# Gas Pressure Volume Relationships Laboratory Simulation 

Name $\qquad$ Lab Section $\qquad$

Problem Statement: How are the pressure and volume of a gas sample related?
How do pressure/volume relationships of different gases compare?

Your instructor will inform you which of the following sections you are to do.
I. Air
A. Data Collection:

Open the Boyles' Law Laboratory Simulation program. Choose air as the gas to study by clicking on the appropriate radio button. Using your mouse, drag the piston to compress the air sample and release the mouse button. Do this at least six times to collect pressure data for volumes ranging from 5 mL to 30 mL . Record your data in the following table.

## Data Table

Pressure Volume
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
B. Data Analysis:

1. How is the pressure and volume data that you collected mathematically related? (Try combining this data using various operations (addition, subtraction, multiplication and division) to see if you can find a pattern.)
2. What pattern is shown in these data when they are graphed? Try to come up with an algebraic equation that expresses the pattern you found in your graph. How is your equation related to the pattern you found in the previous section?
II. Oxygen Gas
A. Data Collection:

Open the Boyles' Law Laboratory Simulation program. Choose oxygen as the gas to study by clicking on the appropriate radio button. Using your mouse, drag the piston to compress the oxygen sample and release the mouse button. Do this at least six times to collect pressure data for volumes ranging from 5 mL to 30 mL . Record your data in the following table.

## Data Table

Pressure Volume
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

## B. Data Analysis:

1. How is the pressure and volume data that you collected mathematically related? (Try combining this data using various operations (addition, subtraction, multiplication and division) to see if you can find a pattern.)
2. What pattern is shown in these data when they are graphed? Try to come up with an algebraic equation that expresses the pattern you found in your graph. How is your equation related to the pattern you found in the previous section?

## III. Helium Gas

## A. Data Collection:

Open the Boyles' Law Laboratory Simulation program. Choose helium as the gas to study by clicking on the appropriate radio button. Using your mouse, drag the piston to compress the helium sample and release the mouse button. Do this at least six times to collect pressure data for volumes ranging from 5 mL to 30 mL . Record your data in the following table.

## Data Table



## B. Data Analysis:

1. How is the pressure and volume data that you collected mathematically related? (Try combining this data using various operations (addition, subtraction, multiplication and division) to see if you can find a pattern.)
2. What pattern is shown in these data when they are graphed? Try to come up with an algebraic equation that expresses the pattern you found in your graph. How is your equation related to the pattern you found in the previous section?
IV. Hydrogen Gas
A. Data Collection:

Open the Boyles' Law Laboratory Simulation program. Choose air as the gas to study by clicking on the appropriate radio button. Using your mouse, drag the piston to compress the air sample and release the mouse button. Do this at least six times to collect pressure data for volumes ranging from 5 mL to 30 mL . Record your data in the following table.

## Data Table

| Pressure | Volume |
| :---: | :---: |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

## B. Data Analysis:

1. How is the pressure and volume data that you collected mathematically related? (Try combining this data using various operations (addition, subtraction, multiplication and division) to see if you can find a pattern.)
2. What pattern is shown in these data when they are graphed? Try to come up with an algebraic equation that expresses the pattern you found in your graph. How is your equation related to the pattern you found in the previous section?
V. Interpretation and Conclusions:
A. Choose one of the gases you studied and write a statement that summarizes how the pressure and volume of this gas are related?
B. Using your data for one of the gases you studied, predict the pressure of this gas sample at a volume of 100L. Show how you made your prediction.
C. Combine the pressure volume data for the four gases. Plot these data on the same graph using a different color for your data points for the different gases. What conclusions can you draw?
