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

**Gas Law Demos Lab**

**Guiding Question:** How are pressure, volume, and temperature related when studying gases?

**Pre-Lab Questions:**

1. Write a scientific explanation that states the relationship between pressure and volume of a gas.

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

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**Reasoning**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. Write a scientific explanation that states the relationship between volume and temperature of a gas.

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

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**Reasoning**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Part 1: Demonstrations**

1. Observe the 2 demonstrations from your teacher.
2. Record your observations in data table 1.

**Data Table 1**

|  |  |
| --- | --- |
|  | **OBSERVATIONS** |
| **Can Demo** |  |
| **Balloon in Flask** |  |

**Part 2: Inquiry**

Station 1: Fill a beaker with 300ml of water and heat it until boiling. Place the dented ping pong ball in the boiling water for \_\_\_\_\_ minutes. Record your observations in data table 2.

Station 2: Place a balloon in the vacuum chamber and remove the air. Record your observations in data table 2.

Station 3: Without tearing the bags, try to push the nag that is outside the first beaker, inside. Then try to take the bag that is inside the second beaker out.

**Data Table 2**

|  |  |
| --- | --- |
|  | **OBSERVATIONS** |
| **Ping Pong Ball** |  |
| **Balloon in Vacuum Chamber** |  |
| **Bags Around the Beakers** |  |

**Questions:**

1. Fill in the blanks to complete the gas law rules.
   1. Pressure and volume have a(n) \_\_\_\_\_\_\_\_\_\_\_\_ relationship.
   2. When pressure increases, volume \_\_\_\_\_\_\_\_\_\_\_\_\_\_.
   3. Pressure and temperature have a(n) \_\_\_\_\_\_\_\_\_\_\_\_ relationship.
   4. When pressure increases, temperature \_\_\_\_\_\_\_\_\_\_\_\_\_\_.
   5. Temperature and volume have a(n) \_\_\_\_\_\_\_\_\_\_\_\_ relationship.
   6. When temperature increases, volume \_\_\_\_\_\_\_\_\_\_\_\_\_\_.
2. In station 3, what was keeping the bags from moving in or outside of the beaker?
3. Describe the gas law that is being represented by the “balloon in vacuum chamber” activity at station 2. Specifically explain what happened to the balloon when the air was removed from the chamber.
4. Describe the gas law that is being represented by the “ping pong ball” activity at station 1. Specifically explain what happened to the ping pong ball when it was placed in boiling water.
5. What occurred at the molecular level to the gas particles (steam) when we heated the can in the demo? *(Did the space between the particles in increase or decrease).*
6. What happened at the molecular level to the gas particles (steam) when the can was placed in the cold water? *(Did the space between the particles in increase or decrease?)*
7. If outside pressure (Standard Pressure) remained constant, why did the can get crushed?  Explain in terms of pressure.
8. Describe the gas law that is being represented in the “balloon in flask” demo. Specifically explain what happened to the balloon when the flask was placed in cold water.  (Where is there a greater pressure, in the room (atmospheric) or inside the flask (under balloon)?)