

Charles's Law Problems

1. Calculate the decrease in temperature when 2.00 L at 20.0 °C is compressed to 1.00 L. **146.5 K**
2. 600.0 mL of air is at 20.0 °C. What is the volume at 60.0 °C?
3. A gas occupies 900.0 mL at a temperature of 27.0 °C. What is the volume at 132.0 °C? **1215 K**
4. What change in volume results if 60.0 mL of gas is cooled from 33.0 °C to 5.00 °C?
5. Given 300.0 mL of a gas at 17.0 °C. What is its volume at 10.0 °C? **293 mL**
6. A gas occupies 1.00 L at 0°C. What is the volume at 333.0 °C?
7. At 27.00 °C a gas has a volume of 6.00 L. What will the volume be at 150.0 °C? **8.46 L**
8. At 225.0 °C a gas has a volume of 400.0 mL. What is the volume of this gas at 127.0 °C?
9. At 210.0 °C a gas has a volume of 8.00 L. What is the volume of this gas at -23.0 °C? **4.1 L**
10. The temperature of a 4.00 L sample of gas is changed from 10.0 °C to 20.0 °C. What will the volume of this gas be at the new temperature if the pressure is held constant?
11. Carbon dioxide is usually formed when gasoline is burned. If 30.0 L of CO₂ is produced at a temperature of 1.00 x 10³ °C and allowed to reach room temperature (25.0 °C) without any pressure changes, what is the new volume of the carbon dioxide? **7.0 L**
12. 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.
13. What volume change occurs to a 400.0 mL gas sample as the temperature increases from 22.0 °C to 30.0 °C? (**gains 10.8 mL, because the new volume is 410.8 mL**)
14. 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
15. 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. **29.0 mL**
16. When the temperature of a gas decreases, does the volume increase or decrease?
17. 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? **737.8 mL**
18. 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?
19. 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? **29.3 K**
20. 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?