



Environmental Effects of Leaching: Testing Your Drinking Water

INTRODUCTION:

In 2014, the government of Flint, Michigan decided to move its drinking water supply from Detroit to the Flint River in efforts to create a cheaper water supply. Although inexpensive, the quality of the water proved harmful to ingest as a result of poorly maintained infrastructure like corrosive pipelines. Corrosive pipelines are rusted pipelines that leach heavy metals, like lead, into the water supply. High lead levels are harmful to consume particularly for young children, causing irreversible brain development, learning problems, and irritability.

Your drinking water can quickly be tested using instant testing strips. Just dip the strip, let it sit for a minute, and read the color change on respective color charts. In this lab, the testing strips test for various parameters, such as iron, copper, lead, fluoride, pH, cyanuric acid, chlorine, bromine, ammonium chloride, hardness (calcium and magnesium), carbonate, nitrate, and nitrite. Each parameter means different things. For example, heavy metals like iron, copper, and lead are undesirable to have in drinking water, causing bad taste and health defects. While minerals like fluoride, calcium, and magnesium are beneficial to have in drinking water, providing positive health impacts.

Furthermore, your drinking water will be compared to a sample of distilled water. Distilled water is water that has been boiled into water vapor and condensed back into liquid. In the process of distillation, all contaminants and minerals are removed, creating an extremely purified sample of water. As a result, all of the parameters mentioned above, except pH, will be 0 for distilled water. pH, on the other hand, will be 7. In this lab however, you will not know which water sample is drinking water or distilled. That's for you to test and find out!

<u>Parameter</u>	<u>Level for Distilled Water</u>
Color	colorless
pH	7
Other Parameters (ppm)	0

PURPOSE:

To compare the levels of various toxins and chemicals in your drinking water to distilled water.

PROCEDURE:

1. Label one cup "A" and one cup "B."
2. Pour equal amounts of water sample A and water sample B into their cups.
3. Record visible observations about each water sample, before testing.
4. Take two strips from the bottle and quickly close the bottle. Avoid touching the strips' colored pads and avoid placing it face down.
5. Label one strip "A" and one "B."
6. Dip strip A into water sample A, fully submerging all colored pads. Remove after ~5 seconds.
7. Allow the strip to sit for 60 seconds. Compare each pad's color change to their parameters color chart. Record on data table.
8. Repeat steps 5-6 for strip B and water sample B.

MATERIALS RECEIPT	
PRICES ARE APPROXIMATE	
1 JNW Direct Testing Kit (100 strips)	\$19.00
2 Cups	N/A
Drinking Water	N/A
Distilled Water	\$1.00
TOTAL	\$20.00



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DATA/OBSERVATIONS:

Describe what Sample A and Sample B look like prior to testing.

Sample A: _____

Sample B: _____

Table 1: **Record** the level of all parameters for Sample A and Sample B.

Parameter	Sample A	Sample B
Total Hardness (ppm)		
Bromine (ppm)		
Residual Chlorine (ppm)		
Iron (ppm)		
Copper (ppm)		
Lead (ppm)		
Nitrate (ppm)		
Nitrite (ppm)		
Ammonium Chloride (ppm)		
Total Chlorine (ppm)		
Fluoride (ppm)		
Carbonate (ppm)		
Total Alkalinity (ppm)		
pH		
Cyanuric Acid (ppm)		



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CONCLUSION:

1. According to the evidence collected, make a claim determining which water sample is drinking water and which is distilled water. **Justify** your reasoning using data and observations.
2. When drinking water is contaminated, many solutions can be implemented to resolve this issue. **Develop** and **explain** a solution that can be implemented in a school whose drinking water has been contaminated.
3. Apart from leaching from corrosive pipelines, **describe** another way human activities cause the leaching of toxic metals and chemicals into water supplies. (List the steps of how those metals and chemicals make it to water.)
4. Your instructor will now tell you what each sample is. Was your claim correct? **Explain** why or why not.