

AP Chemistry Worksheet  
Integrated Rate Law

WS 13.1

1. The initial rate of a reaction  $A + B \rightarrow C$  was measured for several different starting concentrations of A and B, with the results given below:

Experiment Number	[A] (M)	[B] (M)	Initial Rate (M/s)
1	0.100	0.100	$4.0 \times 10^{-5}$
2	0.100	0.200	$4.0 \times 10^{-5}$
3	0.200	0.100	$16.0 \times 10^{-5}$

2. The following data were collected for the rate of disappearance of NO in the reaction  $2 \text{NO} + \text{O}_2 \rightarrow 2 \text{NO}_2$ :

Experiment Number	[NO] (M)	[O <sub>2</sub> ] (M)	Initial Rate (M/s)
1	0.0126	0.0125	$1.41 \times 10^{-2}$
2	0.0252	0.0250	$1.13 \times 10^{-1}$
3	0.0252	0.0125	$5.64 \times 10^{-2}$

3. The following data were measured for the reaction  $\text{BF}_3 + \text{NH}_3 \rightarrow \text{F}_3\text{BNH}_3$ :

Experiment Number	[BF <sub>3</sub> ] (M)	[NH <sub>3</sub> ] (M)	Initial Rate (M/s)
1	0.250	0.250	0.2130
2	0.250	0.125	0.1065
3	0.200	0.100	0.0682
4	0.350	0.100	0.1193
5	0.175	0.100	0.0596

4. Consider the gas phase reaction between nitric oxide and bromine at 273°C:  $2 \text{NO} + \text{Br}_2 \rightarrow 2 \text{NOBr}$ .

Experiment Number	[NO] (M)	[Br <sub>2</sub> ] (M)	Initial Rate (M/s)
1	0.10	0.20	24
2	0.25	0.20	150
3	0.10	0.50	60
4	0.35	0.50	735