

# GAS PRESSURE AND TEMPERATURE RELATIONSHIPS

NAME \_\_\_\_\_

SECTION \_\_\_\_\_

Log on to the Internet. Type the following address into the location-input line of your browser:

<http://introchem.chem.okstate.edu/DCICLA/GLHeNeAr.htm>

This will load a Particulate Simulation. Once you have the simulation running, your screen will look like what is shown in Figure 1 below. If you haven't already done so, read the Particulate Simulation section of the Introduction to MoLEs Activities to learn how to use the simulation.

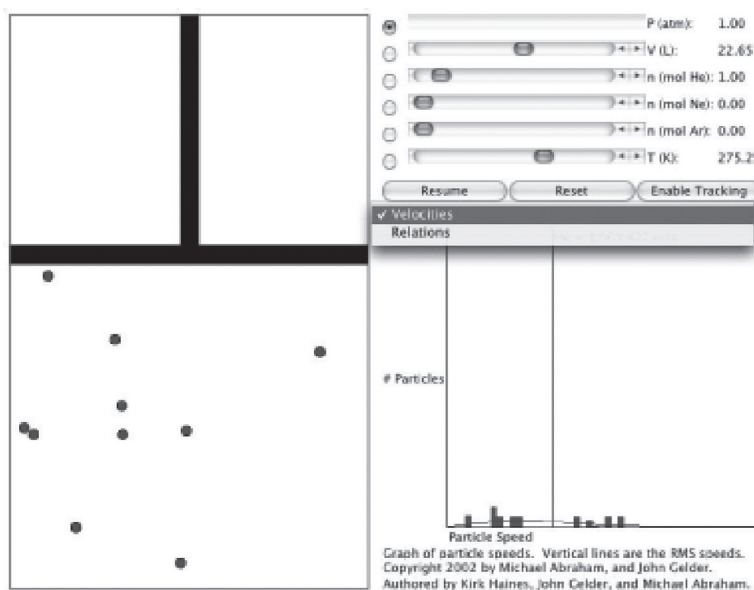
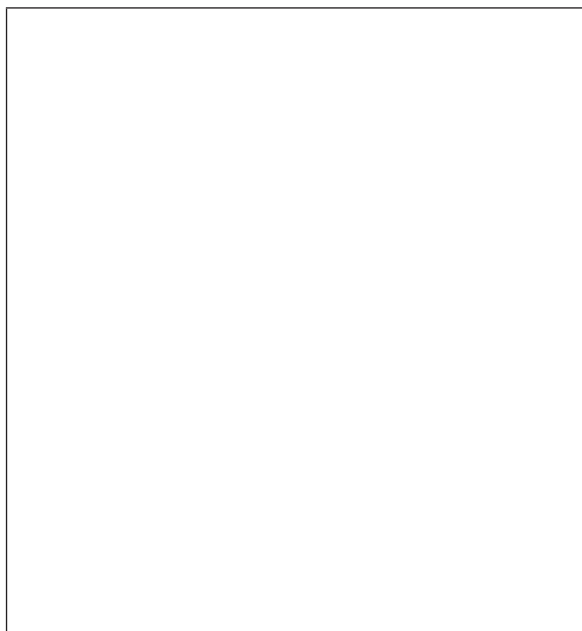


Figure 1.

**Problem Statement: How are the pressure and temperature of a gas sample related?**

**I. Data Collection**

- A. Open the Gas Law Simulation program and observe and describe, in the space below, the activity in the Gas Sample window. Consider using some or all of the following terms in your description: particles, atoms, molecules, collisions, speed, energy, force.
  
  
  
  
  
  
  
  
  
  
  
  
  
- B. One of the objects in the window is colored differently than the others. Enable the tracking function and trace the path of a particle from one side of the screen to the other in the space below. Explain any changes in speed or direction that you observe.



C. Record the values for pressure, volume, and temperature on the digital readouts of the Control Bar window.

D. Observe the action in the Speed Distribution window. Relate what you see with the behavior of the objects in the Gas Sample window.

Click the Pause button and sketch and label the graph in the space below.

E. Using the controls in the Control Bar window, change the temperature in the container and observe what happens to the pressure of the system. Also observe what happens in the Speed Distribution window. Explain how the activity in the Gas Sample window accounts for your observations.

- F. Collect five additional observations of pressure/temperature relationships and record all of your data in the following table.

Data Table

Pressure	Temperature

## II. Data Analysis

What patterns are shown in these data? It might be helpful to graph the data. Try to come up with an algebraic equation that expresses the pattern you found.

## III. Interpretation and Conclusions

- A. How are the pressure and temperature of a gas sample related?

- B. Mental Model: Draw a picture(s) that explains how the pressure and temperature of a gas sample are related at the level of atoms and molecules, and that illustrate(s) the observations you made in the experiment. In words, explain how your picture(s) illustrate(s) this relationship.
- C. Using your data, predict the pressure of a gas sample at a temperature of 10 Kelvins. Show how you made your prediction.