

## Stella Kinetics and Equilibrium Lab Analysis

*Kinetics section*\*: Using data that you generated during the lab period, make a conclusion about your results for each graph in the space below. Did the results obtained during the experiment support your stated hypothesis for each reaction? If so, indicate why doubling the magnitude of the initial concentration led to each result; if not, use the data obtained from STELLA to explain the dependence of half-life on concentration for first, second and zeroth order reactions. Also, feel free to mention any other results that you found interesting during the experiment.

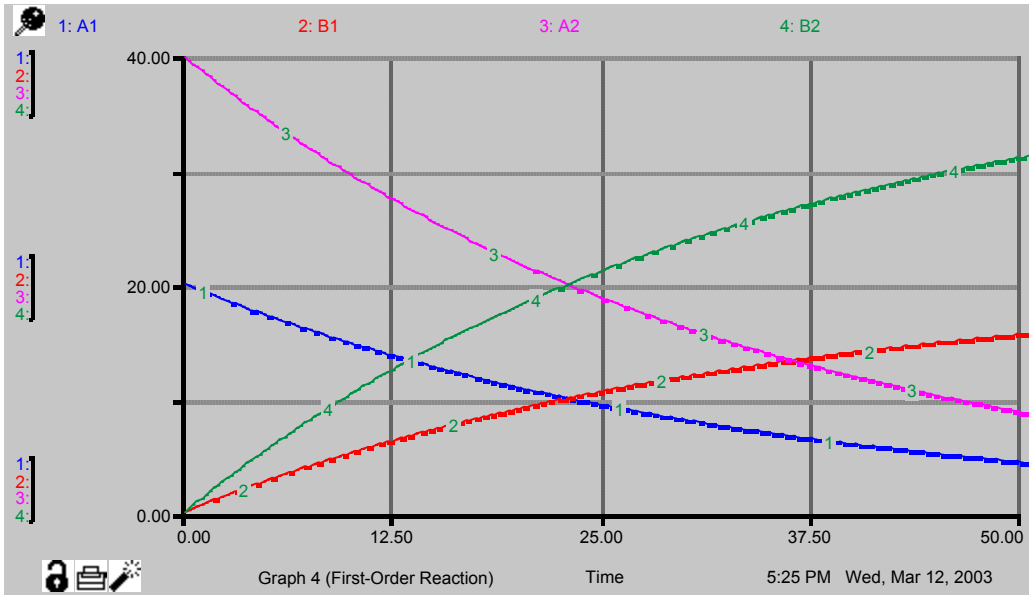
**IMPORTANT:** Attach your lab worksheet to the back of this sheet before handing it in. The key in this experiment, as in all experiments, is to test your hypothesis and explain how your observations/data relate to that hypothesis. There is no wrong answer, but the quality of your discussion will reflect your command of the material. Please be concise and complete.

*Equilibrium section*\*: Use the attached data for Trials one, two and three to answer the following questions.

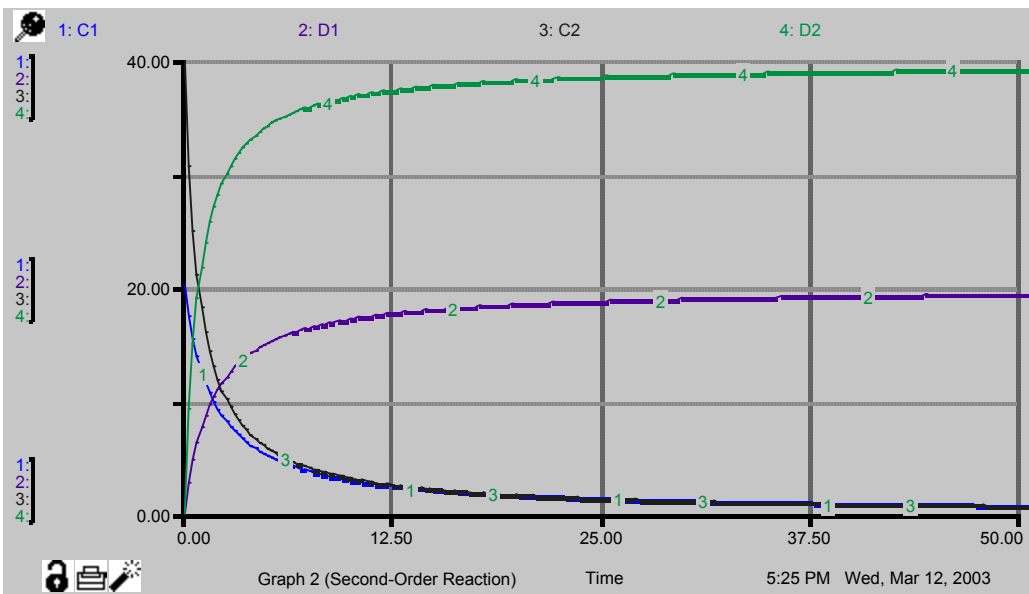
- 1.) What are the equilibrium concentrations of products and reactants for Trials 1 and 2, and what is the ratio of products to reactants for these concentrations?
- 2.) What is the ratio of  $k_{for}$  to  $k_{rev}$  in each case, and how does this ratio relate to the results obtained in question 1?
- 3.) Given that  $K_{eq} = (k_{for}/k_{rev})$ , choose your own set of rate constants for Trial 3 and predict the reactant and product equilibrium concentrations for a system initially containing 50 moles of reactant. (Show all work)

---

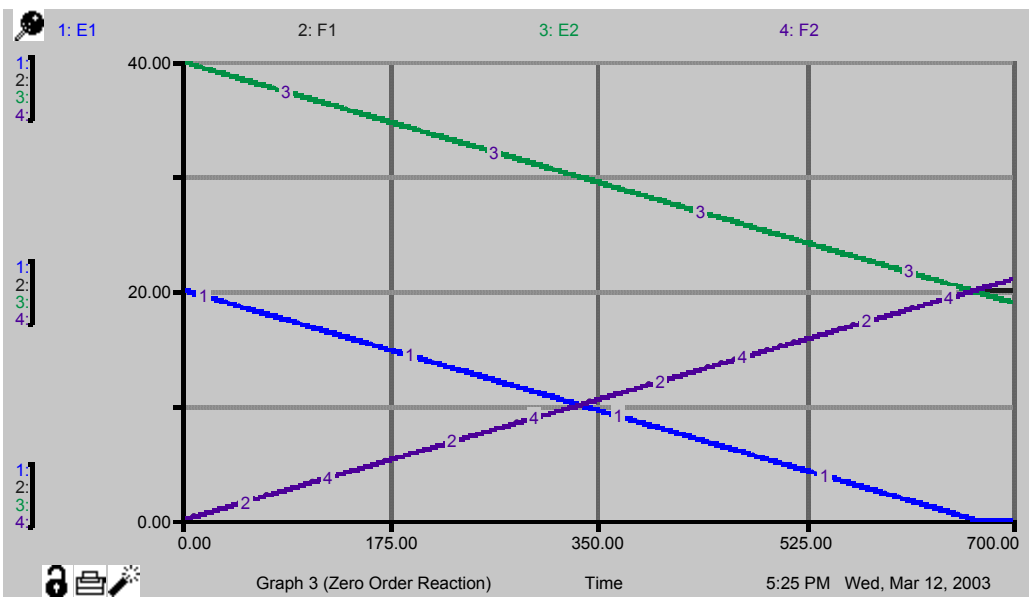
\* Please see pp. 529-537 (kinetics) and pp. 570-574; 580-586 (equilibrium) in the Zumdahl text for additional information on these topics.



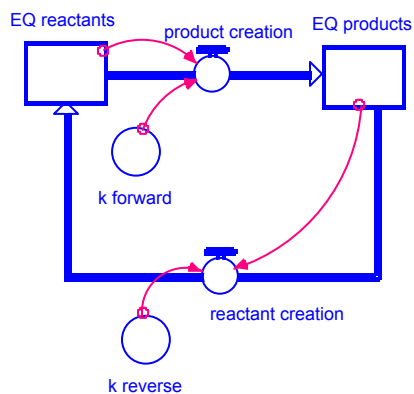
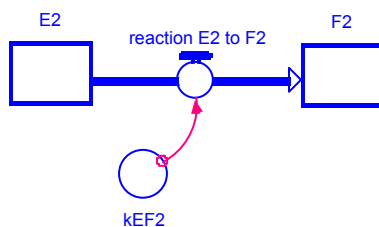
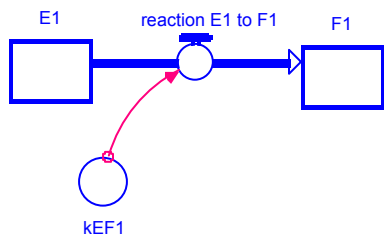
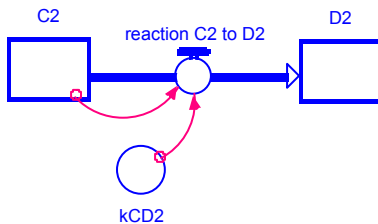
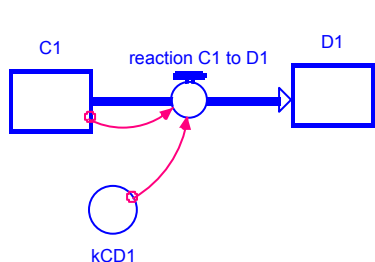
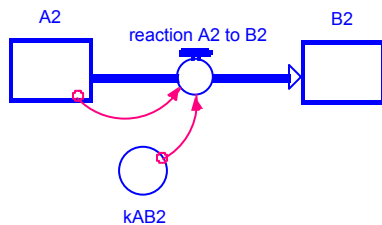
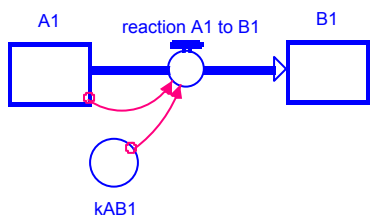
First -Order



Second - Order

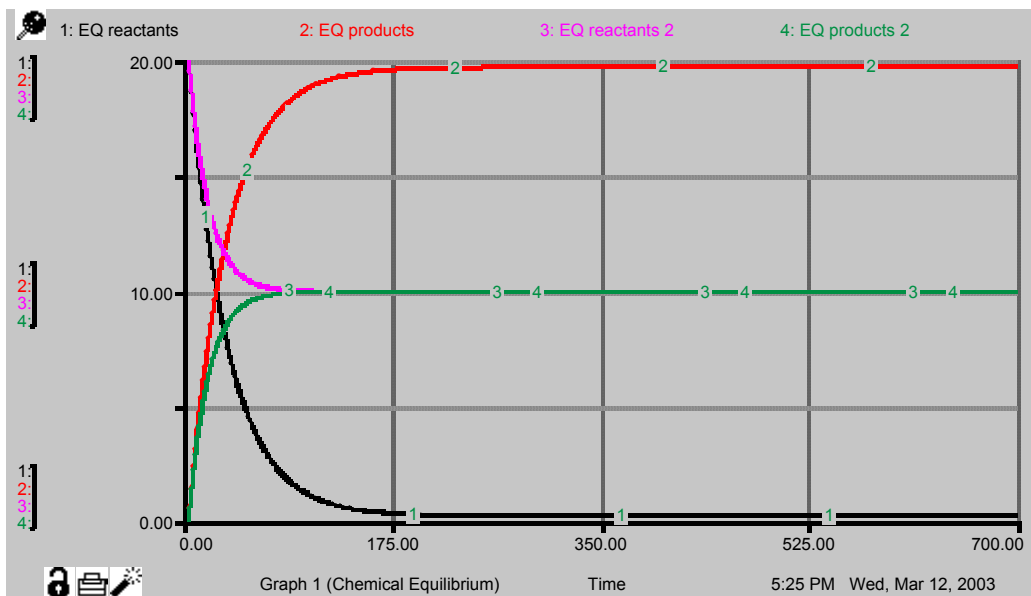


Zeroth -Order



### Stella Equilibrium Data

Trial	kfor	krev	EQ prod Conc	EQ react Conc
1	0.03	0.0003	19.8	0.2
2	0.03	0.003	18.18	1.82
3	?	?	?	?



**Equilibrium Graphical Results Trials 1 and 2**