

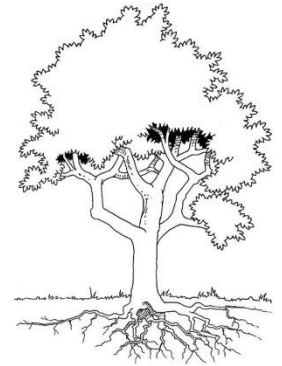
Lesson: Action Project-Watershed Model

Topic/Essential Questions: How can we keep the water clean?

Unit: “Why Are Trees Terrific?” Kindergarten Environmental Literacy Unit

Content Standards:

- Social Studies 3.d.1.b. Identify ways that people change their environment to meet their needs, such as planting crops or cutting forests
- Foundation for EL Standard 5.0 Humans and Natural Resources



Length of Lesson: 30 minutes (*This lesson is split into two 15-minute activities that are taught simultaneously. The group splits in half for the lesson and swaps after their first activity.*)

Student Outcome: The students will explain how they can help keep the water clean.

Knowledge of the Learner:

- Prerequisite Knowledge, skills and processes: trees and animals are living things with basic needs; listening, observing, following instructions
- Student needs, interests, previous learning: These will vary among students.
- Conceptual difficulties: relating model to real life, trees prevent erosion
- Differentiated: The instructor may pace the lesson according to the responses and participation of the students.

Knowledge of Content:

- Content knowledge for instructor: Provided in the text of the lesson.
- Vocabulary: Watershed, pollution, erosion
- Resources:

Watershed Model

Houses

Bridges

Dog

Farm Animals

Farm House

Barn

Cars

Factory

Boat

Trees

Spray Bottle

Sponges

Hand sanitizer

Towel

Bucket of water

Empty Bucket

Pollution Supplies:

Pesticides/Herbicide (Red Kool-Aid powder)

Oil (chocolate syrup + water)

Sediment (hot-cocoa powder)

Fertilizer (Green Jell-O mix)

Salt (salt)

Animal waste (coffee grounds)

Action Project Supplies

Hand rakes

Buckets

Planting poster

Wheel Barrow

Plants

Shovel

Hand shovels

Gloves

Pre-Assessment: During the opening at the beginning of the field trip, Camp Woodlands staff will invite students to share what they have learned at school about trees including trees as living things, trees as plants, parts of a tree, and what is a forest.

Activity A: Watershed Model

Set Up Before Students Arrive:

1. Instructor sets up the watershed model prior to the class. Place trees in the roads and in locations where houses would be. Place two triangular sponges with trees in them at water's edge of the farm field.
2. Fill 5-gallon bucket with water (*Woodlands staff will help*).

Motivation/Warm-Up:

1. Have students stand in a circle around the model.
2. Welcome students to the activity and introduce the instructors. Show students the watershed model. Ask students what the blue area represents (water). Ask students what the green and brown areas represent (land).

Set the Scene:

"This is the area that we live in before people came to live here. When people first came to this land by boat, they saw this beautiful, natural area." Draw attention to the clean water and the land covered with trees. Pour a little water down the river so students can see how clear it was before pollution. Hand out the appropriate model pieces to students to be placed on the model as the story is told:

1. "How did people first arrive in this area?" *By boat*. Have a student place boat in bay.
2. "What would the first people that came to this land need?" *Houses*. Remove trees. Have a student place a house in the designated area.
3. "How would they get food? (Where do crops grow? Where do cows, pigs and chickens live?)" *Farm*. Have the students place a barn, farm animals and tractor on the farm area.
4. "How would people get from one place to another?" *Roads, bridges*. Use chainsaw or bulldozer to remove trees. Have students add bridges and place cars on the road.
5. "As more people came, more houses were built." *Put bulldozer at home construction site*. *Have students place the four houses in designated areas*.
6. "What are some other things that people need to live?" *Cars, clothing, paper, and furniture*. "Where are these things made?" *Factories*. Have students place the factory in the designated area with drain hole facing the stream.
7. Where do children go to learn? *Schools*. Have the students put the school in the designated area. Name the school the same name as the school that is participating in the activity. The model will end up looking how our area looks in present day.

Storyline: Students will now watch a demonstration showing the types of pollution in the Chesapeake Bay watershed.

1. "What is left when trees are removed?" *Soil*. Sprinkle powder labeled soil over farm and construction site.

2. "As more people arrived they needed more food. What do we add to plants to make them grow?" *Fertilizer*. Sprinkle powder labeled fertilizer on farm. "People also wanted green grass, so they put fertilizer on their lawns." Sprinkle fertilizer on the lawns.
3. "When bugs attack farmers' crops or gardens at home, what do people use to kill them?" *Pesticides*. "When there are weeds on a farm and in yards some people use herbicides to kill them." Sprinkle jars labeled pesticide and herbicide over farm and yards of homes.
4. "What comes out of cars?" *Oil and gasoline*. Squirt oil bottle on roads, by the tractor on the farm and bulldozer.
5. "What comes out of our pets and farm animals?" *Animal Waste*. Sprinkle coffee grounds by the dog and farm animals.
6. "What is added to the roads in the winter when it snows so cars don't slide?" *Salt*. Sprinkle salt on roads.
7. "What comes out of the factory?" *Dirty water*. Take the bottle labeled oil and squeeze it into the hole in the top of the factory.
8. Have students predict what will happen if a rainstorm occurs. Have students make it rain by spraying the model with the two spray bottles. Send the spray bottles in opposite directions with the students and have each student spray 3 times and pass it on to the next student. Discuss what happens to the water.
9. Once the spray bottles return to the instructor, tell students that people like them are making a difference by taking action and doing something to stop pollution. One thing that people are doing is (state whatever their action project will be). Another action that people are taking is planting trees which you will do when you get back to your school.
10. *Place the trees (that were previously removed) by the water's edge at the farm. Sprinkle fertilizer on the farm land*. Spray the water on the farm. Hold the sponges so the water must pass through the sponges to get to the bay.
11. Show students the importance of the sponges in front of the trees at the farm by the water's edge by picking them up and squeezing them. Ask students how did the sponges help? Explain that trees slowed down the water and soaked up pollution to help clean the water. Have students clap for the trees.

Assessment: Ask students, how do trees help keep the water clean? *Slow down the water and soak up pollution. Tree roots hold soil in place and prevent erosion.*

Clean up for next group:

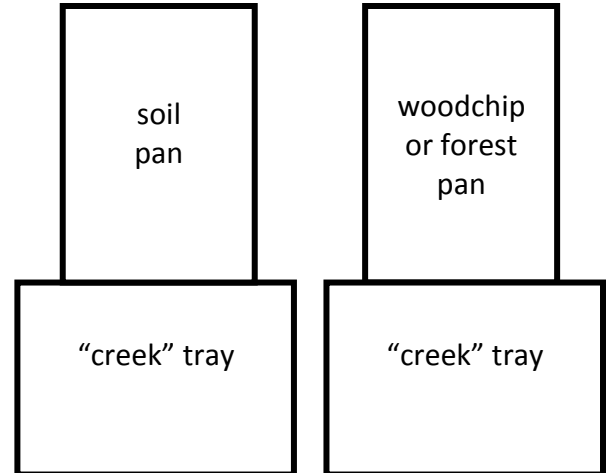
1. Remove all buildings, bridges, cars and boats from the model.
2. Clean and dry the model.
3. Place trees on the model for the next group.

Activity B: Action Project

This will be determined during planning by the teacher and Woodlands staff. This might include erosion control projects such as spreading wood chips or planting. If the action project is spreading wood chips, the woodchip pan will be used with the soil pan. If the action project is planting, the forest pan will be used with the soil pan. If "Roots and Boots" (the waterfront lesson) is **not** being taught, both the woodchip pan and forest pan will be used with the soil pan.

Erosion Model:**Procedure:**

1. Show students the erosion model. Explain that they are going to perform an experiment. Explain that the pans represent two hills, one with woodchips (or a forest) and one with soil. The shallow trays are a creek at the bottom of the hills.
2. Ask students to predict (guess) what will happen when it rains on each hill.
3. Pick two students to be "rain clouds" and have the students pour water with the watering can onto each hill one at a time; all other students should make rain sounds. Have students describe what happens. Which water is cleaner? Which hill had more erosion? Was your prediction correct?
4. If "Roots and Boots" is being taught, conclude this part of the lesson by explaining that the woodchips cover the soil and slow down the water to help stop erosion. Go to number 7 in the procedure.
5. If "Roots and Boots" is **not** being taught, show students a potted tree. Gently lift the tree out of the pot to show the roots to the students. Ask students, "Why didn't the soil fall? What held the soil? *The roots*. Point out how the roots hold the soil. Return tree to the pot.
6. Explain that trees growing near the water keep it clean. Their roots hold the soil in place. This helps the things that live in the water.
7. Between groups, pour muddy water into the woods where it will not drain into the cove.

**Action Project: Wood Chips.** Before students arrive, note the marked area that will be chipped.

1. Ask the students where wood chips come from. *Trees*.
2. Explain that when water rushes over soil, the soil goes away with the water. This is called erosion. Ask students why erosion might be a problem for the fish and other animals that live in the water.
3. Tell the students that if we can slow down the water like we did in the experiment, we can help stop erosion.
4. Explain that today we will be using wood chips to cover the ground to help slow down the water when it runs over the ground.
5. Show the students where the wood chips will be placed.
6. If available and close by, show students an example of an onsite erosion problem.
7. Give each student a bucket and a hand rake.
8. Show how to place the bucket next to the pile of woodchips and use the hand rake to fill it.
9. Have all the students fill their buckets using hand rakes.
10. Walk to the area that is being covered with wood chips.
11. Have students dump the woodchips out of their buckets. The chips need to be 4 to 6 inches thick so they should not be spread out.
12. Continue covering the area with woodchips until the 15 minutes are finished.
13. Cheer for students, telling them that they made a difference today.
14. Do the "Who Can?" cheer with students:

- a. Say, "Who can?"
- b. Students answer, "We Can!"
- c. Say, "Who Can?"
- d. Students answer, "We Can!"
- e. Say, "Who can change the world?"
- f. Students answer, "We can change the world!"

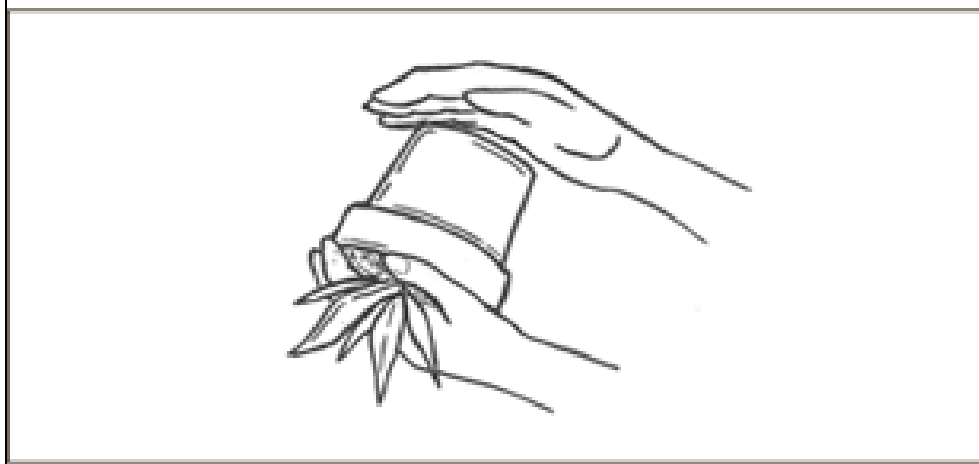
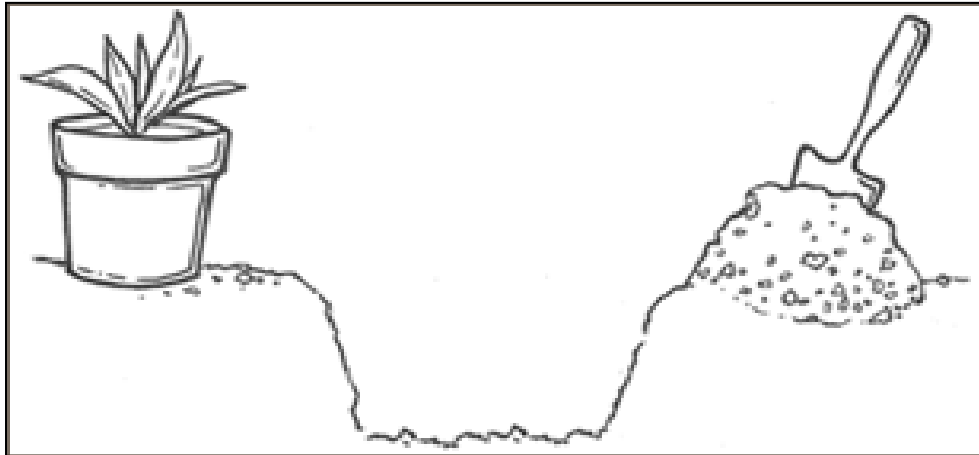
Assessment: Ask students, how did they help stop erosion today? *We covered the bare soil with woodchips that help slow down the water.*

Action Project: Planting. Before students arrive, use flags to mark areas where the plants will be planted or pre-dig holes. Depending on the hardness of the soil and the size of the plants, the holes may or may not need to be pre-dug before each group arrives.

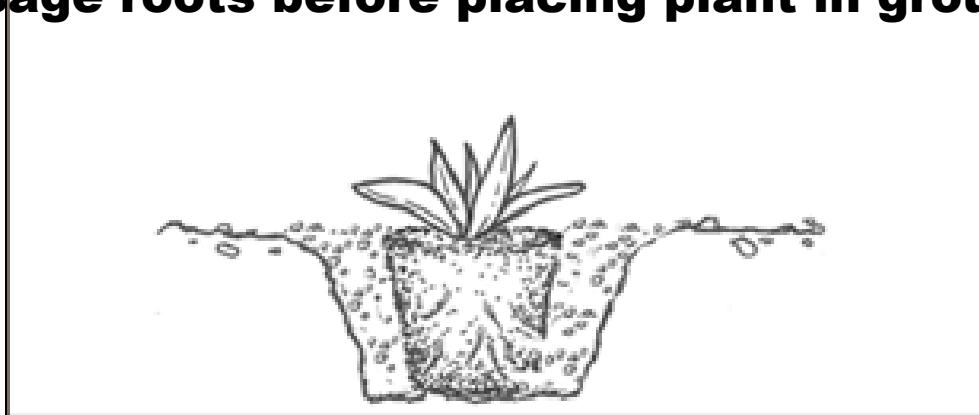
1. Ask the students what part of the plant grows underground? *Roots*
2. Explain that when water rushes over soil, the soil goes away with the water. This is called erosion. Ask students why erosion might be a problem for the fish and other animals that live in the water.
3. Tell the students that if we can slow down the water like we did in the experiment, we can help to stop erosion.
4. Explain that today we are planting _____ to help soak up rain water and slow it down when it runs over the ground.
5. Show the students where the plants will be planted.
6. If available and close by, show students an example of an onsite erosion problem.
7. Follow the directions on the planting poster. Demonstrate how to dig a hole, remove the plant from the pot, massage the roots, put the plant in the hole and backfill the hole.
8. Pair students up and give each pair of students a hand shovel and a plant.
9. With the help of the chaperones have the students plant their plants.
10. If there is enough time and more plants, students can plant more.
11. Cheer for students telling them that they made a difference today.
15. Do the "Who Can?" cheer with students:
 - a. Say, "Who can?"
 - b. Students answer, "We Can!"
 - c. Say, "Who Can?"
 - d. Students answer, "We Can!"
 - e. Say, "Who can change the world?"
 - f. Students answer, "We can change the world!"

Assessment: Ask students, how did they help stop erosion today? *We planted _____ to help soak up the rain and slow down the water running across the ground.*

Take Action- How to Plant



***Massage roots before placing plant in ground.**



***Don't forget to water!**