

Name: \_\_\_\_\_

## ***Mystery Powders Lab Activity***

### **Lab Skills – Session #2**

#### **BACKGROUND**

Science is a constant search for information which may help to explain the mysteries of the universe in which we live. Scientists search for answers to the mysteries of our natural world in an orderly and systematic fashion, using a step-by-step process known as the **Scientific Method**. While the order in which the steps are completed sometimes varies, according to the nature of the problem, the basic steps of the scientific method are:

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| <b>1. Stating the Problem</b>            | <b>4. Experimenting/Testing</b>        |
| <b>2. Gathering Information/Research</b> | <b>5. Recording and Analyzing Data</b> |
| <b>3. Forming a Hypothesis</b>           | <b>6. Stating a Conclusion</b>         |

An important part of this process is experimentation where the proposed solution (hypothesis) is tested. During the testing process, two types of observation are often made – **qualitative** and **quantitative**. Quantitative observations involve measurements such as mass, volume, density, temperature, distance, velocity, etc. Qualitative observations involve describing the general properties of materials which may be used to identify substances, such as color, smell, feel, taste, etc. Each forms a part of the data which is analyzed to form a conclusion.

#### **MATERIALS**

5 White Powders (labeled A-E)	5 Plastic shallow dishes
Wooden Splints	Plastic spoons
Pipettes	Vinegar
Iodine solution	Water
Pen or pencil	

#### **PROCEDURES**

##### **Part 1 – Powders and Water**

In this activity, you will use your observations skills and apply the scientific method to distinguish five white mystery powders. **Follow all the directions below and any safety instructions the teacher provides.** When you have finished, answer the questions in the next section.

1. Put on safety goggles. Know how materials are to be cleaned and discarded. Observe how the room is situated; it should return to that status at the end of the lab.
2. Obtain 5 shallow plastic dishes and label them A-E.
3. Measure a level teaspoonful of each substance and place them in the corresponding labeled dishes.
  - a. Be sure to use a separate spoon for each of the substances. Do not mix spoons and substances.
4. Add one teaspoon of water to each dish. Take the dishes back to your lab tables. Mix with the wooden splint. Record observations.
  - a. Use a different splint for each dish. Don't cross contaminate materials.
5. Carefully record your measurements and observations in a data table. Be sure to identify if there were any changes and reactions once the powder was mixed with the water.
6. Discard of the contents in each of the 5 dishes by rinsing them with warm water in the sink. Dry the containers.

##### **Part 2 – Powders and Vinegar**

7. Repeat steps 3 above.
8. Locate the bottle of vinegar and the pipette. Fill the pipette with vinegar and place 5-6 drops of vinegar along the edge of each powder set up.
9. Repeat Steps 5-6.

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### Part 3 – Powders and Iodine

10. Repeat Step 3.
11. Locate the bottle of Iodine Solution. Fill the pipette halfway with the Iodine Solution and place 5-6 drops of the Iodine Solution along the edge of each powder set up.
12. Repeat Steps 5-6.
13. Clean your lab table and the lab counters.
14. Wash your hands.
15. Return your safety goggles.

### QUESTIONS

1. Careful experimentation is an important part of the Scientific Method. What steps will you take to insure accurate and consistent results?
2. How does the step-by-step approach of testing powders with water, then vinegar, then iodine adhere to the Scientific Method?
3. From your observations, what was the most important property you used in distinguishing one powder from another?
4. Which of your observations were qualitative and which were quantitative? Explain.
5. Which of the samples reacted with bubbling or fizzing during both the water test and the vinegar test? Which sample only fizzed during the vinegar test?
6. Scientists know that when iodine is mixed with substances containing starch the mixture turns black. Did any of the mystery powders contain starch? If so, which one?
7. In what ways does this lab illustrate what Science and the Scientific Method are all about?

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***Data Table***  
**Observations**

<b>Sample</b>	<b>Mixed with Water</b>	<b>Mixed with Vinegar</b>	<b>Mixed with Iodine</b>
<b>A</b>			
<b>B</b>			
<b>C</b>			
<b>D</b>			
<b>E</b>			

**ADDITIONAL NOTES**

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