

CREATING A SURFACE WATER MODEL

BACKGROUND: A watershed is an area of land from which all the water drains to the same location such as a stream, pond, lake, river, wetland or estuary. A watershed can be large, like the Mississippi River watershed, or small, such as all the water that drains to a small pond. Large watersheds are often called basins, and contain many small watersheds. Watersheds can transport non-point source and point source pollution. Non-point source pollution refers to pollutants that are brought into the water system by rainfall and snowmelt runoff moving over and through the ground to a water source. There is typically no single source of these pollutants, and they often accumulate over a large area. Examples of non-point source pollutants are pesticides, fertilizers, sediment, and gas and oil (e.g., from car leaks). Point source pollutants refer to pollution that enters the water from a pipe or ditch. Often the pollution has a single source such as chemical waste entering a stream from a pipe. Best Management Practices (BMPs) are ways to manage the land in order to reduce or prevent non-point source pollution to surface and groundwater.

Examples of best management practices include:

- ☺ Native vegetation along streams and lakes to prevent sediment and other contaminants from washing into the water.
- ☺ Using the appropriate amount of pesticides and fertilizers to prevent chemicals from becoming runoff and entering bodies of water.
- ☺ Keeping automobiles in good condition and fixing leaks to prevent oil and gas from contaminating the water.
- ☺ Reforesting after a logging event, or practicing selective logging.
- ☺ Placing hay bales or silt fences around a construction site to prevent sediment runoff.

MATERIALS:

- ☺ Surface Water Model
- ☺ Spray Bottles
- ☺ Pollutants (it is best to use sugar free pollutants on the model because they are less sticky)
 - Red drink mix (pesticides)
 - Green drink mix (fertilizers)
 - Coffee (sediment from trees and sewage)
 - Soy sauce (gas and oil)
 - Strips of Green Felt
 - Modeling clay
 - Small sponges

PROCEDURE:

PART ONE

1. Create your model:
 - a. Mold your paper (or foil) to create mountains and ridges.
 - b. You should have a high point and a low point (mountain, stream and valley)
 - c. Using a marker, draw lines on all your "ridges"
 2. What does the model represent? _____
 - a. A _____ is an area of land from which all the water drains to the same location such as a stream, pond, lake, river, wetland or estuary.
 3. Now spray water on the model to simulate a rain event.
 - Where does all the water go? _____
 4. Discuss with your partner how water moves through a watershed (i.e., runoff, groundwater). Some water never runs off, but stays in the watershed.
 5. If your "rain" event formed a lake, does it look clean or dirty? _____ Would you like to swim in it? _____
 6. Set your "model" aside and answer Questions 7-9.
Questions to prepare for part 2:
 7. What things positively affect the health and quality of a river? _____
How do we do this? _____
What are the effects of a healthy river and watershed? _____

 8. Explain four reasons why understanding rivers and river basins are important.
 9. What things negatively affect the health and quality of a river? _____

- What are the effects of an unhealthy river and watershed? _____

PART TWO

10. What do you think of when you hear the word "pollution"? _____
11. Discuss the two types of pollution (point source and non-point source, see "background" section for more information). Make a T-Chart to compare the 2 types!

12. What places might contribute to point source pollution? _____
What places might contribute to nonpoint source pollution? _____
13. As you discuss possible pollution sources, sprinkle the contaminants onto the model.
 - a. Red drink mix – pesticides can be found on a farm, or on gardens in the residential areas.
 - b. Green drink mix – fertilizers can be found on the golf course, lawns in the residential area or on farms.
 - c. Cocoa – sediment can be found on the mountain (which may have had logging activity), on farms (where the farmer has recently plowed the field) or on a construction site.
 - d. Soy sauce – gas and oil may be found on the road ways, driveways, or the construction site.
14. Spray your model to simulate a rain event.
15. How does this rain event compare with the rain event before the pollutants were added?

What was different? _____
Where did most of the pollutants end up? _____
16. How can water pollution be prevented? _____
17. How can you prevent water pollution on a small scale? _____
 - a. What about on a large scale? _____