



# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY Lesson Plans for Teachers

[www.tceq.state.tx.us/assistance/education.html](http://www.tceq.state.tx.us/assistance/education.html)

## Wetlands/Watershed Model

### Grade level:

- Fourth and fifth grades.

### Sample TEKS for 4th grade:

#### Science:

- 4.1A, B
- 4.2A - E
- 4.3A - D
- 4.4A
- 4.11A

#### Social Studies:

- 4.7B
- 4.8B, D
- 4.9B, C
- 4.13B

### Objective:

This activity would be used after students have learned the topography of Texas, with its major rivers flowing into the Gulf of Mexico through coastal wetlands, estuaries, and bays. They would also be knowledgeable about the function of wetlands as a filter between land and water and as its value as an aquatic nursery. The model we will make will demonstrate the flow of surface water across the land in Texas and how materials that originate many miles away can end up in the wetland along the coast.

### Materials:

For each pair of students:

- large waterproof tray or tub.
- heavy duty aluminum foil, about 70 cm long
- watercolor paint set and brush
- cellulose sponges, cut into inch strips
- spray bottle filled with water
- landform map of Texas
- small paper scraps (optional)
- newspaper to cover work areas
- paper towels
- bucket or sink with water
- science notebook
- pencil or pen

**Focus:**

"Today we will board our version of the Magic School Bus to go on a trip from the high plains and mountains of western Texas to the Gulf of Mexico in the southeast. We will float on the water. What sorts of materials might we pick up along the way?" Student responses would be recorded on a chart or on the board. After the "brainstormed" list is created, students would be asked to categorize the items as desirable or undesirable. Additional items could be added to these categories.

**Background:**

To reinforce previously taught information, ask students to describe how water flows and to locate the rivers on their map of Texas. Tell them that the foil will be shaped to represent mountains, hills, plains, streams, and rivers that flow into the Gulf of Mexico. The strips of dampened sponges will represent the wetlands. Each pair of students will also select undesirable materials found in the watershed to be represented by the watercolor paints. For instance, blue may represent runoff from urban paved surfaces like roads and parking lots; red may represent soil eroded from fields and forests harvested of trees. Solid waste materials may be represented by small bits of crumbled paper.

The teacher can bend and shape the foil to demonstrate the procedure or have a model already created to save class time; however, not every landform shape should be exactly the same. Paint will be added to the foil's surface and paper bits scattered on the foil. Place the strips of sponges along the edge of the Gulf. Tell the students that the "rain" will occur after all models are completed.

Ask a student to repeat the directions about shaping the foil. Ask others to tell how the paint is to be applied. Remind the class that the rain will not occur until the teacher has approved the landform model and a chart has been created to label which color of paint represents which undesirable element found in the watershed.

**Procedure:**

Students will be pairs. One person will gather materials from the table, while the other will fill the water spray bottle and cover the work area with newspaper. As the students begin to shape their foil and paint the model, the teacher should circulate among the groups to check that the model is being developed according to instructions and to answer questions that the groups may have. After all models have been completed and approved by the teacher, the students will spray the models using the spray bottles. When spraying the models, the students should make sure the "wetlands" are damp. As the "rain" lands on the foil, students should observe how the water moves over their model, where water collects, and the color of the water before/after it passes through the sponges.

Within each working pair, the students must decide how to shape the foil. After the foil is shaped and fastened into the tray, students should designate each color of watercolor paint to represent a different undesirable substance in the watershed. A color chart can be created as the paint is applied. After the foil, sponges, and paint are in place and the chart is created, the teacher will check the model prior to spraying the model. The models are sprayed to simulate rainfall on the watershed. After the closing discussion, models are disassembled, and the foil is wiped clean and recycled in the aluminum recycling bin. The trays, spray bottles, and paint brushes are rinsed and dried to be put away in the storage area. The newspapers may be dried overnight and then put in the recycling bin. If students do not recall the sources of nonpoint pollution, a reference chart may be provided.

A good source for this activity would be the TCEQ publication, Nonpoint Source Pollution, GI-162, (7/98).

**Evaluation:**

After all the groups have simulated rainfall and water has collected in the Gulf area of the model, the students should lift the sponge strips and observe the color of the sponges and the color of the accumulated water. Ask students how effective the wetlands were in trapping the paint sediments. Discuss the effect these materials would have on the living organisms in the wetlands and the effects these undesirables would have on the life forms residing in the Gulf area. Students can be evaluated on three criteria. The first is how well they worked with their partner. Were the responsibilities shared fairly and was the discussion on-task and respectful? The second element for assessment is based on the product. Was the model constructed according to the guidelines? Were the materials used properly? The third assessment is based upon the written record of the students' project. In this case, a class chart and categories were established prior to the model construction, but each team made a color-coded chart of pollutants and it should be in the science notebook. As a final closing, students are asked what they learned from this project and if they would do their project differently if given another opportunity.

**Extension:**

Have students demonstrate their model to another class and prepare a presentation about nonpoint source pollution and the steps we all can take to decrease its presence in our environment.

**Social studies extension:**

Look at the various ways people use rivers in Texas to earn a living and provide recreation. Note settlement patterns along the rivers of Texas.

Submitted by: Carol Cooper, Texas Southern University TES Course, 1996.