from the streets in the neighborhoods into the stormdrain and enters the creek. Some people think the stormdrains go to a treatment plant where the trash and other forms of **pollution** are cleaned from the water, but actually the water goes straight into the creek, along with any trash or pollutants the water picked up as it traveled across the lawns, driveways, and streets.

Stormdrain Demonstration (dye provided for Earth Camp leaders only):

Walnut Creek Metro Park – Walk down to the stormdrain in the street, then follow it to the creek.

Blunn Creek Preserve – Put a few drops of dye in the gutter and wash it down with a cooler full of water. Have students follow the flow of dyed water to the stormdrain where it enters the creek, then look over the bridge and check the creek for dye.

Bull Creek – Put a few drops of dye on the road that enters Bull Creek and wash it down with a cooler full of water.

Co. River Park – none

Slaughter Creek – Point out the stormdrains in the neighborhood adjacent to the parking lot. Hike down the path to the stormdrain outlet behind the houses where it enters the creek.

6. **Segway to the Day's Activity:** Tell students they will investigate the natural watershed to discover plants, animal signs, fossils, rocks, and the creek. The things students will find are found in most of the watersheds in Austin, including your school's watershed.
7. **Rules:** 1) STAY ON THE TRAIL 2) WALK, DON'T RUN 3) BE CALM SO YOU CAN OBSERVE NATURE, 4) STAY TOGETHER AS A GROUP, 5) DO NOT LITTER, and 5) DO NOT PICK THE PLANTS OR HARM THE ANIMALS.
Do: 1) TOUCH,(except wild animals and poison ivy) 2) SMELL, 3) LISTEN, 4) OBSERVE CLOSELY and 5) TASTE (only what the Earth Camp leader provides).

Procedure

1. **Form 2 Groups** - Groups of no more than 15 students per one adult Scavenger Hunt leader. Within each group, students work with a partner. Each pair of students should have an Earth Camp Scavenger Hunt Bag with materials. The leader carries the backpack with the first aid kit, lesson and extra materials.
2. **Group Directions** - The group must stay together with an adult leader. Teach students to say, **"Stop, Look and Listen"** as the cue that something has been found. All students should stop, look at what has been found, and listen to the leader to see if the item has been correctly identified. Also, the leader will have information about what was found.
3. **Teach students how to use the map and compass.**
 - Ask students to identify the symbols on the trail map. Circle the symbols that represent something they are to find on the scavenger hunt.
 - Ask students to find their location on the map. Use the compass rose to identify N, S, E, W on the map. Identify the trail and cardinal direction you will be hiking.
 - Explain how to determine direction using a compass: A compass is a scientific instrument that uses magnetism to determine direction. The needle in the middle of the compass is a magnet. It is attracted to the north pole. The red tip of the needle will always point north. The letter N will not match the red needle until the compass is rotated to the correct position.
 - Give each student a compass. Ask them to correctly position the compass and face North. Position the map North and figure out the trail route.
4. **Start the Scavenger Hunt.** Manage behavior, give hints, help with directions, take a vote when there is disagreement, etc. Stop at the noted locations and do the mini-lessons.

SCAVENGER HUNT MINI-LESSONS

Items are in alphabetical order. Reference the Scavenger Hunt Game Sheet for the park you are visiting to note the items you will be discussing.

Algae

Students should pick up a piece of algae from the water if possible and describe how it feels. Tell students algae is a slimy plant-like organism found in the water. It is necessary for a healthy creek because some fish eat algae and it provides shelter to some animals. Too much algae in the creek is caused by too many **nutrients**, like fertilizer (which is plant food) or too much dog scat, running into the creek during a rainstorm. Too much algae can cause some of the animals to die.

Aquatic Bird

Common water birds found in and around Austin's creeks include the Great Blue Heron, Green Heron, Egrets, Geese and Ducks. These birds depend on clean water and add beauty to our waterways.

Aquatic species

The presence of fish, crayfish, tadpoles and aquatic insects indicates a healthy creek. Damselflies and dragonflies lay their eggs in the water. They need good water to hatch and eventually **metamorphose** into adult flying insects.

Bird Song

Stop and listen. There are three things a bird needs to be attracted to this park. What are they? (seeds for food, trees for nests, clean water in the creek)

Creek

- Stop at the creek and complete the "Creek Observations Data Sheet." Needed equipment is in the backpack provided.
- Form a **hypothesis** about the cleanliness of the creek based on the students' watershed **observations** during the Scavenger Hunt.
- Students will **measure** temperature and depth and collect and record **data** on the "Creek Observations Data Sheet" # 1-6. If there is not a spring to test, discuss the temperature of Barton Springs (70 degrees).
- Students should **evaluate** the health in the creek (#8) based on the **evidence**.
- Ask students to defend their conclusion about the health of the creek using **evidence**.
- Explain Temperature: The ground acts like a blanket, keeping groundwater a constant temperature (around 20 degrees Celsius, or 70 degrees Fahrenheit). Surface water temperature changes with air temperature - in summer it is warmer than groundwater, and in winter it is generally colder than groundwater.

Dam (*Slaughter Creek only*)

- A dam is a man-made wall in the creek or river that holds back water, creating a lake environment (**reservoir**) and good fishing spot.

Erosion & Deposition

When a creek floods, the power of the water can wash away the soil and rocks along the streambank, leaving roots exposed and adding **sediment** to the creek. Too much cement instead of plants in a watershed can increase flooding and streambank **erosion** because water can't soak into the land. Look for piles of sediments, soils and rocks for evidence of **deposition**.

Fossil of an Ammonite (*Blunn Creek only*)

Tell students to look at the "Ammonite" interpretive page that is on the back of the map. Help students locate the Ammonite fossil. (The large ammonite fossil is located in the limestone exposed in the overflow creek channel. Sometimes it has to be dug out because dirt has settled in the fossil. There are smaller ammonites in the creek bed, along with other kinds of shell fossils.)

Fossil of a Seashell

Fossils of seashells are **evidence** a sea used to be here millions of years ago. The sea was shallow and tropical. The **seashells and other sediments** on the ancient sea bottom formed limestone. (NOTE: FOSSILS SHOULD BE LEFT ON THE GROUND AFTER THE LESSON.)

Groundwater (*Blunn and Bull only*)

- Discuss the flow of water: 1) rain falls on the watershed at high elevations; 2) water infiltrates underground, becoming **groundwater**; 3) **groundwater** resurfaces lower in the watershed at a spring; 4) spring flows into the surface water.
- (*Blunn only*) Students will take the temperature of the spring using celsius/fahrenheit thermometers if spring can be reached without causing damage to the surrounding vegetation. Tell students to record their answers on the "Creek Observations Data Sheet."

Karstic Limestone (*Bull Creek only*)

Limestone that has holes in it that allows water to travel through easily. The Edwards Aquifer is made of karstic limestone.

Landslide (*Walnut Creek only*)

Near the Walnut Creek crossing, a landslide occurred in 2012. Water carved out over many years the soft rock and created an overhanging shelf. The weight of the shelf was too much and caused the overhanging rocks and soil to come crashing down.

Majestic Oak (*Blunn Creek only*)

The age of a tree is estimated from the width of the trunk. Look on your trail map to find out the estimated age of the Majestic Oak. This Oak would have been a seedling at the time of Columbus. Trees help filter the water and prevent **erosion**.

Mutt Mitt

Find the mutt mitt box at the trailhead or bags along the trail. Responsible dog owners pick up their dogs waste but sometimes this is difficult in an off-leash park. What happens to the dog waste when it rains? Dog waste can carry harmful bacteria that can harm dogs or people that swim in the creek.

Oak Grove (*Slaughter Creek only*)

Trees help filter the water and prevent **erosion**. The rest of this forest around the Oak Grove is composed mostly of Juniper (Texas Cedar).

Palmetto Plant (*Slaughter Creek only*)

One of two native Texas palm species. Small fruits are edible and taste like dates. How do you think the Native Americans might have used palmettos? (baskets, roofs, fans)

Poison Ivy

DO NOT TOUCH! The oils on the poison ivy leaves can cause a terrible itchy rash if you get it on your skin. Identify by the leaves of 3 on one stem, with the outer two leaves shaped like mittens.

Pollution

Pollution on the land (**watershed**) washes into the creek during rainstorms. We can improve this creek today by picking up litter, a type of pollution. Wildlife can get tangled in litter, think its food, or become poisoned.

Riffle habitat

Oxygen is circulated into the water by the bubbling of creek water over shallow rocky areas, providing healthy habitat for water bugs, fish and other aquatic organisms.

Sedimentary rock

A shallow, tropical sea used to be here millions of years ago. The seashells and **sediments** on the ancient sea bottom formed limestone. What kind of rock is limestone, igneous, **sedimentary**, or metamorphic? (sedimentary since it was made from the sediments on the bottom of the ocean.) The creek bottoms in Austin are limestone, so the water is clear instead of muddy if the creek is healthy.

(*Walnut Creek only*): Shale is also sedimentary rock (mud and clay).

Seed

Seeds provide food for animals and continue a plant's **life cycle**.

Sewer Line (*Bull Creek only*)

Sometimes sewer pipes break and leak and cause high bacteria or an algae bloom in the creek, making the water unsuitable for swimming.

Sign of a Flood

Clumps of leaves lodged in trees or pushed up noticeably along the bank of the creek have been left by floodwaters (**deposition**). Creeks in Austin rise dramatically during heavy rainfall and subside within a few hours or days, depending on the size of the creek, leaving behind **evidence** of the flood. This area is called the **floodplain**, and should be avoided during heavy rains.

Signs of Humans

Did the sign left by the human impact the watershed for the better or worse, or leave it unchanged? Do you have a choice about how you impact the watershed?

Signs of a Predator

Scat with bones and fur, owl pellets, scratch marks, and tracks are all evidence of predators. Why don't we see many predators? Why are they near the creek?

Something Edible

Use the “Edible Wild Plant Guide” to identify an edible plant Earth Camp students are allowed to taste. Only the Earth Camp leader will pick a few samples for the students that are willing to taste. Tell students a natural watershed provides natural sources of food. Native Americans and the early pioneers depended on these natural food sources for survival. The food we eat still comes from the watershed, but from a farm or ranch where the food has been cultivated.

Something Prickly – ex. Prickly Pear Cactus

Identify the prickly pear. Discuss its abundance in our watershed and benefits as a food source.

Tributary

A tributary is a creek that flows into a larger creek or river. It adds water, and any pollution carried with it, from the tributary’s watershed into the receiving creek.

Volcanic Tuff

Austin had many volcanoes on the bottom of the sea that existed here millions of years ago. The ash spewed from these volcanoes formed volcanic tuff. You can see this rock scattered throughout many watersheds in Austin. It is generally greenish gray, and breaks easily like clay. (Shale is at Walnut Creek but it is not volcanic, it is sedimentary rock.)

Watershed

As long as you are on the land, you are on a watershed!

Weathering

Weathering is the breaking down of rocks, soil and minerals through contact with air, water (ice) and plants. Weathering occurs with no movement and should not be confused with erosion, which involves the movement of rocks and minerals by water, wind, waves, gravity etc..

(Wild) Animal Scat or Track, Habitat

Many animals live close to the creek because it is their drinking water source. They are dependent on clean water in the creek for survival. **Scat:** Wild animal scat helps to spread seed and scatter bones that are eaten for calcium by small animals. Dog scat is considered a form of pollution since it does not benefit the ecosystem, and most often is a source of excess bacteria and **nutrients** in the creek after a rainstorm.

Wildflowers

Encourage students to observe the variety of plants on the natural watershed. Discuss how a native yard improves water quality because it is adapted to Austin’s **climate** and doesn’t require fertilizer, pesticide, or extra water to survive. Plants also act as a filter for pollution. Encourage students to learn the types of plants native to Austin by using the wildflower identification brochure.

- If it is late winter or early spring and the flowers are not blooming, look for bluebonnet sprouts. Tell students the leaves of a bluebonnet form a five pointed star on each stem, just like the five pointed star of Texas. The bluebonnet is the state flower of Texas.