**MATTER AND CHEMISTRY**

*BATH BOMBS LESSONS 3 & 4*

**INVESTIGATION QUESTION** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

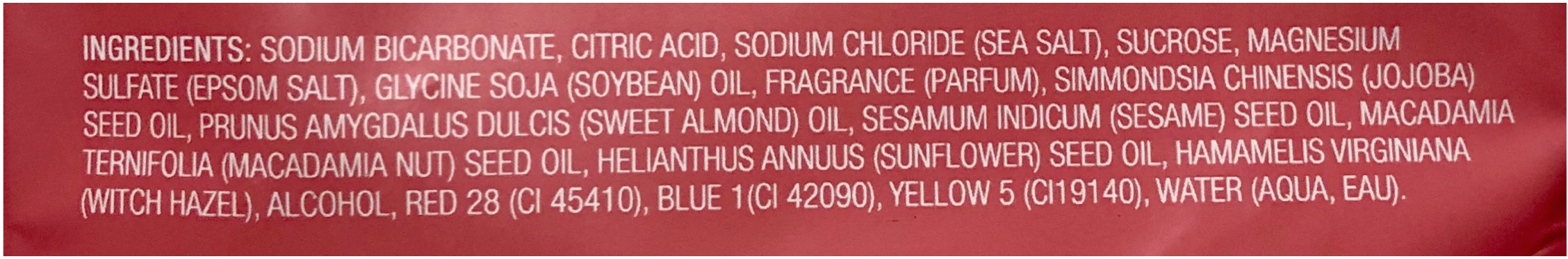
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**OBSERVATIONS**

***Homemade Bath Bomb Recipes***

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| --- | --- | --- | --- |
| **Recipe A** | **Recipe B** | **Recipe C** | **Recipe D** |
| 1/3 c. sodium bicarbonate  1/6 c. lemonade mix  1/6 c. Epsom salt  1 T. cornstarch  1 t. olive oil  1/3 t. water | 1/6 c Epsom salts  1/3 c. sodium bicarbonate  1/6 c. citric acid  1 t. olive oil  1/3 t. water | ½ c. sodium bicarbonate  ¼ c. citric acid  1/8 c. coconut oil  1 t Epsom salt  1 t sugar | 1/6 c lemonade mix  1/6 c. Epsom salts  1/3 c. sodium bicarbonate  1/3 t water  1 t olive oil |

***Store-bought Bath Bomb Ingredients***

****

Record the observations you notice about the bath bomb ingredients, and record what you wonder or question.

|  |  |
| --- | --- |
| **Bath Bomb Ingredients Observations** | |
| Notice | Wonder/Question |
|  |  |

**Bath Bomb Ingredient Property Data**

*Observe and record physical properties of the ingredients that will help us tell the ingredients apart.*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Properties of Bath Bomb Ingredients** | | | | | | | | |
| ***Ingredient*** | ***Scientific Name*** | ***Melting Point (° C)*** | ***State of Matter @ room temp.*** | ***Color*** | ***Viscosity*** | ***Odor*** | ***Texture*** | ***Luster*** |
| Water | Dihydrogen monoxide | 0 |  |  |  |  |  |  |
| Sugar | Sucrose | 160 |  |  |  |  |  |  |
| Citric Acid | Citric Acid | 153 |  |  |  |  |  |  |
| Epsom Salt | Magnesium sulfate | 1124 |  |  |  |  |  |  |
| Table Salt | Sodium chloride | 801 |  |  |  |  |  |  |
| Sodium bicarbonate | Sodium hydrogen carbonate | 50 |  |  |  |  |  |  |
| Corn Starch | Amylum | 257 |  |  |  |  |  |  |
| Olive Oil | Monounsaturated fat (Oleic acid) | -6 |  |  |  |  |  |  |
| Coconut Oil | Fully saturated fat (Lauric acid) | 25 |  |  |  |  |  |  |
| Lemonade Mix | This is a mixture | Not Applicable |  |  |  |  |  |  |

**PLANNING AN INVESTIGATION #1**

Record your ideas below about the following. Feel free to make a list, draw a picture, and/or write out your ideas.

* How can we use the ingredients to help us figure out why the bath bomb makes gas bubbles?
* Do you see any patterns across the ingredients in the store-bought vs homemade bath bombs?
* What/how could we investigate?

**Materials:**

Samples of ingredients

Water

Pipette

Scoop

Toothpicks

Identify the following for this investigation:

**Independent variable:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **Control group:** \_\_**water with no ingredients**\_\_\_

**Dependent variable:**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Constants:**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Create a data table to record your observations of the ingredients in the template below. Use a ruler.

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| --- |
| **Observations of Bath Bomb Ingredients** |
|  | |

**SUMMARY/CONCLUSION OF INVESTIGATION #1**

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| **Problem/Question** |
| *Do any of the individual ingredients have the chemical property of reacting with water?* |
| **CLAIM:** |
| **EVIDENCE:** |
| **REASONING:** |
| **NEXT STEPS:** |

**INVESTIGATION #2**

***Question: Which combinations of the substances in a bath bomb produce a gas?***

**Independent variable:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **Control group:** \_\_**water with no ingredients**\_\_\_

**Dependent variable:**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Constants:**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

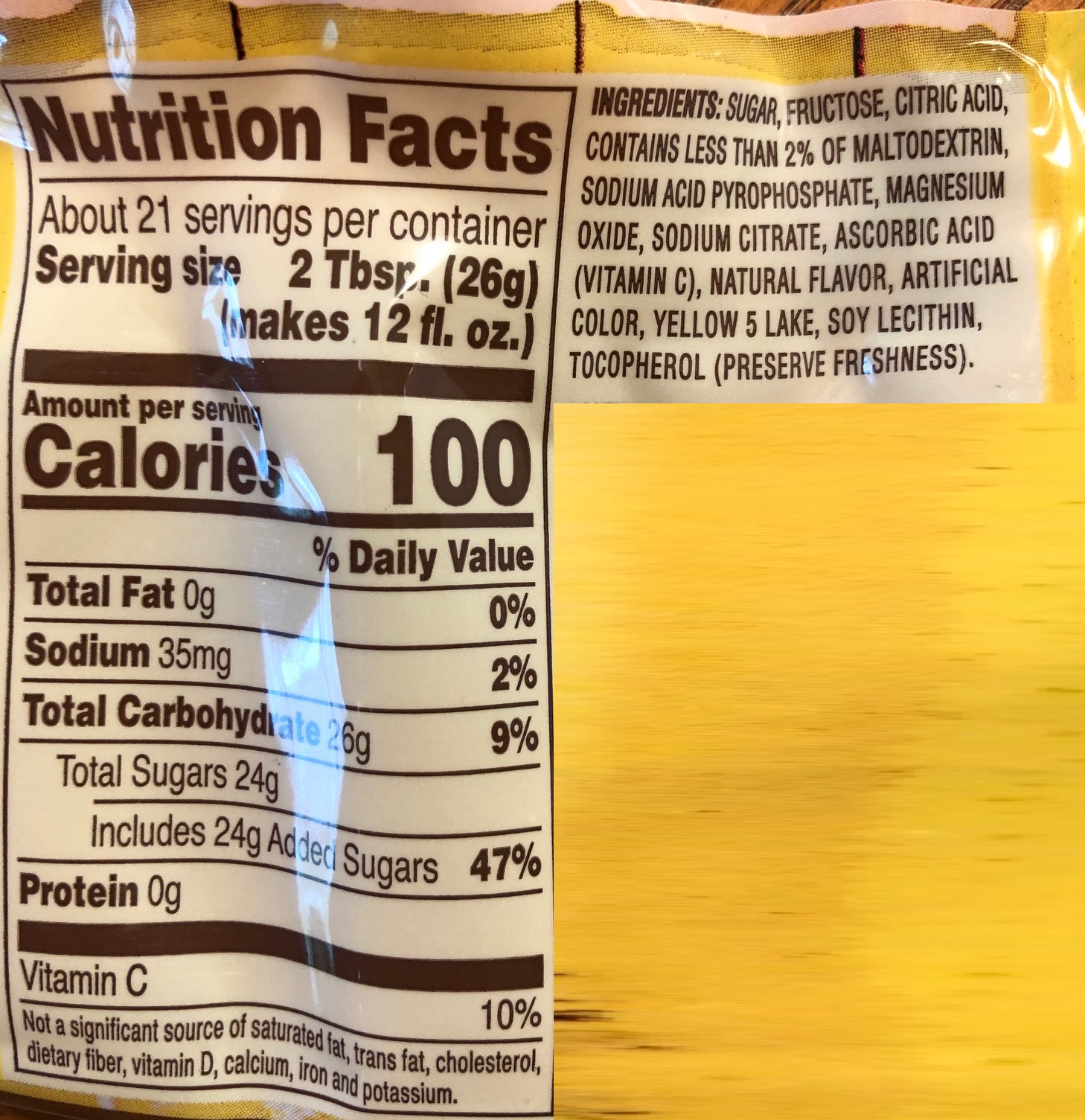
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**Ice Cube Tray**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Combinations of Bath Bomb Ingredients with Water** | | | | | | | | | | | |
| Ingredients | | A | B | C | D | E | F | G | H | Assigned group |
| Coconut oil | Olive oil | Sodium bicarbonate | Epsom salts | Lemonade mix | Citric Acid | Sugar | Cornstarch |
| A | Coconut oil | X |  |  |  |  |  |  |  | 1 |
| B | Olive oil |  | X |  |  |  |  |  |  | 2 |
| C | Sodium bicarbonate |  |  | X |  |  |  |  |  | 3 |
| D | Epsom salts |  |  |  | X |  |  |  |  | 4 |
| E | Lemonade mix |  |  |  |  | X |  |  |  | 5 |
| F | Citric Acid |  |  |  |  |  | X |  |  | 6 |
| G | Sugar |  |  |  |  |  |  | X |  | 7 |
| H | Cornstarch |  |  |  |  |  |  |  | X | 8 |

**CONCLUSION/SUMMARY**

1. What combination(s) of ingredients created gas bubbles when added to water?
2. The lemonade mix is a mixture of many ingredients. What patterns do you notice between the substances listed in the ingredients of the lemonade mix and the substances that resulted in bubbles appearing in question 1 above?



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| --- |
| **Problem/Question** |
| *Which combinations of the substances in a bath bomb produce a gas?* |
| **CLAIM:** |
| **EVIDENCE:** |
| **REASONING:** |
| **NEXT STEPS:** |