**Name: Period:**

**White Powders**

**A Lab on Standardized Tests**

**Used to Identify Unknown Substances**

Crime labs frequently receive unknown substances taken from crime scenes. Experts in the crime lab have the job of determining the physical and chemical identity of these substances. Many times these substances are illegal drugs. The findings of the crime lab are important in determining the guilt or innocence of a suspect.

Crime lab experts must use testing procedures that give characteristic results (positive identification). These tests and their results must be established prior to the examination of the unknown substance. Once the tests are verified, they are recorded and used repeatedly to prove the identity of suspect substances.

It is also important to perform more than one test on an unknown. Proper identification requires that you use enough different tests to rule out the possibility that the unknown may be any other substance.

Forensic scientists in a crime lab must carefully perform each test on each unknown substance. The test results must be precisely recorded. The results they gather must be so exact that the identification is correct “beyond any reasonable doubt” when it goes to court.

***Objectives***

* You will perform a series of tests to determine the physical and chemical characteristics of several unknown powders.
* You will utilize your test results to identify an unknown substance.

**Procedure Part A**

***Developing a positive test for the six unknown powders***

Obtain a bottle of each of the six known samples A through F. Record your results for tests conducted on the six known powders in Data Table 1. If nothing happens in a specific test on a known substance, record ND (no data) in the proper location on the data table.

1. Place a small amount of sample A on a dark piece of paper and observe its appearance with a hand lens. Record your results. Repeat this test with the remaining five powders. Dispose of the samples and the paper in the trash can.

2. Place a small scoop of sample A in a well of your reaction tray. Add a few drops of acetic acid (vinegar). Record your observations. Repeat this test with the remaining five powders. Wash out the reaction tray in the sink.

3. Place a small scoop of sample A in a well of your reaction tray. Add a little distilled water. Use a glass stirring rod to mix the sample and the water. Record your observations. Repeat this for the remaining samples. Do NOT dispose of these samples. You will use them in the next step.

4. Using the solutions from step 3, add a few drops (3-5) of sodium carbonate (Na2CO3) solution to each reaction tray. Record your observations. Wash out the reaction tray in the sink.

5. Place a small scoop of sample A in a well of your reaction tray. Add a couple drops (2-3) of Lugol’s solution to the sample. Record your results. Repeat this test with the remaining five powders. Wash out the reaction tray in the sink.

**DATA TABLE 1**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name of known substance** | **Observation with hand lens** | **Addition of acetic acid** | **Addition of water** | **Addition of sodium carbonate** | **Addition of Lugol’s solution** |
| **A-Brogaine** |  |  |  |  |  |
| **B-Speclate** |  |  |  |  |  |
| **C-Rotaran** |  |  |  |  |  |
| **D-Barrop** |  |  |  |  |  |
| **E-Lixonin** |  |  |  |  |  |
| **F-Table salt** |  |  |  |  |  |

**Procedure Part B *Identification of unknown substance***

Several substances were discovered in student lockers today. In Data Table 2, write down the number of the bottle whose contents you will analyze. This number indicates the locker from which the drug was taken. Compare your results with those in Data Table 1 to determine what substance the student had in his or her locker. Be careful; your results will determine whether or not charges should be pressed against the student.

1. Write down the Locker Number (number on the bottle) you will be testing in Data Table 2.

2. Perform all the tests you performed in Part A on each unknown substance. Record your findings in Data Table 2.

3. Compare the results in Data Table 2 with the results in Data Table 1 and identify each unknown sample. Record your findings.

**DATA TABLE 2**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Locker Number** | **Observation with hand lens** | **Addition of acetic acid** | **Addition of water** | **Addition of sodium carbonate** | **Addition of Lugol’s solution** | **Identified Substance** |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

***Postlab Questions***

1. Describe one positive test from Data Table 1 for *each* of the six powders.

A-

B-

C-

D-

E-

F-

2. Identify the powders you examined in Part B. Explain how you arrived at each conclusion.

12-

24-

35-

49-

3. Explain why forensic scientists must be very accurate when examining substances in the laboratory.

4. Explain why Part A was a vital part of this experiment.