

8 • Why Do Hot Air Balloons Float?

THE COMBINED GAS LAW

In practical terms, it is often difficult to hold any of the variables constant. When there is a change in pressure, volume and temperature, the combined gas law is used. *Show work on another sheet of paper for credit.*

$$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2} \quad \text{or} \quad P_1 \times V_1 \times T_2 = P_2 \times V_2 \times T_1$$

$$K = ^\circ\text{C} + 273$$

Complete the following chart.

| | P₁ | V₁ | T₁ | P₂ | V₂ | T₂ |
|----------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| 1 | 1.50 atm | 3.00 L | 20.0 °C | 2.50 atm | | 30.0 °C |
| 2 | 720. torr | 256. mL | 25.0 °C | | 250. mL | 50.0 °C |
| 3 | 600. mmHg | 2.50 L | 22.0 °C | 760. mmHg | 1.80 L | |
| 4 | | 750. mL | 0.00 °C | 2.00 atm | 500. mL | 25.0 °C |
| 5 | 95.0 kPa | 4.00 L | | 101. kPa | 6.00 L | 471. K or 198. °C |
| 6 | 650. torr | | 100. °C | 900. torr | 225. mL | 150. °C |
| 7 | 850. mmHg | 1.50 L | 15.0 °C | | 2.50 L | 30.0 °C |
| 8 | 125. kPa | 125. mL | | 100. kPa | 100 mL | 75.0 °C |