



# Standard #: SC.912.P.8.11

This document was generated on CPALMS - [www.cpalms.org](http://www.cpalms.org)

Relate acidity and basicity to hydronium and hydroxyl ion concentration and pH.

## General Information

**Subject Area:** Science

**Grade:** 912

**Body of Knowledge:** Physical Science

**Idea:** Level 2: Basic Application of Skills & Concepts

**Standard:** [Matter](#) -

**Date Adopted or Revised:** 02/08

A. A working definition of matter is that it takes up space, has mass, and has measurable properties. Matter is comprised of atomic, subatomic, and elementary particles.

B. Electrons are key to defining chemical and some physical properties, reactivity, and molecular structures. Repeating (periodic) patterns of physical and chemical properties occur among elements that define groups of elements with similar properties. The periodic table displays the repeating patterns, which are related to the atom's outermost electrons. Atoms bond with each other to form compounds.

C. In a chemical reaction, one or more reactants are transformed into one or more new products. Many factors shape the nature of products and the rates of reaction.

D. Carbon-based compounds are building-blocks of known life forms on earth and numerous useful natural and synthetic products.

**Content Complexity Rating:** [Level 2: Basic Application of Skills & Concepts](#) - [More Information](#)

**Date of Last Rating:** 05/08

**Status:** State Board Approved

## Related Courses

Course Number	Course Title
<a href="#">2002110:</a>	M/J Comprehensive Science 3, Advanced (Specifically in versions: 2014 - 2015, 2015 - 2022 (current), 2022 and beyond)
<a href="#">2003340:</a>	Chemistry 1 (Specifically in versions: 2014 - 2015, 2015 - 2022 (current), 2022 and beyond)
<a href="#">2003350:</a>	Chemistry 1 Honors (Specifically in versions: 2014 - 2015, 2015 - 2022 (current), 2022 and beyond)
<a href="#">2002480:</a>	Forensic Science 1 (Specifically in versions: 2014 - 2015, 2015 - 2017, 2017 - 2022 (current), 2022 and beyond)
<a href="#">2002420:</a>	Integrated Science 2 (Specifically in versions: 2014 - 2015, 2015 - 2022 (current), 2022 and beyond)
<a href="#">2002430:</a>	Integrated Science 2 Honors (Specifically in versions: 2014 - 2015, 2015 - 2022 (current), 2022 and beyond)
<a href="#">2003310:</a>	Physical Science (Specifically in versions: 2015 - 2022 (current), 2022 and beyond)
<a href="#">2003320:</a>	Physical Science Honors (Specifically in versions: 2014 - 2015, 2015 - 2022 (current), 2022 and beyond)
<a href="#">2003020:</a>	M/J Physical Science, Advanced (Specifically in versions: 2014 - 2015, 2015 - 2022 (current), 2022 and beyond)
<a href="#">2003800:</a>	Florida's Preinternational Baccalaureate Chemistry 1 (Specifically in versions: 2014 - 2015, 2015 - 2022 (current), 2022 and beyond)
<a href="#">7920011:</a>	Access Chemistry 1 (Specifically in versions: 2014 - 2015, 2015 - 2018, 2018 and beyond (current))
<a href="#">2002085:</a>	M/J Comprehensive Science 2 Accelerated Honors (Specifically in versions: 2014 - 2015, 2015 - 2022 (current), 2022 and beyond)
<a href="#">2000500:</a>	Bioscience 1 Honors (Specifically in versions: 2014 - 2015, 2015 - 2022 (current), 2022 and beyond)
<a href="#">2000510:</a>	Bioscience 2 Honors (Specifically in versions: 2014 - 2015, 2015 - 2022 (current), 2022 and beyond)
<a href="#">2000520:</a>	Bioscience 3 Honors (Specifically in versions: 2014 - 2015, 2015 - 2022 (current), 2022 and beyond)
<a href="#">2002425:</a>	Integrated Science 2 for Credit Recovery (Specifically in versions: 2014 - 2015, 2015 - 2020 (course terminated))
<a href="#">2003345:</a>	Chemistry 1 for Credit Recovery (Specifically in versions: 2014 - 2015, 2015 - 2022 (current), 2022 and beyond)
<a href="#">7920022:</a>	Access Physical Science (Specifically in versions: 2016 - 2018, 2018 and beyond (current))

## Related Access Points

Access Points Number	Access Points Title
<a href="#">SC.912.P.8.In.7:</a>	Identify properties of common acids and bases.
<a href="#">SC.912.P.8.Su.7:</a>	Categorize common materials or foods as acids or bases.
<a href="#">SC.912.P.8.Pa.5:</a>	Recognize that some acids and bases can be dangerous and identify related hazard symbols.

## Related Resources

### Lesson Plans

Name	Description
<a href="#">Acid or Base???:</a>	Students will complete a lab on acids and bases. Students will test various household substances to see if they are acids or bases. They will create a pH scale and label their substances on it.
<a href="#">A Closer Look at pH!:</a>	The purpose of this activity is to classify equimolar (equal concentration) acidic and basic solutions as strong or weak by analyzing pH measurements.
<a href="#">Fish Tank pH:</a>	The lesson incorporates language arts and physical science content through the use of supplemental readings and Model Eliciting Activity. In this lesson student will use their knowledge of the pH scale, hydronium ion concentrations and critical thinking to find the solution to a problem.
<a href="#">Investigating the pH of Soils:</a>	In this activity students will conduct research then test the effects of adding products to soil. Students will learn about soil pH, what factors affect the pH of soil and how important it is to the growth of plants. Students will learn to use reputable resources to support their findings. Students will be expected to write a detailed lab report that thoroughly explores the concept while integrating the data from their investigation.
<a href="#">Introduction to Acids &amp; Bases: what are they and how do we as scientists measure them?:</a>	A hands-on, lab-based introduction to the pH scale and the characteristics of acids and bases.
<a href="#">Acids, Bases, and pH:</a>	This is a lesson for introducing the concepts of acids, bases, and pH.

### Perspectives Video: Expert

Name	Description
<a href="#">pH Scale:</a>	Keep an eye on pH as you learn about what makes acids and bases. Download the <a href="#">CPALMS Perspectives video student note taking guide</a> .

### Perspectives Video: Teaching Idea

Name	Description
<a href="#">DIY Cabbage Juice pH Indicator:</a>	Listen to this chemist describe a simple pH indicator experiment using foods and household chemicals. Download the <a href="#">CPALMS Perspectives video student note taking guide</a> .

### Virtual Manipulatives

Name	Description
<a href="#">Acid-Base Solutions:</a>	How do strong and weak acids differ? Use lab tools on your computer to find out! Dip the paper or the probe into solution to measure the pH, or put in the electrodes to measure the conductivity. Then see how concentration and strength affect pH. Can a weak acid solution have the same pH as a strong acid solution. Some of the topics to investigate: <ul style="list-style-type: none"><li>Given acids or bases at the same concentration, demonstrate understanding of acid and base strength by 1. Relating the strength of an acid or base to the extent to which it dissociates in water. 2. Identifying all the molecules and ions that are present in a given acid or base solution. 3. Comparing the relative concentrations of molecules and ions in weak versus strong acid (or base) solutions. 4. Describing the similarities and differences between strong acids and weak acids or strong bases and weak bases.</li><li>Demonstrate understanding of solution concentrated by: 1. Describing the similarities and differences between concentrated and dilute solutions. 2. Comparing the concentrations of all molecules and ions in concentrated versus dilute solutions of a particular acid or base.</li><li>Describe how common tools (pH meter, conductivity, pH paper) help identify whether a solution is an acid or base and strong or weak and concentrated or dilute.</li></ul>
<a href="#">pH Scale:</a>	Students can test the pH of several substances and visualize hydronium, hydroxide, and water molecules in solution by concentration or the number of molecules. Students can add water to a given substance to see the effects it will have on the pH of that substance; or they can create their own custom substance.

## Student Resources

### Perspectives Video: Expert

Name	Description
<a href="#">pH Scale:</a>	Keep an eye on pH as you learn about what makes acids and bases. Download the <a href="#">CPALMS Perspectives video student note taking guide</a> .

### Virtual Manipulatives

Name	Description
	How do strong and weak acids differ? Use lab tools on your computer to find out! Dip the paper or the probe into solution to measure the pH, or put in the electrodes to measure the conductivity. Then see how concentration and strength affect pH. Can a weak acid solution have the same pH as a strong acid solution.

Some of the topics to investigate:

- [Acid-Base Solutions:](#)
- Given acids or bases at the same concentration, demonstrate understanding of acid and base strength by 1. Relating the strength of an acid or base to the extent to which it dissociates in water. 2. Identifying all the molecules and ions that are present in a given acid or base solution. 3. Comparing the relative concentrations of molecules and ions in weak versus strong acid (or base) solutions. 4. Describing the similarities and differences between strong acids and weak acids or strong bases and weak bases.
  - Demonstrate understanding of solution concentrated by: 1. Describing the similarities and differences between concentrated and dilute solutions. 2. Comparing the concentrations of all molecules and ions in concentrated versus dilute solutions of a particular acid or base.
  - Describe how common tools (pH meter, conductivity, pH paper) help identify whether a solution is an acid or base and strong or weak and concentrated or dilute.

[pH Scale:](#) Students can test the pH of several substances and visualize hydronium, hydroxide, and water molecules in solution by concentration or the number of molecules. Students can add water to a given substance to see the effects it will have on the pH of that substance; or they can create their own custom substance.

## Parent Resources

Perspectives Video: Expert

Name	Description
<a href="#">pH Scale:</a>	Keep an eye on pH as you learn about what makes acids and bases. Download the <a href="#">CPALMS Perspectives video student note taking guide</a> .

Perspectives Video: Teaching Idea

Name	Description
<a href="#">DIY Cabbage Juice pH Indicator:</a>	Listen to this chemist describe a simple pH indicator experiment using foods and household chemicals. Download the <a href="#">CPALMS Perspectives video student note taking guide</a> .

Virtual Manipulative

Name	Description
<a href="#">Acid-Base Solutions:</a>	How do strong and weak acids differ? Use lab tools on your computer to find out! Dip the paper or the probe into solution to measure the pH, or put in the electrodes to measure the conductivity. Then see how concentration and strength affect pH. Can a weak acid solution have the same pH as a strong acid solution. Some of the topics to investigate: <ul style="list-style-type: none"><li>Given acids or bases at the same concentration, demonstrate understanding of acid and base strength by 1. Relating the strength of an acid or base to the extent to which it dissociates in water. 2. Identifying all the molecules and ions that are present in a given acid or base solution. 3. Comparing the relative concentrations of molecules and ions in weak versus strong acid (or base) solutions. 4. Describing the similarities and differences between strong acids and weak acids or strong bases and weak bases.</li><li>Demonstrate understanding of solution concentrated by: 1. Describing the similarities and differences between concentrated and dilute solutions. 2. Comparing the concentrations of all molecules and ions in concentrated versus dilute solutions of a particular acid or base.</li><li>Describe how common tools (pH meter, conductivity, pH paper) help identify whether a solution is an acid or base and strong or weak and concentrated or dilute.</li></ul>