

Chapter 16 Kinetics: Rates and Mechanisms of Chemical Reactions

The AP curriculum includes chemical kinetics the topic of this chapter. The curriculum expects students to be able to determine the order of each reacting species given experimental data. Once the orders are known, the rate law can be written and solved for the rate constant (k) with the proper units assigned. The concepts of mechanisms, intermediates, catalysts, concentration-time equations, graphical relationships to orders, and determining instantaneous rates from a graph are important in the AP curriculum and are tested in both the multiple-choice and free-response sections of the AP Exam.

There are other concepts covered in this chapter that AP students will need to understand as well. Working with half-lives for first-order reactions should be practiced. From data or a graph, students should be able to determine a half-life and should be able to calculate the concentration at any point in the reaction by using the concentration-time equation. It is important to understand the collision model theory and how it applies to chemical kinetics. Potential energy–reaction progress coordinate diagrams should be mastered so all features can readily be described or used, such as activation energy of both the forward and reverse reactions and ΔH of both forward and reverse reactions. AP students are expected to understand the role of a catalyst and the way in which a catalyst changes the potential energy diagram for a chemical reaction.