**Analysing Results**

The graph from Part B in Lesson 1 Exercises is shown below:



The equation for this reaction is O2(g) + 2 NO(g) → 2 NO2 (g).

If we examine the graph, the concentration of the NO2 increases about the same amount as the NO decreases and the concentrations of the NO and NO2 change about twice the amount that the O2 changes.

If we look at the rate data, the initial rate of consumption of NO is about 2.65 × 10−5 mol/Ls and O2 is 1.3 × 10−5 mol/Ls; the rate for NO is twice the O2. The initial rate of formation of NO2 is equal to the rate of consumption of NO and twice that of the O2.

Look at all the other rate calculations. You should see that this pattern is maintained. These ratios are the same ratios as those found in the reaction stoichiometry. We can write this in our rate equation as shown below:



or



**Rate and Stoichiometry Problems**

**Example 1.** The decomposition of nitrogen dioxide occurs according to the equation below.

2 NO2 → O2 + 2 NO

If the rate of decomposition of NO2 is determined to be 0.50 mol/Ls at a certain temperature, predict the rate of creation of both products.

**Solution:**

Use the molar ratios to determine rates.

We can solve this problem in a similar manner to how we solved stoichiometry problems in grade 11 chemistry.



**Example 2.** For the reaction 2 A + B → 3 C, what is the rate of production of C and the rate of disappearance of B if A is used up at a rate of 0.60 mol/Ls?

**Solution:**

Use the molar ratios to determine rates.

by using the molar ratio of A to C we can make the equation:



by using the molar ratio of A to B we get:

