

Name _____
Date _____

CSI – Mystery Powders Lab

PURPOSE: To describe physical and chemical properties of matter and to observe physical and chemical changes in matter in order to identify matter.

Learning Objectives: Clarifying Objective: 8.P.1.3 Compare physical changes such as size, shape and state to chemical reaction to include changes in temperature, color, formation of a gas or precipitate.

Essential Question(s): 8.P.1 Understand the properties of matter and changes that occur when matter interacts in an open and closed container.

Your Assignment:

You are a crime scene investigator who has been assigned the task of identifying the contents of a vial found at the scene of a murder. The vial is suspected to be a poison that was given to the victim in his drink. Various white powders were found in the car of the suspected killer. Your job is to analyze the 6 known white powders found in the suspected killer's car and compare the results to the analysis of the vial found in the victim's home to determine the composition of the poison.

Procedure:

Each group of investigators has a baggie of vials of the 6 white powders found in the suspect's car. You are to move through the testing stations in the crime lab (the classroom) performing each test on the 6 white powders. Once you have completed the analysis of the 6 powders, you will be given a sample of the powder from the vial in the victim's home. You are then expected to "run" the sample through all of the testing that you performed on the 6 powders. YOU MUST RECORD YOUR OBSERVATIONS FOR EACH TESTING STATION AND EACH POWDER.

STATION 1: CRYSTALLINE STRUCTURE

1. Place a small amount of powder 1 in the Petri dish.
2. Place the Petri dish under the microscope.
3. SKETCH the structure of the powder, as you see it, under the microscope in your data section.
4. Repeat the process for each powder. Wipe the Petri dish out between each test.

STATION 2: SOLUBILITY (Water)

1. Place a small amount of powder 1 in the Petri dish.
2. Add 25 drops of water to the solid.
3. Stir the mixture with a toothpick.
4. Record your observations. Pay close attention to whether or not the powder "dissolves" in the water.
5. Repeat the process for the rest of the powders.

STATION 3: ODOR AND TEXTURE

1. Place a small amount of each powder in a well in the well plate. DO NOT MIX THE POWDERS TOGETHER.
2. Waft (wave the odor towards your nose with your hand) each powder.
3. Record your observations in the data section.
4. Note the texture of each powder. Record this observation in the data section.

STATION 4: pH

1. Place a small amount of each powder in a well in the well plate. DO NOT MIX THE POWDERS.
2. Add 10-15 drops of water to each powder.
3. Touch the tip of a piece of red litmus paper to each mixture. Use a different piece for each powder mixture.
4. Record your observations in the data section.
5. Repeat the process using blue litmus paper.
6. Record your observations in the data section.

STATION 5: LIQUID TESTS (Suggestion: vinegar, iodine, and milk)

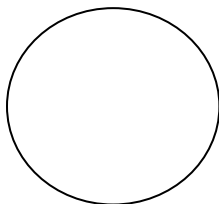
1. Place a small amount of each powder in a Petri dish. DO NOT MIX THE POWDERS—EACH POWDER SHOULD GET ITS OWN PETRI DISH.
2. Add 5 drops of liquid 1 to the Petri dishes under liquid 1.
3. Record your observations in the data section.
4. Add 5 drops of liquid 2 to the Petri dishes under liquid 2.
5. Record your observations in the data section.

STATION 6: THE HEAT IS ON

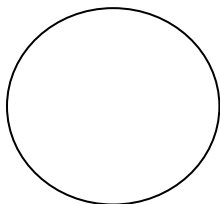
1. Make 6 aluminum foil trays.
2. Place a small amount of each powder in its own dish.
3. Set the foil dishes with the powders on the hot plate (turned on a medium heat setting).
4. Allow the powders to heat for 5-10 minutes.
5. Record your observations in the data section.

VICTIM'S HOME:

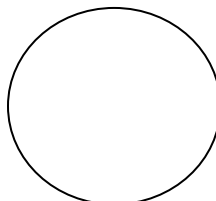
1. You will repeat EVERY test from the 6 stations with your sample from the Victim's home.
2. You will compare the results of the sample from the Victim's home to the tests you performed on each of the powders at stations 1-6.

Data Section**STATION 1 OBSERVATIONS:**

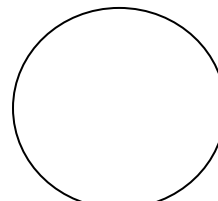
Powder 1



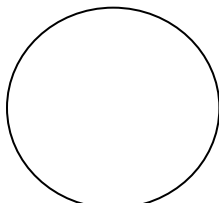
Powder 2



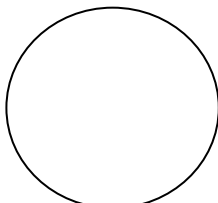
Powder 3



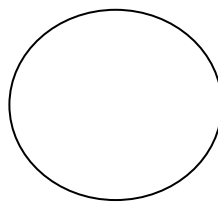
Powder 4



Powder 5



Powder 6



Victim's Home

STATION 2 OBSERVATIONS – *Describe* your observations.

POWDER	SOLUBLE	INSOLUBLE
1		
2		
3		
4		
5		
6		
VICTIM'S HOME		

STATION 3 OBSERVATIONS– **Describe** your observations. **Also, complete Section Assessment on page 557 please.**

POWDER	ODOR	TEXTURE
1		
2		
3		
4		
5		
6		
VICTIM'S HOME		

STATION 4: pH– **Describe** your observations.

POWDER	RED LITMUS	BLUE LITMUS	pH
1			
2			
3			
4			
5			
6			
VICTIM'S HOME			

STATION 5 OBSERVATIONS– ***Describe*** your observations.

POWDER	LIQUID 1	LIQUID 2
1		
2		
3		
4		
5		
6		
VICTIM'S HOME		

STATION 6 OBSERVATIONS– ***Describe*** your observations.

POWDER	OBSERVATION
1	
2	
3	
4	
5	
6	
VICTIM'S HOME	

Name _____
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Analysis Questions:

1. Describe, in complete sentences, how you cross-referenced your data from the 6 stations to determine the composition of the powder from the victim's home.
2. Determine which tests are used to investigate physical properties.
3. Determine which tests are used to investigate chemical properties.
4. Describe the differences between physical and chemical properties.
5. Why is the identity of the powders not an issue in this lab?

Identifying the Mystery Powders Using Chemical or Physical Properties:

Study the data table below. Compare the data with results you collected as you performed various test on the 6 white powders. Answer the questions.

Powder	Color / Texture	pH	Iodine	Water	Vinegar	Heat	Solubility
Dishwasher detergent (powder)	Small white balls	Blue	Yellow / orange	Fizzes	Fizzes	No reaction	Part.
Corn starch	Fine yellow white powder-silky	No change	Reddish-purple then black	Makes cloudy but stays on bottom	Gets thick and then hard	Brown around edges	No
Baking soda	Fine white powder	Blue	Yellow / orange	Fizzes	Fizzes	May brown edges	Yes
Sugar	White irregular crystals	No change	Yellow	Dissolves	Dissolves	Burns and chars	Yes
Salt	White cubic crystals	No change	No reaction	Dissolves	No reaction	Turns clear	Yes
Baby powder	Fine white powder-silky	No change	Yellow	Makes cloudy but stays on bottom	No reaction	No change	No

1. What is the identity of the powders used in the CSI Mystery Powder Lab?
 - a. Powder 1 is _____.
 - b. Powder 2 is _____.
 - c. Powder 3 is _____.
 - d. Powder 4 is _____.
 - e. Powder 5 is _____.
 - f. Powder 6 is _____.
2. What powders make up the powder found in the Victim's Home?