Name: Date: Period:

Practice: Boyle’s Law

1. 1.00L of a gas at standard temperature and pressure (0 ºC, 1 atm) is compressed to 473 mL. What is the new pressure of the gas?
2. In a thermonuclear device, the pressure of 0.050 liters of gas within the bomb casing reaches a pressure of 4.0 x 106 atm. When the bomb casing is destroyed by the explosion, the gas is released into the atmosphere, where it reaches a pressure of 1.00 atm. What is the volume of the gas after the explosion?
3. Synthetic diamonds can be manufactured at pressures of 6.00 x 104 atm. If we take 2.00 L of gas at 1.00 atm and compressed it to a pressure of 6.00 x 104 atm, what would the new volume of the gas be?
4. The highest pressure ever recorded in a laboratory setting was about 2.0 x 106 atm. If we have a 1.0 x 10-5 liter sample of gas at that pressure, then release the pressure until it is equal to 0.275 atm, what would the new volume of the gas be?
5. Atmospheric pressure on the peak of Mt. Everest can be as low as 150 mmHg, which is why climbers need to bring oxygen tanks for the last part of the climb. If the climbers carry 10.0 L tanks with an internal gas pressure of 3.04 x 104 mm Hg, what will the volume of the gas be when it is released from the tanks?
6. Part of the reason that conventional explosives cause so much damage is that their explosion produces a strong shock wave that can knock things down. While using explosives to knock down a building, the shock wave can be so strong that 12 L gas will reach a pressure of 3.8 x 104 mm Hg. When the shock wave passes and the volume returns to 600L, what is the new pressure?
7. Submarines need to be extremely strong to withstand the extremely high pressure of water pushing down on them. An experimental research submarine has a volume of 15,000 L at a pressure of 1.2 atm. If the volume is compressed to 72 L, what is the new pressure?
8. Divers get “the bends” if they come up too fast because the gas in their blood expands, forming large bubbles in the blood. If a diver has 0.05 L of gas in his blood at a pressure of 250 atm and then rises to a depth at which the volume expands to 0.25 L, what is the new pressure of the gas?