Gas Law Activity


In this activity, you will examine Charles' Law, which relates the temperature and the volume of an ideal gas under constant pressure.

1. Select the CHARLES' LAW tab. Set the mass to 5 kg and click OK.
2. Display the DESCRIPTION pane.
3. Slowly increase the temperature of the gas by dragging the Select temperature slider to the right.
   a. What happens to the gas as you do?
4. Reduce the temperature by dragging the slider to the left.
   a. What effect does this have on the gas?
5. With the mass still set to 5 kg, set the temperature of the gas to 100 K.
   a. What is the pressure of the gas?
   b. What is its volume?
6. Click the TABLE tab and click Record.
7. Increase the temperature of the gas to 200 K.
   a. What is the volume of the gas now?
   b. What is the pressure?
   c. Explain why the pressure of the gas is unchanged from the previous setup.
8. Click Record.
   a. How do the temperature and the volume compare with those in the preceding configuration?
9. Under constant pressure, the temperature and the volume of a gas are directly proportional to one another. If one value doubles, the other doubles as well. If one is halved, the other will be halved. This is called Charles' Law.
10. Make a hypothesis as to what the volume of the gas would be if the temperature of the gas were 400 K.
    a. Use the Gizmo to check your hypothesis. You must have my initials before you check the hypothesis.
11. Click Reset. Set the mass resting on top of the lid to any value you like and click OK.
12. Click the GRAPH tab to see a graph of volume vs. temperature.
13. Set the temperature of the gas to 50 K.
    a. What is the volume of the gas at this temperature?
    b. Click Record. What are the coordinates of the point that is plotted on the graph?
14. Increase the temperature of the gas to 100 K. Click Record.
15. Continue increasing the temperature by increments of 50 K. Click Record each time you change the temperature.
   a. Sketch the graph when you are done.
16. Click Reset. Change the mass resting on the lid. Repeat steps 3, 4 and 5 with the new value for pressure.
   a. How does the new graph of volume vs. temperature compare to the original?

Answer the questions at the bottom of the webpage.