

# Unit: Kinetics

Rate of Reaction

Name:

## Your FINAL Project

In this final project, you are to work in 2, 3 or 4.

- You are completely responsible for you and your groups understanding
- On Presentation day, each group will be asked to explain random topics located below. Every member will be given one topic to explain to the class on their understanding.
- The last day will be *quiz day*. Everyone will be assessed their understanding on the concepts done in class.

What you need to demonstrate (OUTCOMES):

- Define what reaction rate is: **Basic understanding**
  - o What exactly is reaction kinetics?
  - o How do we define a reaction rate?
  - o Why are reaction rates always positive?
  - o Variables that are used to monitor reaction rates
- Calculate average and instantaneous reaction rates of a chemical reaction **Calculations – simple review**
  - o Provide sample calculation questions and answers
- Factors that affect the rate of reaction **Memorization**
  - o What is collision theory?
  - o What are the factors that affect reaction rates?
  - o Attribute the collision theory to the factors that affect the rate of reaction
- What is a potential energy diagram for an endothermic and exothermic reaction? **Understanding**
  - o What are potential energy diagrams?
  - o What are the basic shapes for endothermic and exothermic PE curves?
  - o Identify the activate energy, rate determining step of a curve
  - o What is reaction mechanism?
  - o Provide examples
  - o Based on the reaction mechanism, identify the rate determining step, and relate it to the activation energy.
- Rate law calculation **Toughest section - Calculations**
  - o What is it?
  - o Zero, first, and second order reactions
  - o Calculate sample questions

On the presentation day, you can create a Powerpoint/KeyNote presentation to sum up all the notes you need for your presentation. Remember, I will be assessing you understanding – reading off your screen does not demonstrate understanding while talking / sharing about it with minimal aid does.

## Sample class number for this unit

### Kinetics Unit Outline (Required concepts to know)

- Operationally define reaction rate 0.5 Class
- Variables used to monitor reaction rates (i.e change of something per time) 0.5 Class
- Measuring and calculating average and instantaneous rate of a chemical reaction 1 classes
- Relate the rate of formation of a product to the rate of disappearance of a reactant given experimental rate using stoichiometry 0.5 classes
- Identify factors that affect the rate of a chemical reaction 1 classes
- Use Collision Theory to explain the factors which affect the rate of chemical reactions (Activation energy and orientation of molecules) 0.5 class
- Draw potential energy diagrams for endothermic and exothermic reactions 1 class
- Explain the concept of a reaction mechanism (rate determining step, activation energy) 0.5 class
- Determine the rate law and order of a chemical reaction from experimental data (zero, first or second order) 2 classes

### Where and how to get started:

1. Select group members that are reliable, and will be present in class. If they, for some reason, cannot attend class on presentation day, then your group is held responsible.
2. Read through the topics required.
3. Go to the class website, [www.sciyeung.com](http://www.sciyeung.com), and load up Chapter16, or visit Ch.16 of your textbook.
4. Basically, this unit is separated into 4 sections, skim through the chapter, and relate the chapter text with the required OUTCOMES in your presentation.
5. Everyone in the group should skim through the text and decide on a specific section that they would like to do. All group members should eventually read the entire chapter to gain full understanding.
6. Every member should read through their section, and jot notes with diagrams, and examples. Try example questions to ensure understanding.
7. Once everyone is done, then everyone brings all their notes together and teach each other their section.
8. Every other member should then read the entire chapter to ensure they have understood the other sections.
9. Once everyone is done reading the entire chapter, they should compile a final presentation.
10. What happens when you get stuck?
  - a. Read my other notes also posted on the site
  - b. I might put tutorial videos up for you review
  - c. Bozeman Science
    - i. <https://www.youtube.com/watch?v=WDXzVI8SmfE> - Rate Law
    - ii. <https://www.youtube.com/watch?v=6mAqX31RRJU> Rate of Reactions