

## Answer on Question #46529, Physics, Mechanics | Kinematics | Dynamics

### Question:

A helium-filled balloon escapes a child's hand at sea level and 20.0C. When it reaches an altitude of 3600, where the temperature is 5.0C and the pressure only 0.68 atm, how will its volume compare to that at sea level?

### Answer:

The ideal gas law:

$$PV = nRT$$

where P is the absolute pressure of the gas, V is the volume of the gas, n is the amount of substance of gas (measured in moles), R is the ideal, or universal, gas constant, and T is the absolute temperature of the gas.

For initial and final states:

$$P_0V_0 = nRT_0$$

$$P_1V_1 = nRT_1$$

Therefore:

$$\frac{V_1}{V_0} = \frac{P_0T_1}{P_1T_0} = 1.4$$

Answer:  $\frac{V_1}{V_0} = 1.4$