**Chemical & Physical Changes Lab**

**Station 1 - What would happen if...**

***Inquiry Question***: What do you think will happen when vinegar combines with baking soda or baking powder?

***Prediction****:*

Baking soda: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Baking powder: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Safety:** Wear goggles and apron; don’t smell, drink, or eat anything during this lab. Clean your area and your instruments after the lab and wash your hands.

**Materials**

* Vinegar
* Water
* Baking soda
* Baking powder
* 4 Balloons
* 4 Test tube
* Test tube holder
* Triple beam balance/scale

or measuring spoon

**Initial observations:**

Physical properties:

* 1. Vinegar: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ c. Water \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  2. Baking soda: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ d. Baking powder \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Procedure**

1. Place 4 test tubes in the test tube holder and label each one as follows: 1a, 1b, 2a, 2b
2. Pour 10 mL of vinegar into test tubes 1a and 2a.
3. Pour 10 mL of water into test tubes 1b and 2b.
4. Measure 1 tsp (5 grams) of baking soda and pour it inside 2 of the 4 balloons.
5. Measure 1 tsp (5 grams) of baking powder and pour it inside the other 2 balloons.
6. Put the baking soda balloons over the mouth of test tubes 1a and 1b and the baking powder balloons over the mouth of test tubes 2a and 2b, making sure that you do not drop the baking soda or the baking powder into the test tubes.
7. Lift each one of the balloons (one at a time) just enough to release the baking soda or baking powder inside the test tube: 1a, 1b, 2a, 2b.
8. Observe and record observations for each one of the test tubes.

***Observations:***

|  |  |  |  |
| --- | --- | --- | --- |
| *1a – Vinegar & Baking Soda* | *1b – Water & Baking Soda* | *2a – Vinegar & Baking Powder* | *2b – Water & Baking Powder* |
|  |  |  |  |

***Using the physical/chemical change check list, answer the following questions***

***Analyze:***

1. What type of change (physical or chemical) did you see in this investigation? What evidence supports your answer?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Did the investigation support your prediction? What evidence supports your answer?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Station 2: Dissolving a Substance**

**Inquiry Question:** Does colored sugar dissolve equally well in water, vegetable oil, and alcohol?

**Prediction** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Make colored sugar**

**Materials**

* Zip-close sandwich bag
* Sugar
* Food coloring
* Alcohol
* Water
* Vegetable oil
* 3 popsicle sticks
* Mixing tray or small cups

**Procedure**

1. Put 1 tablespoon of sugar in the plastic bag. Add 1 drop of food coloring to the sugar.
2. Leaving air in the bag, seal the bag securely.
3. Shake the bag vigorously until the sugar is thoroughly colored.
4. Add 1 teaspoon of colored sugar to 1 tablespoon of water; add 1 teaspoon of colored sugar to 1 tablespoon of alcohol, and add 1 teaspoon of colored sugar to 1 tablespoon of vegetable oil.
5. Stir each with a clean Popsicle stick.
6. Record your observations below.

**Observations**

|  |  |  |
| --- | --- | --- |
| Water | Alcohol | Oil |
|  |  |  |

**Analyze:**

1. Describe what happens to both the color and the sugar when you stir colored sugar in each liquid. What did you do to make sure it was a fair comparison? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. If a substance dissolves in one liquid, will it necessarily dissolve equally well in another? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Explain your answer to #2 by using evidence from your experiment. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. If your teacher gave you a sample of water and a sample of isopropyl rubbing alcohol but did not tell you which one was which, do you think adding salt or some other solute might help you identify the two liquids? Why or why not? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Answers**

**Chemical & Physical Changes Lab**

**Station 1 - What would happen if...**

***Inquiry Question***: What do you think will happen when vinegar combines with baking soda or baking powder?

***Prediction****:*

Baking soda: Predictions will vary\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Baking powder: Predictions will vary\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Initial observations:**

Physical properties:

a. Vinegar: liquid, clear, strong odor Water: liquid, clear, odorless

b. Baking soda: solid, white, odorless, powder Baking powder: solid, white, odorless, powder

***Observations:***

|  |  |  |  |
| --- | --- | --- | --- |
| *1a*  *(vinegar+ baking soda)* | *1b*  *(water+ baking soda)* | *2a*  *(vinegar + baking powder)* | *2b*  *(water + baking powder)* |
| Possible answers may include formation of bubbles, balloon inflates rapidly | Possible answers may include that there is no reaction, balloon doesn’t inflate | Possible answers may include formation of bubbles, balloon inflates very slowly | Possible answers may include formation of small bubbles, balloon inflates very slowly |

***Analyze:***

What type of change (physical or chemical) did you see in this experiment? What evidence supports your answer?

Vinegar and Baking soda- Chemical (Considerable formation of gas, bubbling, drop of temperature)

Water and Baking soda- Physical (No reaction, the baking soda will dissolve in the water)

Vinegar and Baking powder-Chemical (Medium formation of Gas, very little drop of temperature, little bubbles)

Water and Baking soda- Chemical (Small formation of gas, very little drop of temperature, little bubbles)

Did the experiment support your prediction? What evidence supports your answer?

Answers will change depending on the students’ predictions

**Station 2: Dissolving a Substance**

**Inquiry Question:** Does colored sugar dissolve equally well in water, vegetable oil, and alcohol? Prediction Answers will vary

**Observations**

|  |  |  |
| --- | --- | --- |
| Water | Alcohol | Oil |
| Water – the color and the sugar dissolved completely | Alcohol – the color dissolves, but the sugar does not dissolves | Oil – the color does not dissolves neither does the sugar |

**Analyze:**

1. Describe what happens to both the color and the sugar when you stir colored sugar in each liquid. What did you do to make sure it was a fair comparison? The sugar dissolved in the water and the color blended in with the water. (Answers may vary).\_\_\_\_\_\_\_\_\_\_\_\_
2. If a substance dissolves in one liquid, will it necessarily dissolve equally well in another? No\_\_
3. Explain your answer to #2 by using evidence from your experiment. \_\_\_Although sugar dissolved in water, it did not dissolve in the alcohol or the oil. (Answers may vary)\_\_\_\_
4. If your teacher gave you a sample of water and a sample of isopropyl rubbing alcohol but did not tell you which one was which, do you think adding salt or some other solute might help you identify the two liquids? Why or why not? Yes because salt (and most solutes) will dissolve in water but it will not dissolve in alcohol.

***There are TWO copies of the checklist provided on this page.***

**Blackline Master #2**

**Physical and Chemical Changes Checklist**

**Physical Change**

\_\_\_\_\_\_ Change in state of matter

\_\_\_\_\_\_ Change in color

\_\_\_\_\_\_ Change in density

\_\_\_\_\_\_ Change of shape

\_\_\_\_\_\_ The identity of the substances didn’t change

**Chemical Change**

\_\_\_\_\_\_ Formation of gas or bubbles

\_\_\_\_\_\_ Change in temperature happened when the substances were added together

\_\_\_\_\_\_ Formation of a precipitate (solid)

\_\_\_\_\_\_ Change in color

\_\_\_\_\_\_ Production of light or sound

**Physical and Chemical Changes Checklist**

**Physical Change**

\_\_\_\_\_\_ Change in state of matter

\_\_\_\_\_\_ Change in color

\_\_\_\_\_\_ Change in density

\_\_\_\_\_\_ Change of shape

\_\_\_\_\_\_ The identity of the substances didn’t change

**Chemical Change**

\_\_\_\_\_\_ Formation of gas or bubbles

\_\_\_\_\_\_ Change in temperature happened when the substances were added together

\_\_\_\_\_\_ Formation of a precipitate (solid)

\_\_\_\_\_\_ Change in color

\_\_\_\_\_\_ Production of light or sound

**Identify the Unknown Substance Lab**

**Blackline Master #3**

**Background**: Baking powder is a combination of different powders—baking soda, cream of tartar, and cornstarch. The mixture of two of these ingredients react when water is added to the mixture by releasing a gas, CO2.

**Objective:** Identify the two substances in baking powder that react with water.

**Inquiry question:** Which two substances in baking powder will react with water to release CO2 (gas)?

**Prediction**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Identify**:

1. Independent variable (test): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Dependent variable (outcome): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Control group: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Materials** **for each group**

* Baking soda
* Baking powder
* Cornstarch
* Cream of tartar
* Water
* 4 beakers

**Procedure**

1. Label 4 beakers: 1, 2, 3, 4
2. In beaker 1 mix 5 grams (1 tsp) of cream of tartar with 5 grams (1 tsp) of corn starch.
3. In beaker 2 mix 5 grams (1 tsp) of cream of tartar with 5 grams (1 tsp) of baking soda.
4. In beaker 3 mix 5 grams (1 tsp) of baking soda with 5 grams (1 tsp) of corn starch.
5. In beaker 4 add 10 grams (2 tsp) of baking powder.
6. Add 10 mL of water to beaker 1, observe and record observations.
7. Repeat step 6 with beaker 2, beaker 3, and beaker 4.

**Observations:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Powders | Cream of Tartar & Baking Soda | Baking Soda & Corn Starch | Corn Starch & Cream of Tartar | Control group |
| Reaction |  |  |  |  |

1. Which powder mixture(s) reacted with water to produce gas? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Was this observation a chemical or a physical change? Explain your answer \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Which powder mixture(s) underwent physical changes when water was added? Explain your answer.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Answers**

**Identify the Unknown Substance Lab**

**Inquiry question:** Which two substances in baking powder react with water to release CO2 (gas)?

Prediction: \_Answers will vary \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Identify**:

1. Independent variable (test): \_The combination of powders: cream of tartar and baking soda, cream of tartar and cornstarch, and cornstarch and baking soda
2. Dependent variable (outcome): \_The formation of bubbles
3. Control group: The sample with baking powder only

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Powders | Cream of Tartar & Baking Soda | Baking Soda & Corn Starch | Corn Starch & Cream of Tartar | Control group  Baking powder |
| Water | Bubbling | No change | No change | Bubbling |

1. Which powder mixture(s) reacted with water to produce gas? When water was added, the mixture of baking soda and cream of tartar produced bubbles \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Was this a chemical or a physical change? Explain your answer. This was a chemical change because when water was added to the mixture of cream of tartar and baking soda, the production of gas was observed.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Which powder mixture(s) underwent physical changes when water was added? Explain your answer.

When water was added to the mixture of either cream of tartar and cornstarch, or corn starch and baking powder no new substances were formed, and no significant temperature changed was noticed.

**Physical and Chemical Changes Check for Understanding**

**Blackline Master #4**

1. Identify what the reactants are in a chemical reaction. *(SC.8.P.9.2)*

1. the substances that result from the reaction
2. the substances that change as a result of the reaction
3. the substances that change as a result of and from the reaction
4. neither the substances that change nor the substances that result from the reaction

2. Which of the following is **not** evidence of a chemical change? *(SC.8.P.9.2)*

1. change in color
2. change in odor
3. change in state of matter
4. change in temperature

3. David and Roberto made a saline solution by adding 50g of table salt to 100 mL of water. They boiled the solution and noticed that as the water evaporated, some salt crystals formed on the walls of the pot. What can David and Molly infer from this observation? *(SC.8.P.9.2)*

1. Physical changes can be reversed
2. Chemical changes can be reversed
3. Physical changes cannot be reversed
4. Chemical changes cannot be reversed

4. Which is of the following may bean indicator of physical or chemical change? *(SC.8.P.9.2)*

1. Gas may be produced
2. Light may be produced
3. Sound may be produced
4. A color change may take place

5. Two drops of sulfuric acid were added to 1g of copper sulfate powder (step 1). Next, a small amount of hot water was added to dissolve the mixture (step 2). Upon cooling, beautiful blue colored crystals formed (step 3). Step 1, 2, and 3 are:

*(SC.8.P.9.2)*

1. all chemical changes
2. chemical, physical, chemical changes respectively
3. chemical, physical, physical changes respectively
4. physical, physical, chemical changes respectively

6. Jenny and Teresa have found three unknown white powders. They decide to react each powder with water, vinegar, and alcohol to see if they can identify the powders based on their physical and chemical properties. They mix 5g of each powder with 5ml of each of the liquids and then record their observations. Which of the factors in Jenny & Teresa’s experiment would be considered the independent (test) variable? *(SC.8.N.1.1)*

1. The 5ml of each liquid
2. The 5g of each powder
3. The three different liquids
4. The three unknown powders

**Physical and Chemical Changes Check for Understanding ANSWER KEY**

1. Identify what the reactants are in a chemical reaction. *(SC.8.P.9.2)*

1. the substances that result from the reaction
2. the substances that change as a result of the reaction
3. the substances that change as a result of and from the reaction
4. neither the substances that change nor the substances that result from the reaction

2. Which of the following is **not** evidence of a chemical change? *(SC.8.P.9.2)*

1. change in color
2. change in odor
3. change in state of matter
4. change in temperature

3. David and Roberto made a saline solution by adding 50g of table salt to 100 mL of water. They boiled the solution and noticed that as the water evaporated, some salt crystals formed on the walls of the pot. What can David and Molly infer from this observation? *(SC.8.P.9.2)*

1. Physical changes can be reversed
2. Chemical changes can be reversed
3. Physical changes cannot be reversed
4. Chemical changes cannot be reversed

4. Which is of the following may bean indicator of physical or chemical change? *(SC.8.P.9.2)*

1. Gas may be produced
2. Light may be produced
3. Sound may be produced
4. A color change may take place

5. Two drops of sulfuric acid were added to 1g of copper sulfate powder (step 1). Next, a small amount of hot water was added to dissolve the mixture (step 2). Upon cooling, beautiful blue colored crystals formed (step 3). Step 1, 2, and 3 are:

*(SC.8.P.9.2)*

1. all chemical changes
2. chemical, physical, chemical changes respectively
3. chemical, physical, physical changes respectively
4. physical, physical, chemical changes respectively

6. Jenny and Teresa have found three unknown white powders. They decide to react each powder with water, vinegar, and alcohol to see if they can identify the powders based on their physical and chemical properties. They mix 5g of each powder with 5ml of each of the liquids and then record their observations. Which of the factors in Jenny & Teresa’s experiment would be considered the independent (test) variable? *(SC.8.N.1.1)*

1. The 5ml of each liquid
2. The 5g of each powder
3. The three different liquids
4. The three unknown powders