

A First Course on Kinetics and Reaction Engineering

Unit 1. Lesson Plan

Before Class

- Add whatever slides you need to describe your class logistics, etc.
- Provide the redacted slides to the students and tell them to bring them to class

During Class

- Go over the logistics for your course using your own slides
- Slides 1 and 2 (~ 1 minute): Haven't actually done anything yet, but note that most of part I should be a review of previous courses
- Review of Unit 1 (5 to 10 minutes)
 - Slides 3 and 4: emphasize the point and concepts from Unit 1 that you feel are most important; modify the slides before class if necessary
- Ask whether the students have any questions from their pre-class preparation
 - Slide 5
- Learning Activity (~20 minutes)
 - Slide 6: Comment on the problems
 - Read through the problem statements, note that all three will be used encountered repeatedly during the part of the course dealing with the analysis of kinetics data, note that the second problem type will be encountered when calculating the equilibrium composition of a reacting mixture in Unit 3
 - Slide 7: Note the need to learn how to analyze problems and identify problem types
 - When doing an activity like this or when doing homework problems, you most often don't need to analyze the problem, you know what kind of problem is by the chapter or unit it is found in; that gives you clues how to proceed and what equations to use
 - On exams, in later courses and on the job, you won't have such clues, you need to be able to analyze problems and identify the type of problem they represent; you also need to know how to approach different types of problems
 - Stoichiometry problems may not mention the reactor, reactor type or any properties of the reactor, they also may not mention anything associated with the kinetics of the reaction. Stoichiometry problems are components of other problem types such as finding equilibrium compositions and analyzing kinetics data
 - Slide 8: Present a general approach for stoichiometry problems
 - Slide 9: Have them apply that approach
 - Have groups count off by threes, all #1 groups work on the first problem, all #2 groups work on the second and all #3 groups on the third.
 - Circulate among the students as they set up their solution, answer questions that arise

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- Note when most seem to be finished have them join with two other groups such that each of the groups solved a different problem
 - Read the first problem statement and tell the group that solved it to explain it to the other groups
 - Repeat for the second and third problem statements, answer any questions that arise during their explanations/discussion
- Slides 10 through 13: Show them the mole table and the solutions to the three problems
- Slide 44 (~1 minute): Next class will consider reaction thermochemistry, how much heat is released or consumed when a chemical reaction takes place

After Class

- Provide the complete slides to the students and the written solution from the AFCoKaRE site.