Worksheet: Gas Laws

1 (a). A sample containing 2.8 mg of nitrogen gas has a pressure of 152.0 mm Hg in a 250 mL flask. What is the average kinetic energy of the gas?

1 (b). What is the average velocity of a nitrogen molecule in this gas sample?

2. A 25.0-mL sample of gas is enclosed in a gas-tight syringe at 22°C. If the syringe is immersed in an ice bath (at 0°C), what is the new gas volume assuming the pressure is held constant in the room?

3. Solid sodium metal (Na(s)) reacts with chlorine gas (Cl₂(g)) to form solid sodium chloride. A closed container of volume 3.00 L is filled with chlorine gas at 27°C and 1,250 torr. If 6.90 g of sodium is introduced and the reaction goes to completion, what will the final pressure be if the temperature rises to 47°C?
   (Hint: write the balanced reaction first.) Do this problem on the back of the sheet.