

Molecular Motion

Recommended for Chapter(s): 5

Demo #017

Procedure

1. (Prep) Place the demonstrator on top of the overhead. You might need to use the plastic or the wooden shims to level the device.
2. Select the appropriate balls and accessories (effusion barrier, volume reducer, etc.) to show the concept being taught.
 - a. I would suggest using equal amounts of the white and blue balls for the demonstrations.
3. Turn the motor until the desired speed is reached.
 - a. I would suggest setting it to the maximum speed.

Clean Up

1. Return the materials to the cart in the demonstration library room.

Stockroom Notes

1. Put the balls back into the appropriate containers.
2. Return items to demonstration tub.
3. Return tub to the demonstration library.

Discussion

The motor on the demonstrator is used to simulate temperature; as the temperature increases the balls in the demonstrator travel faster. This demonstration can also be used to show several other concepts. Concept (1) the relationship between pressure and volume can be demonstrated. Turn on the motor and have the student pay attention to the number of times the balls hit the sides of the container when the balls are allowed to occupy the entire volume. Then put in the volume reducing barrier in and ask them, does the number of times that the molecules hit the sides of the container increase, decrease, or stay the same. Since the number of moles and temperature (speed) are constant, the balls hit the sides of the container more frequently when the volume is reduced, which demonstrates that reducing the volume at constant temperature and moles increases the pressure. Concept (2) if balls of different masses are placed into the demonstrator and the motor is turned on, the balls with the smaller mass will move faster than the balls with the larger mass. Concept (3), effusion, if the effusion barrier is put into the demonstrator along with balls of two different sizes/weights, and the motor is turned on, the smaller lighter balls will effuse through the barrier faster than the larger heavier balls.

Materials for demo 017

1. Molecular motion simulator
2. 2 Metal divider one with whole and one without
3. 5 Bottles with different colored/weighted balls
4. 4 Wood shims
5. 4 Plastic shims
6. 1 Power adapter