**Chemistry In A Bag**

**Integrated Science**

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_Pd\_\_\_\_\_

**Objective:** Students will demonstrate their understanding of physical and chemical properties and physical and chemical changes through a laboratory experiment.

**Safety Notes**

 \*Wear goggles

 \*wash hands and clean up any spills

 \*chemicals are safe to touch skin, but do not ingest any (they will stain hands so be careful)

 \*when you are finished, carefully release the air out of the bag, reseal and throw in the trash can

**Materials:** Quart Ziploc bag, Sodium bicarbonate (NaHCO3), Calcium chloride (CaCl2), water, Phenol red indicator solution, 25 ml graduated cylinder, microplate, test tube brush

**Pre-Lab:**

A. Describe how a chemical change is different from a physical change.

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B. List the 4 indications that a chemical change has taken place.

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Procedures:**

 ***Note: Be sure to clean off everything from your desk except what you will use in the lab! You will also be responsible for cleaning up at the end of the lab.***

1. Tear a piece of notebook paper in half. Label one half Sodium bicarbonate and the other half Calcium chloride.

2. Take both halves of the paper up to the teacher desk to get your chemicals. Place 2 level spoonfuls of each chemical on their appropriately labeled papers and carefully take back to your station.

3. Use a 25 ml graduated cylinder and measure out 10 ml of water from the sink. Take back to your lab station and let your teacher know you are ready to add 2-3 drops of Phenol red solution to your water. Phenol red is an acid base indicator. It is red in a base and turns yellow in an acid.

4. Record several initial properties of the chemicals; decide if your properties are physical (P) or a chemical (C).

**Data Table 1: Initial Properties of Chemicals**

|  |  |
| --- | --- |
| **Chemical** | **Properties (P or C)** |
| Sodium bicarbonate |  |
| Calcium Chloride |  |
| Water + Phenol Red Solution |  |

5. Add the sodium bicarbonate and the calcium chloride to your bag. Mix them together but DO NOT PUT IN ANY WATER YET.

 \*Has a physical or chemical change taken place? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Explain how you know.

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

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6. Shake the chemicals to one corner of your bag and twist off so that when you add the water it will not mix.

7. Pour your water + Phenol red solution into the opposite corner of your bag so that it does NOT MIX with your chemicals.

8. Carefully remove all air from your bag and seal up WITHOUT MIXING THE WATER WITH THE DRY CHEMICALS.

9. Once you have it completely sealed (be sure or you will have to start all over again!) then gently mix all of the ingredients together. Continue to gently mix, watch, and feel the contents of your bag for several minutes.

 \*Has a physical or chemical change taken place? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Explain how you know.

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

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10. Record all observations in Data Table 2.

**Data Table 2: Final Observations**

|  |  |
| --- | --- |
| **Observations** |  |

11. Dispose of bag according to your teacher's initial instructions.

**Follow-Up: You now have to figure out which combination of chemicals was responsible for each of the chemical change indicators.**

12. List the 4 chemicals you mixed together in your bag.

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

13. Collect your chemicals again as you did for the first part **BUT GET SMALLER AMOUNTS: ½ level spoonful of each Sodium bicarbonate and Calcium chloride, 5 ml of water.**

14. Obtain a microplate and scoopula. Use them to mix different combinations of your chemicals together to figure out which caused each of the chemical change indicators. Use the droppers on the teacher's desk for drops of Phenol red solution - SHARE! Use a pipette for drops of water and clean off your scooplua to avoid contamination. Record your results in Data Table 3.

**Note: You may use the diagram of the microplate below to help you organize your tests. Be sure to record your results in the data table.**

**Diagram Microplate**

 

 

 

 

 **Data Table 3: Chemical Combinations**

|  |  |
| --- | --- |
| **Chemical Change Indication** | **Chemical Combination** |
| Temperature Increase |  |
| Temperature Decrease |  |
| Gas Production |  |
| Color Change |  |

**Analysis:**

1. Explain how a physical property is different from a chemical property.

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2. What do you think happened to the mass of your bag as the chemical changes took place? Explain your reasoning.

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