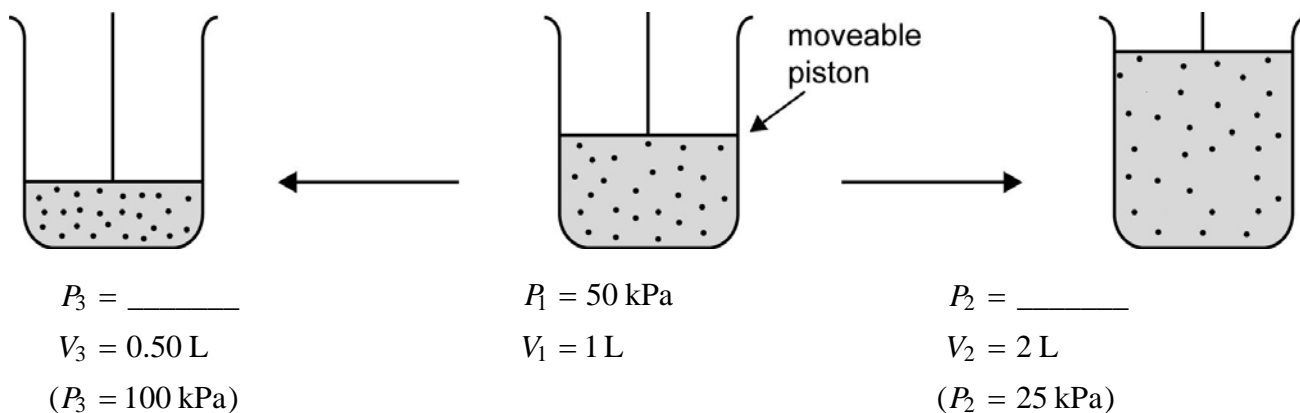


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| CHAPTER 3 | Gas Pressure, Temperature, and Volume | BLM 3.3.5 |
| ASSESSMENT | | |
| | | |

1. A 20.0 mL volume of air is trapped inside a syringe. If the plunger is pressed to 10.0 mL, how does the pressure change?

2. The volume of a gas is altered and the effect on pressure is studied in the following experiment:



The experiment illustrates law.

- (a) Find the missing values for pressure in the diagram above.

- (b) Fill in the following table of data. Use the calculated values for the above experiment.

| Volume (L) | Pressure (kPa) |
|------------|----------------|
| 0.30 | |
| 0.50 | |
| 1.0 | 50 |
| 1.5 | |
| 2.0 | |
| 2.5 | |

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| CHAPTER 3 | Gas Pressure, Temperature, and Volume (continued) | BLM 3.3.5 |
| ASSESSMENT | | |

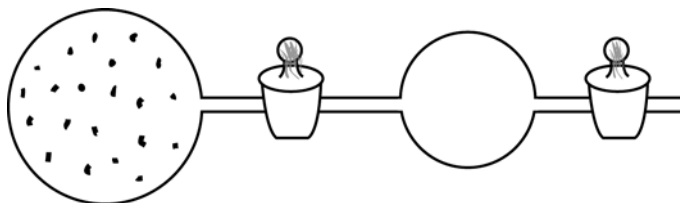
(c) Graph the data



(d) This graph shows a **direct/indirect** relationship between volume and pressure. (Circle the correct choice.)

(e) To straighten this graph, or make it linear, you must plot _____ and _____ .

3. Consider two glass bulbs separated by a valve. The 1.5 L bulb on the left is filled with a gas at a pressure of 3.0 atm, and the 0.50 L bulb on the right is empty.



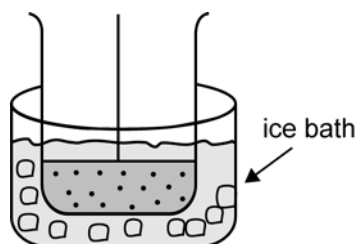
(a) What happens to the total volume when the middle valve is opened?

(b) Calculate the new pressure of the gas after the valve is opened.

(c) Explain this result using the KMT of gases.

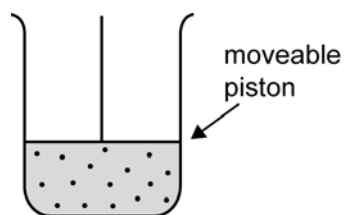
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| CHAPTER 3 | Gas Pressure, Temperature, and Volume (continued) | BLM 3.3.5 |
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4. The temperature of a gas sample is changed in the following experiment and the volume is monitored.



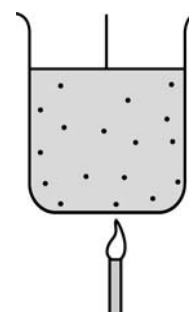
$$T_2 = 0^{\circ}\text{C}$$

$$V_2 = \underline{\hspace{2cm}}$$



$$T_1 = 25^{\circ}\text{C}$$

$$V_1 = 1.0 \text{ L}$$



$$T_3 = 200^{\circ}\text{C}$$

$$V_3 = \underline{\hspace{2cm}}$$

This experiment illustrates _____ Law.

- (a) Find the missing values for the volume.

- (b) Fill in the following data table for the above example.

| Temperature ($^{\circ}\text{C}$) | Temperature (K) | Volume (L) |
|------------------------------------|-----------------|------------|
| 0 | | |
| 25 | | |
| 200 | | |

- (c) Draw a rough sketch of this graph.



- (d) There is a **direct** / **indirect** relationship between the two variables. (Circle the correct choice.)

| | | |
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| CHAPTER 3 | Gas Pressure, Temperature, and Volume (continued) | BLM 3.3.5 |
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5. An air bubble in a cake dough at 25 °C has a volume of 0.80 mL. If the cake bakes at 450 K, find the new volume of the air bubble.

6. A bicycle tire has a pressure of 450 kPa at 20 °C. Calculate the new pressure at 35 °C.

7. A pressure produced in a lab setting was about 2.0×10^6 atm. If a 1.0×10^{-5} L sample of gas at that pressure is released until it is equal to 0.275 atm, what would be the new volume of the gas?

8. Express these values in Kelvin:
 - (a) Body temperature is 37 °C.

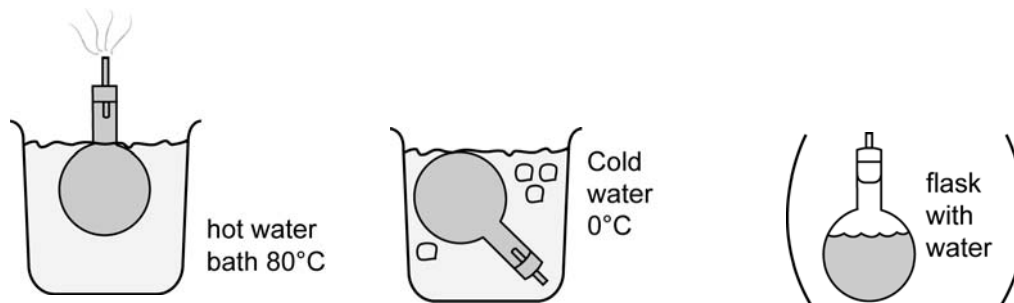
 - (b) The melting point of table salt is 801 °C.

 - (c) The boiling point of liquid nitrogen is –196 °C.

9. In Vancouver, a balloon with a volume of 5.0 L is filled with air at 101 kPa. The balloon is then taken to Banff, where the atmospheric pressure is 91 kPa. What will the volume of the balloon be if the temperature remains the same?

Gas Pressure, Temperature, and Volume (continued)

- 10.** A round-bottom flask is fitted with a one-holed stopper and a glass tube. The flask is immersed in a hot water bath at 80°C for a few minutes. Next, the flask is quickly submerged upside down in a bath of ice water. What would be observed?



- 11.** Propane is stored under pressure for use in barbeques. If a tank holds 15.0 L at 3.0 atm, what would the volume be if the pressure were 1.0 atm?
- 12.** What change in temperature is expected if 15.0 L of a gas at 300°C is compressed to half of its volume?