

## Gas Law Problems

Name: \_\_\_\_\_

Date: \_\_\_\_\_ Per: \_\_\_\_\_

*Directions: Solve each problem. Use the problem solving steps, and SHOW YOUR WORK.*

1. A weather balloon is filled with helium that occupies a volume of  $5.00 \times 10^4 \text{L}$  at  $0.995 \text{atm}$  and  $32.0^\circ\text{C}$ . After it is released, it rises to a location where the pressure is  $0.720 \text{atm}$  and the temperature is  $-12.0^\circ\text{C}$ . What is the volume of the balloon at that location?
2. Hydrogen gas at a temperature of  $22.0^\circ\text{C}$  that is confined in a  $5.00 \text{L}$  cylinder exerts a pressure of  $4.20 \text{atm}$ . If the gas is released into a  $10.0 \text{L}$  reaction vessel at a temperature of  $33.6^\circ\text{C}$ , what will be the pressure inside the reaction vessel?
3. If  $0.756 \text{L}$  of gas exerts a pressure of  $94.6 \text{kPa}$ , what would the volume be at standard pressure ( $101.33 \text{kPa}$ )?
4. A helium-filled balloon at sea level has a volume of  $2.1 \text{L}$  at  $0.998 \text{atm}$  and  $36^\circ\text{C}$ . If it is released and rises to an elevation at which the pressure is  $0.900 \text{atm}$  and the temperature is  $28^\circ\text{C}$ , what will be the new volume of the balloon?



9. If 649mL of gas at 280K is heated to 297K, what will the new volume be?
10. A sample of air in a syringe exerts a pressure of 1.02atm at a temperature of 22.0°C. The syringe is placed in a boiling water bath at 100.0°C. The pressure of the air is increased to 1.23 atm by pushing the plunger in, which reduces the volume to 0.224mL. What was the original volume of the air?
11. An unopened cold 2.00L bottle of soda contains 46.0mL of gas confined at a pressure of 1.30atm at a temperature of 5.0°C. If the bottle is dropped into a lake and sinks to a depth at which the pressure is 1.52atm and the temperature is 2.09°C, what will be the volume of gas in the bottle?
12. A gas initially has a volume of 25L at a pressure of 90kPa. If the gas is allowed to expand to 50L, what is the final pressure?

13. Air in a tightly sealed bottle has a pressure of 0.987atm at 25.5 °C. What will the pressure be if the temperature is raised to 46.0 °C?

14. A gas expands from 35mL to 70mL. If the initial temperature was 22 °C, what will the final temperature be?

15. If 0.52L of gas at 345K is expanded to 0.763L, what will the new temperature be?