

Bromothymol Blue Investigation

College for Kids

The case

It is 4 AM in Madison, and Inspector Doolittle is snoring away in a deep, wonderful sleep, when her dream is interrupted by the harsh sound of a phone ringing. Doolittle sits up in bed and reaches for the phone. It is police Chief Sanders. He is calling to inform the inspector that there has been a mole murdered, presumably by poisoning, in the UW chemistry building.

The inspector jumps out of bed, dresses, and speeds over to the scene of the crime. Doolittle can see the crumpled motionless body of the mole. She notices that the water dish, next to the mole's body, has a small amount of greenish liquid left at the bottom. "What's that?" asked the inspector. "The poison" replies the chief. We added the indicator Bromothymol Blue to test for acidity.

Being somewhat knowledgeable in the area of chemistry, the inspector recalls that this indicator turns yellow in the presence of acid and blue in the presence of base. Inspector Doolittle knows that many acids and bases are found in normal household products. The inspector then asks about the UW staff. She notes the following have access to acids or bases and to the moles water dish.

Name and Job	Source of acid/base and pH
Mite E. Mouse, mechanic	battery acid pH = 1.0
Curry O. City, janitor	citric acid pH = 6.0
S.B. Squarepants, exterminator	rat poison pH = 6.7
Twee T. Bird, nurse	medicine pH = 6.9
Tom N. Jerry, electronics technician	jewelry cleaner pH = 7.4
Christian Huygens, plumber	drain cleaner pH = 10

The inspector hurries back to the laboratory and gives you the vial of the water sample. Using your photometer and your knowledge of color, can you identify the poisoner? Be sure you have data to support your conclusion in case you called upon as an expert witness in the trial.

Follow these steps to measure the absorbance of a solution with your photometer

- Insert the appropriate colored LED.
- Place water in the sample cell and measure the voltage across the CdS.
- Place the solution in the sample cell and measure the new voltage across the CdS.
- Calculate the absorbance using the Excel Spreadsheet.