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LESSON 1: MYSTERY INTRODUCTION AND KASTLE-MEYER COLOR TEST

INTRODUCTION:

The Kastle-Meyer Color Test is commonly used to presumptively indicate if blood is present on an object. It is fast and easy to use, making it an ideal test at a crime scene or for use on samples taken from a crime scene. The test relies upon the heme, the iron-containing portion of a red blood cell, to catalyze the oxidation of phenolphthalein (also known as Kastle-Meyer reagent). Phenolphthalein is normally clear and colorless, but in the presence of blood and hydrogen peroxide, it becomes pink. If results of a Kastle-Meyer test suggest the presence of blood, investigators then know that further analysis of the residue may provide additional useful information.

The disadvantage of the Kastle-Meyer test is that it is presumptive, not conclusive. If any chemical and plant oxidants from sources other than blood are present, the test can produce a false positive result. In this experiment, however, you will minimize false positive results by adding the hydrogen peroxide catalyst last. Other chemical oxidants that may be present will usually produce a pink color before the hydrogen peroxide catalyst is added.

The reaction that you will test for is described below:

Heme iron + phenolphthalin (clear) + hydrogen peroxide ---- oxidized phenolphthalein (pink) and water

(Heme is a catalyst and is unchanged. Hydrogen peroxide is reduced to water)

SAFETY PRECAUTIONS:

Given the materials you will be working with for this test, safety goggles and latex gloves must be worn.

PROCEDURE:

- 1. In order to determine that there are no other chemical oxidants present, first test the clean filter paper sample (Negative Control).
- 2. Apply one drop of ethanol or distilled water to the sample.
- 3. Apply one drop of Kastle-Meyer (KM) reagent to the same area on the sample, and observe any color change. If there is a color change, record it in the chart provided. If not, record that no change occurred.
- 4. Apply one drop of 3% hydrogen peroxide to the sample area. Observe and record any color change. (Because there are no chemical oxidants present on the sample, you should observe and record no color changes.)





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- 5. Repeat steps 2 4 on the Positive Control paper sample containing a known spot of blood. You should observe and record a pink color after adding the hydrogen peroxide.
- 6. Repeat steps 2 4 on each of the Unknown filter paper samples. One has been wiped on the spots from the rag found in the basement, while the other has been wiped on the spots from the napkin found in the basement. Observe and record any color changes in the appropriate rows.
- 7. When finished, clean up your lab area by disposing of the bloody filter papers in the biohazard or other bag supplied by your teacher.

OBSERVATIONS:

Enter the results of each test in the chart below. Make sure that you record precise descriptions of the color(s) that appear, and note when no color changes result.

	After Kastle-Meyer treatment	After hydrogen peroxide treatment
Negative Control		
Positive Control		
Unknown from rag		
Unknown from napkin		

DATA ANALYSIS:

Based on your recorded observations, answer the following questions:

1. Did the wipes from any of the Unknown samples taken from the scene test presumptively positive for blood?



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- 2. Describe what you presume to be on the rag and what you presume to be on the napkin. Explain why you've reached these presumptions.
- 3. What was the purpose of performing the test on a known spot of blood and on clean filter paper?
- 4. Why is this test not conclusive with respect to the presence of blood?

Conclusion:

Write two to three sentences summarizing the results of this test as they relate to your investigation. You will refer to this summary later in the investigation.