

Grade	10-12
Unit of Study	Unit 11: Acids and Bases
Length of Unit	4 weeks
Sample Essential Questions	Sample Corresponding Big Ideas
What are the factors that affect the relative strength of acids and bases?	The overall hydronium concentration (pH) as well as the amount of dissociation (K_a/K_b) both influence the overall strength. For example a strong acid with low pH can be diluted, and a weak acid with a pH closer to 7 can be concentrated.
How can corrosive spills be neutralized?	Acids are neutralized by bases to create water and a salt. Bases are neutralized by acids by the same chemical process.

Missouri Learning Standards	
Priority Standard(s)	Supporting Standard(s)
I can explain how matter is structured, how its properties are determined by its structure, and how it changes during chemical reactions.	9-12.PS1.A.2

Unit 11 Sequence			
MLS	Topic(s)	Learning Targets	Academic Vocabulary
PS1.A.2	Acid/Base Strength	I can describe the relative strength of an acid/base using ionization (K_a) and pH. I can determine the conjugates of a Bronsted-Lowry Acid/Base reaction. I can calculate the strength of a strong acid using pH calculations.	pH Ionization Hydronium Hydroxide Arrhenius Acids/Bases Bronsted-Lowry Acids/Bases Conjugate Acid/Bases
	Neutralizations	I can perform a laboratory titration investigation to reveal the concentration of a sample of acid or base.	Neutralization Titration Indicator Salt
	Weak Acid/Weak Base Equilibria	I can calculate the strength of a weak acid using equilibrium (ICE box) calculations. I can describe how buffers use Le Chatelier Principle to stabilize pH. I can use the Henderson-Hasselbach equation to determine the pH of a buffer.	Weak acid ionization Weak base ionization Buffers Henderson-Hasselbach

MLS	Learning Activities	
PS1.A.2	Acid Base Titration Lab	Must Do ▾
	Titration of Cola (Titration Curve) Lab	Must Do ▾
	Household Acid Base Exploration Activity	Diff Inst ▾

Assessments		
MLS	Description or Location	Rubric/Location
PS1.A.2	Unit 11 Test	Paper

Additional Resources
Phet, OpenStax, Javalab