**FORENSICS LAB: USING PROPERTIES TO IDENTIFY MATERIALS**

*Forensic chemists test the physical and chemical properties of materials found at a*

*crime scene. The also do similar tests on the materials found on a suspect’s skin or*

*clothing. These materials are often complex mixtures, such as soil, which contain*

*many substances. In this lab, you will compare the properties of three known*

*materials with two samples of “evidence.” Although your materials and equipment*

*are less complex than those used by forensic chemists, your overall method will be*

*similar to the methods they use.*

**SCENARIO**

A crime has occurred at a bakery.

Throughout the bakery is an unidentified white

powder. Multiple individuals were brought in for

questioning, but only one had white powder on

her shoes. At this point she is the main suspect

in the crime, but is the white powder on her

shoes the same white powder that was found in

the bakery?

**PRE-LAB**

The pre-lab must be completed in its entirely before the lab can be started in class.

1. Read and understand the entire lab.

2. What are the safety hazards involved in this lab?

3. Write the title of the lab and the question in your notebook.

4. Rewrite the procedures in your own words.

5. Neatly, copy the data table into your

notebook.

**QUESTION**

Can the properties of materials that appear similar be used to tell them apart?

**MATERIALS**

Reaction plate

25 Wooden splints

Cornstarch

Baking soda

Baking powder

Distilled water

Vinegar (Acetic Acid)

Iodine solution

Sample from the crime scene

Sample from the suspect’s shoe

Paper towel

**SAFETY**

Goggles must be worn at all times during this investigation.

Iodine solution is corrosive and poisonous. It can stain skin and clothing. Rinse any iodine spills with water.

**PROCEDURES**

**Part A. Properties of a Known Substance**

1. Copy the data table into your science

notebook.

2. Using a wooden splint, scoop a

small amount of cornstarch (one scoop) onto the reaction plate in the three spaces available for cornstarch.

3. Record any physical properties of the

cornstarch you observe.

4. Add 1-2 drops of distilled water to the

appropriate space on the reaction plate. Mix the water and cornstarch with a wooden splint. Record any physical or chemical changes that occur.

5. Repeat step #4 with 1-2 drops of vinegar and then 1-2 drops of iodine. ALWAYS USE A FRESH WOODEN SPLINT EACH TIME SO AS NOT TO CONTAMINATE THE SAMPLE!

6. Repeat steps #4 and #5 with the baking soda and baking powder. Record observations in the data table.

**Part B. Properties of an Unknown**

**Substance**

7. Predicting: Look at the sample form the crime scene and the sample from the suspect’s shoe. Based on your observations, predict whether testing will show that the samples are identical. Record your prediction (hypothesis) in your science notebook.

8. Using a clean wooden splint, place one scoop of the crime scene sample in the appropriate spaces on the reaction plate.

9. Record any physical properties of the crime scene sample you observe.

10. Repeat steps #4-#6 using distilled water, vinegar, and iodine.

11. Repeat steps #8-#10 using the sample from the suspect’s shoe.

12. Clean-up: Rinse all substances on the reaction plate down the drain with water. Do not leave any residue on the reaction plate. Wipe off your tables and wash your hands with soap and water.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Sample | Physical Description | Result of adding water | Result of adding vinegar | Result of adding Iodine solution |
| Baking Soda |  |  |  |  |
| Baking Powder |  |  |  |  |
| Cornstarch |  |  |  |  |
| Crime Scene Sample |  |  |  |  |
| Suspect Shoe Sample |  |  |  |  |

**ANALYSIS**

Answer the following questions in complete sentences in your science notebook.

1. Were there any notable differences in physical properties of cornstarch, baking soda, and baking powder that you could use to compare to the crime scene and suspect samples? Explain.

2. Was the ability to dissolve in water a physical change that you could use to distinguish the three known white powders from each other? Explain.

3. What affect did vinegar have on the three known white powders?

4. What affect did iodine have on the three known white powders?

5. What results did you get when testing the crime scene sample? Remember, you are

simply analyzing the data, not making any conclusions.

6. What results did you get when testing the sample from the suspect’s shoe? Remember, you are simply analyzing the data, not making any conclusions.

**CONCLUSIONS**

Answer the following questions in complete sentences in your science notebook.

1. Based on your observations above, what is the white powder that was found at the crime scene? What data do you have to support that conclusion?

2. Based on your observations above, what is the white powder that was found on the

suspect’s shoe? What data do you have to support that conclusion?

3. Are the samples from the suspect and from the crime scene the same material?