

Gases

- 1) If I have 5.6 liters of gas in a piston at a pressure of 1.5 atm and compress the gas until its volume is 2.3 L, what will the new pressure inside the piston be?
- 2) I have added 18.2 L of air to a balloon at sea level (1.0 atm). If I take the balloon with me to Denver, where the air pressure is 0.85 atm, what will the new volume of the balloon be?
- 3) I've got a car with an internal volume of 12,000 L. If I drive my car into the river and it implodes, what will be the volume of the gas when the pressure goes from 1.0 atm to 2.4 atm?
- 4) If I have 29.3 liters of helium in a balloon at 25°C and increase the temperature of the balloon to 55°C, what will the new volume of the balloon be?
- 5) I have 130 liters of gas in a piston at a temperature of 250°C. If I cool the gas until the volume decreases to 49.5 liters, what will temperature of the gas be?
- 6) A commercial airliner has an internal pressure of 1.00 atm and temperature of 25°C at takeoff. If the temperature of the airliner drops to 10°C during the flight, what is the new cabin pressure?
- 7) If divers rise too quickly from a deep dive, they get a condition called "the bends" which is caused by the expansion of very small nitrogen bubbles in the blood due to decreased pressure. If the initial volume of the bubbles in a diver's blood is 18.2 mL and the initial pressure is 12.75 atm, what is the volume of the bubbles when the diver has surfaced to 1 atm pressure?

Combined gas law

1) A child has a toy balloon with a volume of 1.80 liters. The temperature of the balloon when it was filled was 20°C and the pressure was 1.00 atm. If the child were to let go of the balloon and it rose 3 kilometers into the sky where the pressure is 0.667 atm and the temperature is 10°C, what would the new volume of the balloon be?

Ideal gas law

2) How many moles of gas does it take to occupy 120 liters at a pressure of 3.2 atmospheres and a temperature of 340 K?

3) If I have a 62.5 liter container that holds 45 moles of gas at a temperature of 200°C, what is the pressure inside the container?

4) It is not safe to put aerosol canisters in a campfire, because the pressure inside the canisters gets very high and they can explode. If I have a 1.89 liter canister that holds 2 moles of gas, and the campfire temperature is 1400°C, what is the pressure inside the canister?

5) How many moles of gas are in a 25 liter scuba canister if the temperature of the canister is 300 K and the pressure is 200 atmospheres?

6) I have a balloon that can hold 100 liters of air. If I blow up this balloon with 3 moles of oxygen gas at a pressure of 1 atmosphere, what is the temperature of the balloon?

Dalton's Law of Partial Pressures Worksheet

7) If I place 2 moles of N₂ and 9 moles of O₂ in a 35 L container at a temperature of 25°C, what will the pressure of the resulting mixture of gases be?

8) Two balloons are connected with a sealable valve. The first balloon has a volume of 5 liters and contains nitrogen gas at a pressure of 0.75 atm. The second balloon has a volume of 8 L and contains oxygen gas at a pressure of 1.25 atm. When the valve between the balloons is opened and the gases are free to mix, what will the pressure be in the resulting mixture?