 Groundwater & Soils Pollution Lab   
By C. Kohn, Agricultural Sciences, Waterford WI

Group Names (first/last):

Hour Due: *at the end of the hour* Why late? Score: + ✓ -  
 If your project was late, describe why

**Materials**: food coloring; a slice of white bread; a plastic/aluminum tray; paper towel; water; eye dropper

**Directions**: use this sheet (and your notes) to complete this lab. Each person is responsible for answering an equal share of the questions (e.g. if you have 4 people in your group, the first person should answer #1, #5, #9, etc.). Those not writing should work together to create the answer for the writer to write. Only one sheet per group is needed.   
+ = exceed expectations (full sentences, legible handwriting, etc.). ✓= met but did not exceed expectations.

**Procedure**:

Step 1: Hold your slice of bread vertically in the tray.

Step 2: Add a drop of food coloring to the top of the bread (make sure it drops on the crust and not on the bread).

Step 3: Drop 2 ml of water onto the bread using an eyedropper.

Step 4: Record your observations after 5 minutes. While waiting, answer any questions below that you are able to.

**Observations:**

1. What happened to the bread after you added the drops of water? Explain:  
     
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2. Draw what happened below:   
     
   *Before the food coloring After the food coloring Immediately after the water After 5 minutes*

**Questions**:

1. In this analogy, state what each represent:   
     
   The bread: The food coloring:   
     
   Drops of water:
2. If the food coloring is the pollutant, what happened to it as the drops of water were added to the bread? Did the ‘pollutant’ spread out or did it go straight down? Explain:   
     
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3. As water moved to the bottom of the bread, was it clean and purified or did it carry the pollutants all the way to the bottom?   
     
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4. Imagine if the food coloring were the site of a landfill. If this is an accurate model of what happens, predict what would happen to the well-water of residents near the landfill if it were to leak.   
     
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5. What does this exercise indicate about how difficult it can be to find the cause of soil and groundwater pollution? Explain by connecting what happened to your bread to what happens to pollutants in the soil.   
     
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6. Would this be point or nonpoint pollution? Explain:   
     
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7. If the food dye represented leaky containers of a substance that could biomagnify, how would this change things? (Hint: as the substance spreads into the environment, what happens to its concentration? What happens to its concentration as it moves up the food chain?).   
     
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8. Which of the following pieces of federal legislation would regulate the “pollution” in our bread if this were an actual location? Circle all that apply below. At least 3 (or more) could apply to this case.  
     
   *Clean Air Act (’63) Clean Water Act (’64) Clean Air Act (’70) Pesticides Control Act (’72)  
     
   Ocean Dumping Act (’72) Safe Drinking Water Act (’74) Resource Conservation & Recovery Act (’76)   
     
   Toxic Substances Control Act (’76) Comprehensive Env’t Response, Compensation, & Liability Act (‘80)*  
   Explain how they apply:  
     
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9. If this pollutant were lead, what problems could it create in fish and wildlife?   
     
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10. If this pollutant were chromium-6, what problems could it create in fish and wildlife?  
      
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11. If this pollutant were mercury, what problems could it create in fish and wildlife?  
      
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12. If this pollutant were nitrogen and phosphorus, what problems would it create in the environment?   
      
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