

Boyle's Law - Solutions

- 1) If I have 5.6 liters of gas in a piston at a pressure of 1.5 atm and compress the gas until its volume is 4.8 L, what will the new pressure inside the piston be?

$$\begin{aligned}P_1V_1 &= P_2V_2 \\(1.5 \text{ atm})(5.6 \text{ L}) &= (x)(4.8 \text{ L}) \\x &= 1.8 \text{ atm}\end{aligned}$$

- 2) I have added 15 L of air to a balloon at sea level (1.0 atm). If I take the balloon with me to Denver, where the air pressure is 0.85 atm, what will the new volume of the balloon be?

$$\begin{aligned}P_1V_1 &= P_2V_2 \\(1.0 \text{ atm})(15 \text{ L}) &= (0.85 \text{ atm})(x) \\x &= 18 \text{ L}\end{aligned}$$

- 3) I've got a car with an internal volume of 12,000 L. If I drive my car into the river and it implodes, what will be the volume of the gas when the pressure goes from 1.0 atm to 1.4 atm?

$$\begin{aligned}P_1V_1 &= P_2V_2 \\(1.0 \text{ atm})(12,000 \text{ L}) &= (1.4 \text{ atm})(x) \\x &= 8600 \text{ L}\end{aligned}$$