Chemguide – answers

OTHER GAS LAWS

1. a) For a fixed mass of gas at constant temperature, the volume is inversely proportional to the pressure.

   b) For a fixed mass of gas, the number of moles, n, is constant. R is always a constant. Boyle's Law talks about a constant temperature.

   Therefore everything on the right-hand side of $pV = nRT$ is a constant. So PV = constant.

   c) Pressure is caused by molecules hitting the walls of the container. If you decrease the volume, they will hit the walls more often, and so increase the pressure.

2. a) For a fixed mass of gas at constant pressure, the volume is directly proportional to the kelvin temperature.

   b) For a fixed mass of gas, the number of moles, n, is constant. Charles' Law talks about a constant pressure. R is always constant.

   So, rearranging $pV = nRT$

   to $V = nR/p \times T$

   everything in nR/p is constant, so $V = $ constant $\times$ T

   c) Heating the gas makes the molecules move faster, and therefore hit the walls of the bag more often and harder. That increases the pressure on the inside of the bag. The bag will expand until the pressure of the gas inside is again the same as that of the air outside it.