Name:_____ **Lab ID:**_____

Experiment 11 - Kinetics of Food Dyes
Required Feedback Form

1. In the space below, prepare data tables to record data for your simulation experiments: volumes and initial concentrations of dye and bleach in **solutions** you prepare in both experiments (Step 1 and 3), k' values (including units), and Beer's law slope. Record all this data while you perform the experiments. Explain your experiments in a short paragraph.

Answer the following questions using your kinetic traces. Attach the appropriate printouts to your feedback form and hand it in to your TA.

1. What is the reaction order in bleach (n)? Explain.

2. Calculate the rate constant (k) for the reaction of Yellow 6 with bleach with 2 significant figures, for the two experiments you have conducted (Step 1 and 3). Attach the appropriate graphs. Formulate the rate law for this reaction.

3. The table below contains time and absorbance data collected in a kinetic trace experiment in which 9.60mL of 3.40E-5 M Yellow dye reacted with 0.40 mL of 0.15 M bleach. The Beers law slope for Yellow 6 is 3.44E4 M^{-1}. Fill out the table below and create the following graphs: ln(absorbance) vs time and ln[dye] vs time. *[Note: You may use excel to complete the table and attach a printed copy. The graphs are not required to be turned in but will be needed to answer question 4.]*

Time (s)	**Absorbance**	**ln(absorbance)**	**Conc (M)**	ln(conc)
1	0.98			
2	0.87			
3	0.77			
4	0.68			
5	0.61			
6	0.54			
7	0.49			
8	0.44			
9	0.39			
10	0.35			
11	0.32			
12	0.29			
13	0.26			
14	0.24			
15	0.22			
16	0.20			

[Download this table as an excel file]

4. What are the k' values in both graphs? Include the units.

   For the ln(absorbance) vs time graph, k' =

   For the ln(concentration) vs time graph, k' =

5. Calculate the average reaction rate during the first second of this reaction.

   During this time interval, $\Delta t = t_1 - t_0$ (0 and 1 indicate the zeroth and first second of the reaction), there is a change in concentration of the dye, Δ [dye] = $[dye]_1 - [dye]_0$. The ratio of these two changes, $\frac{\Delta[dye]}{\Delta[t]}$, describes the average rate at which the concentration changes during the time interval Δt.

   Compare this average rate with the instantaneous rate at the first second. In your calculations use the data for this experiment, from the table above.