

Michael Amendola and Daniel Smith
AP Chemistry

Unit 04 -- Chemical Reactions

Activities/Assignments: Go to your Google Classroom for direct links to activities and assignments.

[Mr. Amendola's google site](#) [Mr. Smith's Shared Google Drive](#) [Google Classroom](#)

Curriculum: [AP Course and Exam Description](#)

**Unit Learning Objectives/
Goals**

By the end of this unit students should be able to:

- Identify evidence of chemical and physical changes in matter
- Represent changes in matter with a balanced chemical or net ionic equation: (a) for physical changes; (b) for given information about the identity of the reactants and/or product; (c) for ions in a given chemical reaction
- Represent a given chemical or physical process with a consistent particulate model
- Explain the relationship between macroscopic characteristics and bond interactions for: (a) chemical processes and (b) physical processes
- Explain changes in the amounts of reactants and products based on the balanced chemical equation for a chemical process
- Identify the equivalence point in a titration based on the amounts of the titrant and analyte, assuming the titration reaction goes to completion.
- Identify a reaction as acid-base, oxidation-reduction, or precipitation
- Identify species as Brønsted -Lowry acids, bases, and/or conjugate acid/base pairs, based on proton-transfer involving those species.
- Represent a balanced redox reaction equation using half-reactions

**Performance Task- what
skills are we working
towards?**

- Formulate a hypothesis or predict the results of an experiment.
- Determine a balanced chemical equation for a given chemical phenomena.
- Represent chemical substances or phenomena with appropriate diagrams or models (e.g., electron configuration).
- Support a claim with evidence from experimental data.
- Explain the relationship between variables within an equation when one variable changes.
- Represent chemical phenomena using appropriate graphing techniques, including correct

	scale and units. - Describe the components of and quantitative information from models and representations that illustrate both particulate level and macroscopic-level properties. - Determine a balanced chemical equation for a given chemical phenomena.
Unit Activities	
Day 1: Unit 4.1-4.4	Objectives - Identify evidence of chemical and physical changes in matter - Represent changes in matter with a balanced chemical or net ionic equation: (a) for physical changes; (b) for given information about the identity of the reactants and/or product; (c) for ions in a given chemical reaction - Represent a given chemical or physical process with a consistent particulate model - Explain the relationship between macroscopic characteristics and bond interactions for: (a) chemical processes and (b) physical processes Activities - Review chemical reactions from sophomore year. Focus on net ionic equations and particulate representations of reactions. Introduce the solubility rules for predicting products of precipitation reactions. Assignments - Optional AP Classroom video with formative assessments on 4.1-4.5. Suggested time for completion by Day 3 - Complete Webassign 4.1-4.5 due Day 3
Day 2 Unit 4.5:	Objectives - Explain changes in the amounts of reactants and products based on the balanced chemical equation for a chemical process - Identify the equivalence point in a titration based on the amounts of the titrant and analyte, assuming the titration reaction goes to completion. Activities

	• Discussion of solution stoichiometry and using molarity. • Gravimetric analysis precipitation reactions will be highlighted and sample problems will be provided. Assignments • Optional AP Classroom video with formative assessments on 4.1-4.5. Suggested time for completion by Day 3 • Webassign 4.1-4.5 due Day 3
Day 3 Unit 4.1-4.5	Objectives • Explain changes in the amounts of reactants and products based on the balanced chemical equation for a chemical process • Identify the equivalence point in a titration based on the amounts of the titrant and analyte, assuming the titration reaction goes to completion. Activities • Students will be allowed to work on Webassign 4.1-5 with teacher help. Assignments • Webassign 4.1-4.5 due Day 3
Day 4 Unit 4.6-4.7	Objectives • Identify the equivalence point in a titration based on the amounts of the titrant and analyte, assuming the titration reaction goes to completion. • Identify a reaction as acid-base, oxidation-reduction, or precipitation • Identify species as Brønsted -Lowry acids, bases, and/or conjugate acid/base pairs, based on proton-transfer involving those species. Activities • General overview of reaction types and how to identify them will be discussed. ○ Acid-base ○ Precipitation ○ Redox ■ disproportionation

	• Lecture on acid-base type reactions. Students will learn different definitions of acids and bases. How to determine acid base pairs will be discussed. • How to write the structure of conjugate acids and bases will be discussed. Assignments • Webassign 4.6-8 due Day 6 at 11:59pm • Optional 2 AP Classroom videos on 4.6 recommended by Day 5 • Optional AP Formative MCQ 4.6-9 recommended by Day 7
Day 5 Unit 4.6	Activities • Titration Discussion--Teacher will demonstrate how to practically conduct a titration, including rinsing, conditioning, and filling a buret. • Students will have the remainder of the time to work on WebAssign with teacher help. Assignments • Webassign 4.6-8 due Day 6 at 11:59pm
Day 6 Unit 4.9	Objectives • Represent a balanced redox reaction equation using half-reactions Activities • Lecture on redox reactions. • Explain how to determine oxidation numbers in compounds and in ions. • How to write and balance redox equations using half-equations. Assignments • Watch video on conductivity titration (on website) • Webassign 4.9 due Day 7 at 11:59pm
Day 7 Unit 4.9	Objectives • To review the content for Unit 4 Activities • Review via plickers, practice FRQ, etc. Assignments • Study for the assessment • Webassign 4.9 due Day 7 at 11:59pm
Day 8: Assessment	Activities

	Unit 4 Assessment
Lab 1 Potentiometric Titration	Objectives - Identify the equivalence point in a titration based on the amounts of the titrant and analyte, assuming the titration reaction goes to completion. Activities - Students will graphically determine the equivalence point of a titration by measuring the electrical conductivity of the solution while the reaction occurs. - Titration of sulfuric acid with barium hydroxide. We will not only review chemical reactions with this experiment, but stoichiometry and electrolytes. The post lab questions come directly from a released AP practice exam for this specific reaction. Assignments - Post lab questions
Lab 2: Determination of % iron in a mixture	Objectives - Identify the equivalence point in a titration based on the amounts of the titrant and analyte, assuming the titration reaction goes to completion. Activities - Students will perform a redox titration to find the % iron in an unknown sample. They will then find the number of milligrams of iron in an over the counter iron supplement. Assignments - Post lab questions