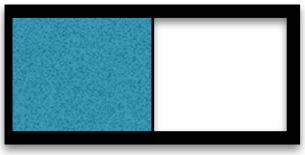
Gas Laws Problem Set 2

1. A sealed plastic bag is filled with 2 L of air at standard temperature and pressure (STP). You accidentally sit on the bag. The maximum pressure the bag can withhold before popping is 600 kilopascals (kPa). What is the internal volume of the bag at the instant before it pops? Show your work.

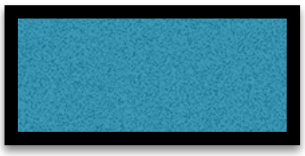
2. An amateur entomologist captures a particularly excellent ladybug specimen in a plastic bottle. The internal volume of the bottle is 1 L, and the air within the jar is initially at 1 atm. The bug-lover is so excited by the catch that she squeezes the jar fervently, compressing it such that the final pressure within the jar is 1.25 atm. What is the final volume in the ladybug's prison? Show your work.

3. A container possesses 6 L internal volume. This volume is divided equally in two by a gas-tight seal. On one half of the seal, neon gas resides at 15 atm. The other half of the container is kept under vacuum. Suddenly, and with great fanfare, the internal seal breaks! What is the final pressure within the container? Show your work.

Initial State →



Final State →



STP
Temperatures

Pressures

Boyle's Law