Watershed Connections
Activity 2: The 1960s to the 1990s

Part 1: The Economic Boom and Population Growth

Your group is developing a watershed that represents Maryland from the 1960s through the 1990s. Imagine yourself in this time period. The Beatles have just come to the USA, and your watershed is going through big changes. Read the following description.

- During colonial times almost all of Maryland's forests were cut down, but because less land is now used for agriculture and less wood is used for fuel, forests have grown back in some areas. By the 1960s, about 40% of the watershed is forested.

- Farming of crops, tobacco, and livestock is still important to Maryland's economy, but now most farmers use chemical fertilizers to improve crop growth, chemical pesticides to kill insects and weeds, and large machinery to plant and harvest crops.

- One of the biggest changes is our growing population. From the 1970s through the 1990s, the landscape has been changing rapidly. Suburban areas with housing developments, businesses, and industrial areas have been built in areas that had been farmland or forests.

- In the mountains of Western Maryland, coal mining remains a big part of the economy. When groundwater, streams, or ponds come in contact with the waste rock dumped from mines, the water becomes acidic and toxic to people and wildlife.

- Over the last 200 years almost half of our wetlands were filled in and used for agriculture or housing or to protect low-lying towns from flooding.

Part 1 Activity: Your group will model a landscape that represents Maryland watersheds during the 1960s-1990s.

1. Cover **about 40%** of the watershed with forests.

2. Place wetlands near in the flat low-lying areas of your watershed near rivers and the "bay." Cover **about 10%** of the watershed with wetlands.

3. Place urban and suburban areas with housing and industrial areas on your watershed. They should cover **about 25%** of the watershed.

4. Cover **about 25%** of your watershed with farms, including livestock fields.

5. Now, remove one forested area in the mountains and replace it with a coal mine. When you're done, the entire watershed should be covered.

6. What types of pollutants would you expect to come from the different land-use areas in your watershed? ***Record this information on your Pollutant Table.*** Pick these from the containers of pollutants, and put 4 drops (or 4 pinches) of each in the areas where the pollution comes from.

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. ***Write your observations on the answer sheet.***

8. 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 (clear), cloudy, or opaque. ***Record this 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: Rescue our Rivers and Bay!

By the 1980s, Marylanders realized that the Chesapeake Bay and our rivers were in BIG trouble. For example, too many nutrients were entering our waters. They entered streams and rivers from out-of-date storm & sewage systems and from stormwater runoff containing fertilizers from farms and lawns. Big loads of sediments were also washing into rivers from farm fields and construction sites. These and other pollutants contributed to the decline of fish and other life in our streams and the Chesapeake Bay.

Our state started conservation practices, called **Best Management Practices**, to reduce polluted runoff. For example, some farmers planted **riparian buffers** (trees near streams) to reduce the amount of fertilizer and other **nonpoint pollutants** from reaching the stream. Some also put in sediment ponds (also called catchment ponds) to catch polluted runoff from barnyards. In urban areas, laws required that new housing and commercial areas build sediment ponds to catch polluted runoff from streets, roofs, and yards.

Part 2 Activity: You are going to adopt some Best Management Practices to see if you can improve water quality in your watershed.

1. Consider where runoff occurs near the farms on your watershed model. Plant forested riparian or grass buffers in these areas to reduce runoff into the river.

2. Place sediment ponds or plant buffers around livestock fields.

3. What changes can you make to the crop fields? Make them.

4. Try to think of other ways to reduce the amount of pollutants coming from the farm.

5. URBAN AREAS: Community groups are planting trees along waterways to try to reduce erosion. Put trees along your waterways.

6. While you are trying to clean up the watershed, new shopping centers are still being built. Replace two farms with a commercial area. Include a sediment pond with it.

7. THE MINES: Laws were passed requiring that areas that were once strip mined be “reclaimed” by planting forests and meadows. So put forests where your mines were. Also, agencies in Maryland and the Federal Government have developed some ways to reduce the acidity of water caused by abandoned mines and rubble. These changes reduced the amount of pollution entering from these sources.

8. NOW, FOR THE POLLUTANTS. Do all the farmers use as much fertilizer and as damaging pesticides as before? You may want to reduce the number of drops of some pollutants. On the other hand,

urban areas continue to expand, so other pollutants might be worse. Put 2-5 drops of pollutants in the areas they would come from and ***record the pollutants on the Pollutant Table.***

9. 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.

10. 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 (clear), cloudy, or opaque. **Record this information on the Data Sheet**. 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		
Part 2		

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. Did you see an improvement in your water quality or the amount of runoff? Why or why not?