



NAME: _____

Water Muddle Up and Clean Up

Adaptation of There Is No Point To This Pollution!

Participant Worksheet

Procedure: You will be given a map of Loop Lake Map along with a Pollutant Description Sheet; refer to these to fill out this worksheet. You will also be given a cup with water; this represents the water that flows across your property and into Loop Lake.

1. Observe the highlighted property on your map. Write the name of this property below:
2. Consider the activities that take place at this location and review the Pollutant Description Sheet. List one or more pollutants that your property might be responsible for:
3. Pick one of the pollutants from your list and place a small amount (e.g., a couple drops of diluted food coloring, cooking oil, or colored corn syrup or a pinch of cocoa) of pollutant into your cup according to the pollution indicators provided by your teacher. Write the name of the pollutant you selected here: _____
4. Observe your pollutant in water. Describe how it behaves and its chemical properties (solubility, density, etc.):
5. Scientists found this pollutant in Loop Lake. Locate your property on the Loop Lake Map. Describe how your pollutant might travel from your property to Loop Lake:
6. Based on the behavior of your pollutant in water, how do you think a scientist would try to remove it from the water?
7. When instructed, pour the contents of your cup into Loop Lake.



Pollutant Description Sheet

Water-soluble contaminants

Many **pesticides and fertilizers** are water-soluble contaminants, meaning that they readily dissolve in water. Lawns may be one source of pesticides and fertilizers. Another source may be a nursery or farm. Barber Orchard is an example of a hazardous waste site, or Superfund site¹, contaminated with arsenic, lead, and pesticides. Located in Waynesville, Haywood County, NC, this property was used as a commercial apple orchard from 1903 until the mid 1980's. In the late 1980's, some of the land was sold and homes were built on it. In 1999, contaminants were found in the soil, and/or in the majority of drinking water wells.

Light non-aqueous phase liquids (LNAPLs)

LNAPLs do not dissolve in water and are less dense than water, and therefore, they float on top of the water table. Benzene, toluene, jet fuel and **gasoline** are all examples of a LNAPL. LNAPLs' low solubility contributes to their ability to remain groundwater sources of contamination for extended periods. However, over time the liquids spread laterally and begin slowly dissolving into the water, making the chemicals harder to extract. Parking lots may be one source of gasoline and oil. Potter's Septic Tank Service Pits in Sandy Creek, Brunswick County, NC, is a hazardous waste site contaminated with LNAPLs. Nearby groundwater was contaminated with LNAPLs from an oil spill, which was traced to one of the four disposal pits at the site.

Dense Nonaqueous-Phase Liquids (DNAPLs)

DNAPLs do not dissolve in water and are denser than water. These toxic chemicals sink and form pools at the bottom of an aquifer. DNAPLs can enter moving groundwater and potentially pollute large areas over time. **Trichloroethylene (TCE)** and tetrachloroethylene (PERC) are examples of DNAPLs that are more commonly known as chlorinated solvents. They are often used in metal cleaning, degreasing, dry cleaning, leather tanning, pharmaceuticals and paints. They are highly carcinogenic chemicals that can be found at many Superfund sites including the Massachusetts site featured in the book and movie, *A Civil Action*. Both of these chemicals were also found at the Camp LeJeune Superfund site in Onslow County, NC. Another example of DNAPLs is **polychlorinated biphenyls (PCBs)**, which were used as a coolant in electric transformers. PCBs are found at the Ward Transformer Superfund site in Raleigh, NC.

Sediment

Sediment is soil that can be transported in water. The leading water quality problem in many water ways is sediment coming from storm water runoff. The particles in sediment may be suspended in the water, making it look cloudy, and over time they may settle to the bottom. Sediment can make it difficult or impossible for aquatic plants to grow and can destroy aquatic habitats. Construction sites can be a significant source of sediment. Bare spots on lawns can also be a source of sediment.

¹ A **Superfund site** is a site where hazardous wastes are located and the Environmental Protection Agency has designated them to be cleaned up.