

NAME _____

INSTRUCTIONS: These problems cover most, if not all, of the gas laws we've covered so far. Use your notes. Use your calculator. Use your Periodic Table, yellow Card™, and even your textbook (for all the help it'll be). Just be sure to do these *on your own*. Show your work, keep it neat.

1. A helium filled balloon at sea level has a volume of 2.1 L at 0.998 atm and 36°C. If it is released and rises to an elevation at which the pressure is 0.900 atm and the temperature is 28°C, what will be the new volume of the balloon?
2. At 0.00°C and 1.00 atm of pressure, a sample of gas occupies 30.0 ml. If the temperature is increased to 30.0°C and the entire gas sample is transferred to a 20.0 mL container, what will be the gas pressure inside the container?
3. A sample of air in a syringe exerts a pressure of 1.02 atm 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 0.224 ml. What was the original volume of the air?
4. An unopened, cold 2.00 L bottle of soda contains 46.0 mL of gas confined at a pressure of 1.30 atm at a temperature of 5.0 °C. If the bottle is dropped in a lake & sinks to a depth at which the pressure is 1.52 atm and the temperature is 2.09°C, what will be the volume of the gas in the bottle?
5. A sample of gas at unknown pressure occupies 0.766 L at a temperature of 298K. The sample of gas is then tested under known conditions & has a pressure of 32.6 kPa and occupies 0.644 L at 303 K. What was the original pressure of the gas?
6. Determine the volume of a container that holds 2.4 mol of gas at STP.

7. What size container do you need to hold 0.0459 mol of nitrogen gas at STP?

8. What volume will 1.02 mol of carbon monoxide gas occupy at STP?

9. How many mol of nitrogen gas will be contained in a 2.00 L flask at STP?

10. If a balloon will rise off of the ground when it contains 0.0226 mol of helium in a volume of 0.460 L, how many moles of helium are needed to make the balloon rise when its volume is 0.865 L. Assume that the temperature & pressure remain constant.

11. How many grams of carbon dioxide gas are in a 1.0 L balloon at STP?

12. What volume in mL will 0.00922g of hydrogen gas occupy at STP?

13. What volume will 0.416 g of krypton gas occupy at STP?

14. A flexible plastic contains 0.860 g of helium gas in a volume of 19.2 L. If 0.205 g of helium is removed without changing the pressure or the temperature, what will be the new volume?

15. Calculate the volume that 4.5 kg of ethylene gas (C_2H_4) will occupy at STP.