# Watershed Connections

## Activity 3: The Beginning of the New Millennium: 2000 and BEYOND!

### Part 1: 2000 to 2009

Your group is developing a landscape that represents watersheds in Maryland at the beginning of the 21st century.

- The suburbs with large housing developments, shopping centers, and industrial parks continue to expand into areas that were once open country or farmland (referred to as **urban sprawl**).
- Stands of forests also are being cut down for housing, shopping centers and industry.
- In the mountains, mountain-top coal mines destroy vast acres of forest and result in streams being buried in large amounts of rubbish, rock, and dirt. Some rivers are contaminated by mine processing toxic minerals that can kill wildlife and cause cancer in humans.

### Part 1 Activity: Your group will model a landscape that represents Maryland from 2000 to 2009.

1. Cover about **35%** of the watershed with forests.
2. Cover about **10%** of the Bay's shoreline with wetlands.
3. Cover about **30%** of your watershed with urban and suburban areas. In the 1980s, the Maryland State government started requiring that new housing and commercial developments put in sediment ponds to catch storm-water runoff. Put in small ponds or sponges around some of your developments to represent sediment ponds.
4. Cover about **20%** of your watershed with farms. The farmers who own these farms are using government incentives to reduce runoff and pollution from their land, so when you put down the farms, use some of the **Best Management Practices** discussed in the presentation. (Hints: the orientation of the fields, forested buffers, sediment ponds.)
5. Place mines in the mountains. (You might have to remove some forests to do so.)
6. What types of pollutants would you expect to come from the different land-use areas in your watershed? Pick the appropriate containers of pollutants, and put 4 drops (or 4 pinches) of each in the areas where the pollution comes from. ***Record this information on your Pollutant Table.***
7. Fill the measuring cup with **1000 ml** of water. Now, make it "rain" on the watershed model. Have one person *slowly* pour the water over your entire watershed, starting near the mountains, and going back and forth towards the bay. The rest of the team should observe where the water flows, where it flows the fastest, and where it is absorbed.
8. Drain the water in the bin back into the measuring cup, and record the amount of water collected. (Ask for help if you need it.) Observe the color of the water and whether it is transparent (clear), cloudy, or opaque. ***Record this information on the Data Table.*** Save the water, so you can show it to the rest of the class.

***Answer the observation questions on your answer sheet.***

## Part 2: 2010 and BEYOND!

It's not all doom and gloom. Maryland state and county governments are trying many new ways to clean up our streams and the Chesapeake Bay. One State law requires that new housing and commercial developments install systems to manage storm-water runoff on their properties. These systems include ***rain gardens*** (also called bioretention areas), and ***grass swales***, where runoff can collect and slowly soak into the ground. As the water infiltrates into the ground, plants and soil microbes "eat up" the excess nutrients and breakdown other pollutants. Another State goal is ***to plant more forests***, especially along our rivers.

## Part 2 Activity: YOU ARE IN CHARGE OF THE BAY'S CLEANUP, so incorporate all the above changes into your watershed.

1. Add as many storm-water best management practices as you can to reduce polluted runoff into your streams.

2. Add the appropriate pollutants. Do you need to add as much as before*?* ***Record this information on your Pollutant Table.***

3. Fill the measuring cup with **1000 ml** of water. Now, make it rain on the watershed model. Have one person *slowly* pour the water over your entire watershed, starting near the mountains, and going back and forth towards the bay. The rest of the team should observe where the water flows, where it flows the fastest, and where it is absorbed.

4. Drain the water in the bin back into the measuring cup, and record the amount of water collected. Observe the color of the water and whether it is transparent, cloudy, or opaque. ***Record the information on the Data Table.*** Save the water, so you can show it to the rest of the class.

***Answer the observation questions on your answer sheet.***

# Answer Sheet

**Pollutant Table**

| | Contaminants | Where do the pollutants come from? |
|---|---|---|
| **Part 1** | | |
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| **Part 2** | | |
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**Data Table**

| | Amount of runoff (mL) (collected water = runoff) | Color of water | Water Clarity (Transparent, Cloudy, or Opaque) |
|---|---|---|---|
| **Part 1** | | | |
| **Part 2** | | | |

# Observations

**Part 1**

1. When it rains on the model, where does the water flow the fastest and where is it absorbed?

**Part 2**

1. What conservation practices did you add?

2. How could such practices reduce runoff or improve water quality?

3. Was there was a difference in the amount of pollution and runoff between Part 1 and Part 2? Why or why not?