

Charles's Law Problem Notes

Step 1: Determine which equation to use and **WRITE IT DOWN** $V_1/T_1 = V_2/T_2$

Step 2: Create a **Variable Table**

V1	
V2	
T1	
T2	

Step 3: Substitute your values and **units** into your equation

Step 4: show **ALL** steps while you solve

EXAMPLE: A gas in a can has an initial volume of 2L and an initial temperature of 25°C. The final volume decreases to 0.25L. What is the final temperature?

$$\frac{V_1}{T_1} = \frac{V_2}{T_2}$$

$$\frac{2L}{298^\circ C} = \frac{0.25L}{T_2}$$

$$(T_2)(2L) = (0.25L)(298^\circ C)$$

$$\frac{T_2 2L}{2L} = \frac{74.5 L \cdot K}{2L}$$

$$T_2 = 37.25 K$$

$$\begin{aligned} V_1 &= 2L \\ T_1 &= 25^\circ C + 273 = 298 K \\ V_2 &= 0.25L \\ T_2 &= X \end{aligned}$$

Charles Law Practice Problems

Only works when temp is in Kelvin...To convert to Kelvin add 273 to °C

1. In your own words, write down Charles's Law.
2. What is the equation for Charles's Law?
3. A balloon is inflated in a room at 25°C. It has a volume of 4.00L. The balloon is then heated to a temp of 58°C. What is the new volume if the pressure remains the same?
4. 1L of a gas is cooled from 500K to 250K. What is the volume?
5. A man heats a balloon in the oven. If the balloon initially has a volume of 0.4L and a temperature of 20°C, what will the volume of the balloon be after he heats it to a temperature of 250°C?

6. Carbon dioxide is usually formed when gasoline is burned. If 30L of Carbon Dioxide is produced at a temperature of $1 \times 10^3 \text{C}^\circ$ and allowed to reach room temp of 25°C without any pressure change, what is the new volume of the carbon dioxide?
7. A 600.0 mL sample of nitrogen is warmed from 77.0°C to 86.0°C . Find its new volume if the pressure remains constant.
8. What volume change occurs to a 400.0 mL gas sample as the temperature increases from 22.0°C to 30.0°C ?

9. A gas syringe contains 56.05 milliliters of a gas at 315.1 K. Determine the volume that the gas will occupy if the temperature is increased to 380.5 K

10. A gas syringe contains 42.3 milliliters of a gas at 98.15 °C. Determine the volume that the gas will occupy if the temperature is decreased to -18.50 °C.

11. If 540.0 mL of nitrogen at 0.00 °C is heated to a temperature of 100.0 °C what will be the new volume of the gas?

12. A balloon has a volume of 2500.0 mL on a day when the temperature is 30.0 °C. If the temperature at night falls to 10.0 °C, what will be the volume of the balloon if the pressure remains constant?

13. When 50.0 liters of oxygen at 20.0 °C is compressed to 5.00 liters, what must the new temperature be to maintain constant pressure?

14. If 15.0 liters of neon at 25.0 °C is allowed to expand to 45.0 liters, what must the new temperature be to maintain constant pressure?