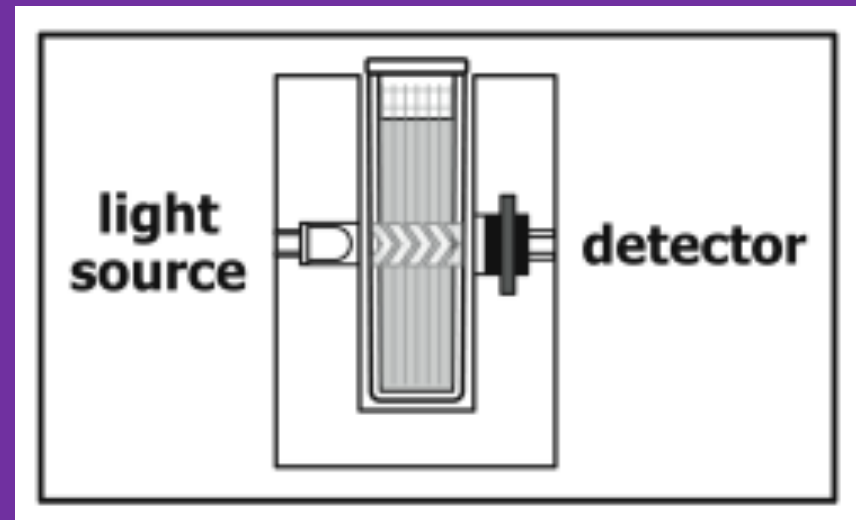# Rate of Reaction

A Spectroscopic Kinetic Relationship

Objectives…

- Conduct the reaction of KI and $FeCl_3$ using various concentrations of reactants.

- Determine the order of the reaction in KI and $FeCl_3$.

- Determine the rate law expression for the reaction.

Purpose…

- In this experiment you will conduct the reaction between solutions of potassium iodide and iron (III) chloride. The reaction equation is shown below, in ionic form.

$$2\ I^- \text{ (aq)} + 2\ Fe^{3+} \text{ (aq)} \rightarrow I_2 \text{ (aq)} + 2\ Fe^{2+} \text{ (aq)}$$
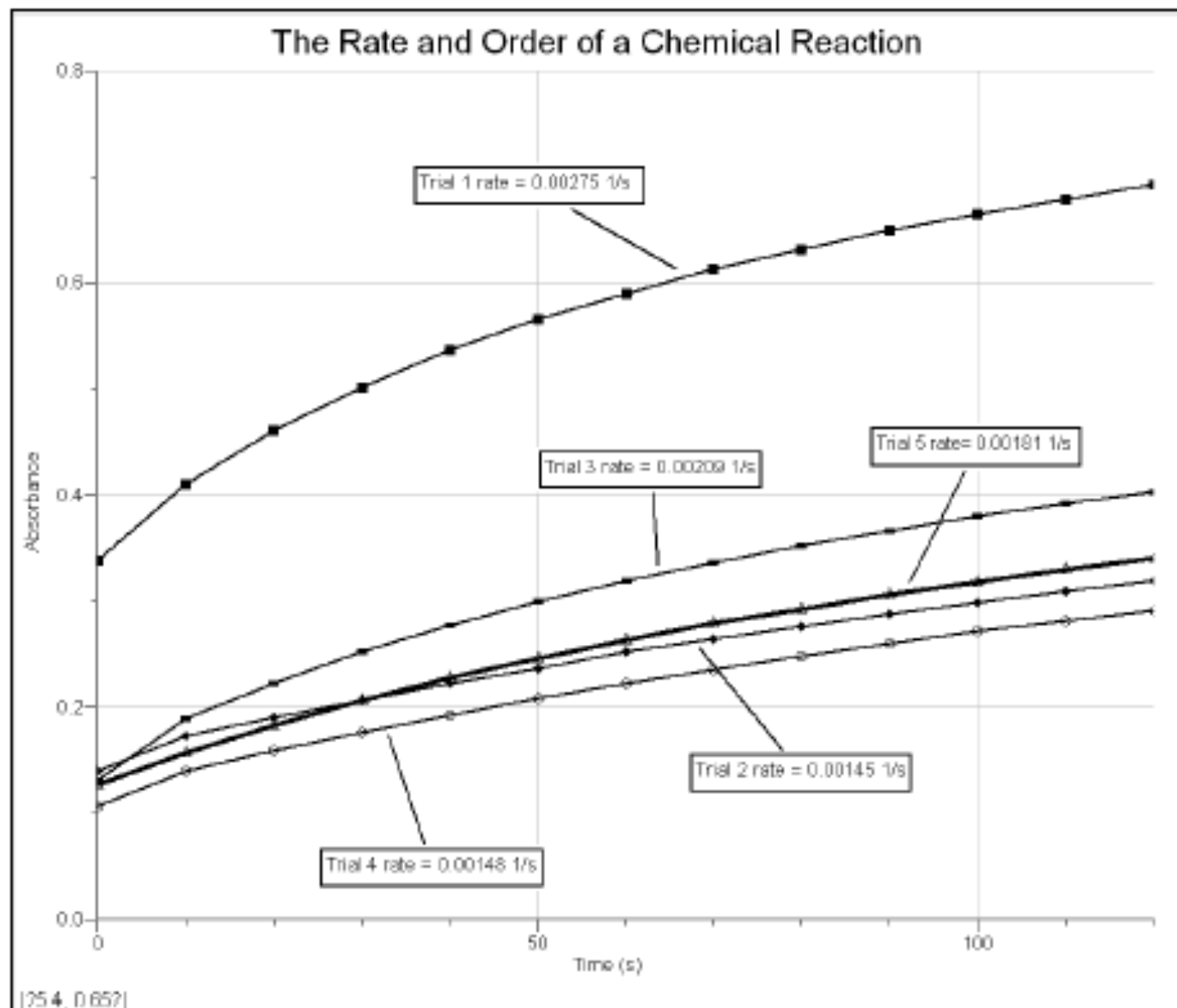
- As this reaction proceeds, it undergoes a color change that can be precisely measured by a Colorimeter or Spectrometer. By carefully varying the concentrations of the reactants, you will determine the effect each reactant has on the rate of the reaction, and consequently the order of the reaction. From this information, you will write a rate law expression for the reaction

Procedure-ish

- Determine wavelength Max based on stock solution
  - The light source for the reaction is either 430 nm or 470 nm. The nearly monochromatic blue light is absorbed by the solution
- …will conduct 5 trials of the reaction between KI and $FeCl_3$, using the volumes of liquids described
- Need to keep note of time when mix all chemicals to putting into cuvette
  - Cuvette must be cleaned w/ water and side wiped every time
- Need to analyze a portion of the graph within about the first minute

Sample Graph

The Rate and Order of a Chemical Reaction

Trial 1 rate = 0.00275 1/s

Trial 5 rate= 0.00181 1/s

Trial 3 rate = 0.00209 1/s

Trial 2 rate = 0.00145 1/s

Trial 4 rate = 0.00148 1/s

Absorbance

Time (s)

[25.4, 0.657]

Figure 1

Student Data – Data Table

Breakout Room	Data File
1 and 2	File DS
3 and 4	File KH
5 and 6	File VR
7 and 8	File YL