Standard #: SC.912.P.8.2

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Differentiate between physical and chemical properties and physical and chemical changes of matter.

General Information

Subject Area: Science

Grade: 912

Body of Knowledge: Physical Science

Idea: Level 2: Basic Application of Skills & Concepts

Standard: Matter -
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.

Date Adopted or Revised: 02/08

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
2002110:	M/J Comprehensive Science 3, Advanced (Specifically in versions: 2014 - 2015, 2015 - 2022 (current), 2022 and beyond)
2003340:	Chemistry 1 (Specifically in versions: 2014 - 2015, 2015 - 2022 (current), 2022 and beyond)
2003350:	Chemistry 1 Honors (Specifically in versions: 2014 - 2015, 2015 - 2022 (current), 2022 and beyond)
2002480:	Forensic Science 1 (Specifically in versions: 2014 - 2015, 2015 - 2017, 2017 - 2022 (current), 2022 and beyond)
2002400:	Integrated Science 1 (Specifically in versions: 2014 - 2015, 2015 - 2022 (current), 2022 and beyond)
2002410:	Integrated Science 1 Honors (Specifically in versions: 2014 - 2015, 2015 - 2022 (current), 2022 and beyond)
2003310:	Physical Science (Specifically in versions: 2015 - 2022 (current), 2022 and beyond)
2003320:	Physical Science Honors (Specifically in versions: 2014 - 2015, 2015 - 2022 (current), 2022 and beyond)
2003020:	M/J Physical Science, Advanced (Specifically in versions: 2014 - 2015, 2015 - 2022 (current), 2022 and beyond)
2003800:	Florida's Preinternational Baccalaureate Chemistry 1 (Specifically in versions: 2014 - 2015, 2015 - 2022 (current), 2022 and beyond)
7920011:	Access Chemistry 1 (Specifically in versions: 2014 - 2015, 2015 - 2018, 2018 and beyond (current))
7920025:	Access Integrated Science 1 (Specifically in versions: 2014 - 2015, 2015 - 2018, 2018 and beyond (current))
2002055:	M/J Comprehensive Science 1 Accelerated Honors (Specifically in versions: 2014 - 2015, 2015 - 2022 (current), 2022 and beyond)
2002405:	Integrated Science 1 for Credit Recovery (Specifically in versions: 2014 - 2015, 2015 - 2020 (course terminated))
2003345:	Chemistry 1 for Credit Recovery (Specifically in versions: 2014 - 2015, 2015 - 2022 (current), 2022 and beyond)
7920022:	Access Physical Science (Specifically in versions: 2016 - 2018, 2018 and beyond (current))

Related Access Points

Access Points Number	Access Points Title
SC.912.P.8.In.2:	Compare characteristics of physical and chemical changes of matter.
SC.912.P.8.Su.2:	Identify examples of physical and chemical changes.
SC.912.P.8.Pa.2:	Recognize a common chemical change, such as cooking, burning, rusting, or decaying.

Related Resources

Lesson Plans

Name	Description
Solutions are Everywhere:	Students will look at similar solutes and create solutions with them. They will compare and contrast them and record their observations.
Precipitate Lab:	Students will make chalk by reacting calcium chloride with sodium bicarbonate. They will be able to watch a precipitate being formed. This lab will help them understand the difference between a precipitate and a filtrate and understand what reaction type the reaction is-double displacement. In the next class period, the precipitate will be dry and the students can use the chalk they made and draw with it.
Dollars for Density:	This is a guided inquiry activity in which students use simple lab procedures and discussions to develop and apply the concept of density. Students collect and graph data which they use to explore the relationship between mass and volume. Then students use their graph, rather than a memorized formula, to identify the unknown substance.
Physical and Chemical Changes Observed in Pancakes:	Students will observe the physical and chemical changes that occur during pancake preparation while following the scientific method.
Let's Get Physical:	The following lesson provides instruction and activities that introduce the physical properties and physical changes of matter. The guided practice gives students the opportunity to engage in analyzing real world examples and their unique physical properties. Students will experience a interactive virtual density lab. The culminating activity for "Let's Get Physical" will be a creative collaborate activity, in which students will have to work together to create a game, chidren's book, song or skit to introduce the 7 physical properties of matter to elementary aged students.
Gluva-Glop:	This is a rework of the lab creating "Silly Putty" from a traditional cookbook lab to an inquiry based lesson. A situational story is read to the class and students are then challenged to create the "lost" substance. Students are provided the raw materials but not given exact amounts. Through multiple trials, students experiment with ways to come up with a sample that closely resembles the one provided at the beginning of the lesson.
BIOSCOPES Summer Institute 2013 - Solutions:	This lesson is designed to be part of a sequence of lessons. It follows CPALMS Resource #52705 "BIOSCOPES Summer Institute 2013 - States of Matter" and precedes CPALMS Resource #52961 "BIOSCOPES Summer Institute 2013 - Atomic Models." The lesson employs a predict, observe, explain approach along with inquiry-based activities to enhance student understanding of properties aqueous solutions in terms of the kinetic molecular theory and intermolecular forces.
Classifying the Universe: What is matter and how do we as scientists categorize it?:	This is a hands-on lesson teaching what matter is and the differences between pure substances (elements and compounds) and mixtures (heterogeneous and homogeneous).
My 2 Cents:	Students predict how the mass of a penny changes over time, devise a method to test their prediction, collect/analyze data and determine the composition of a penny based on physical properties and calculations. This student-centered activity allows freedom from mistakes as they explore their learning in a supportive environment.
SMALL: Shape Memory Alloy Lab:	Shape Memory Alloys are metals that can return to or 'remember' their original shape. They are a cutting edge application for Chemistry, Physics, and Integrated Science. The activities in this lesson work well for the study of forces, Newton's Laws, and electricity in physics. They also lend themselves well to crystalline structures, heat of reaction, and bonding in chemistry. In addition, students could study applications for the materials in the medical and space industries.

Perspectives Video: Expert

Name	Description
Physical and Chemical Changes in Food :	Don't overreact when this chemist describes physical and chemical changes that you can observe in your own kitchen! Download the CPALMS Perspectives video student note taking guide.

Perspectives Video: Professional/Enthusiasts

Name	Description
Solving Systems of Equations, Oceans & Climate:	Angela Dial discusses how she solves systems of equations to determine how the composition of ocean floor sediment has changed over 65 million years to help reveal more information regarding climate change. Download the CPALMS Perspectives video student note taking guide.
Nitrogen Ice Cream:	Dig in as Daniel Golik, Owner at Chill-N, describes how liquid nitrogen is used to create smooth ice cream in Miami. This video was created by students at Alonzo And Tracy Mourning Senior High School in Miami as part of the SECME STEM video competition. Download the CPALMS Perspectives video student note taking guide.

Teaching Idea

Name	Description
Recognizing Chemical Reactions:	This resource describes activity that will allow students to observe the effects of a chemical change as opposed to a physical change. It also gives them the opportunity to observe conservation of matter by modeling chemical equations. The main learning objective is the recognition that all chemical reactions create new molecules and that in a chemical reaction the original atoms get rearranged, bonding together in different ways.

Text Resources

Name	Description

Ammonium Dichromate:	This article explains the uses and properties of ammonium dichromate, an "explosive" compound once common in children's chemistry sets, and the reasons why society has gradually moved away from using this compound.
Regenerating Plastic Grows Back After Damage:	This informational text resource is intended to support reading in the content area. This article describes researchers' development of a material similar to plastic that regenerates or grows back after damage. Researchers have discovered that the material is similar to biologic regenerative functions in living organisms and works by bonding to the damaged area and filling the holes and cracks to repair itself.
Molten Salts Could Improve Fuel Economy:	This informational text resource is intended to support reading in the content area. This text describes a new technology that might a boost car engine's efficiency by 2% by adding ionic liquids called "molten salts" to lubricating engine oil. The addition of the molten salts has the potential to reduce millions of barrels of oils from being imported into the United States annually.
The Quest for a Clean Drink:	This informational text resource is intended to support reading in the content area. In America, clean water flows with the turn of a knob, but many countries do not have this luxury. This article looks at three different ways scientists have created treatment systems for drinking water in poor countries like India and Bangladesh.
"Cooking with Chemistry":	This informational text resource is intended to support reading in the content area. This article from the Royal Society of Chemistry's *Chemistry World* magazine explains molecular gastronomy, a scientific discipline based on the physics and chemistry of cooking.

Tutorial

Name	Description
Central Idea: Quenching Your Thirst for Literacy Skills:	**Click "View Site" to open a full-screen version.** This tutorial is designed to help secondary science teachers learn how to integrate literacy skills within their science curriculum. The focus on literacy across content areas is designed to help students independently build knowledge in different disciplines through reading and writing. This tutorial will demonstrate a series of steps that teachers can teach students to help them determine the central ideas of a science text. This tutorial will also explain what an effective summary contains and provide steps teachers can use to help students with paraphrasing.

Video/Audio/Animation

Name	Description
Science Crossword Puzzles:	A collection of crossword puzzles that test the knowledge of students about some of the terms, processes, and classifications covered in science topics

Student Resources

Perspectives Video: Expert

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Video/Audio/Animation

Name	Description
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Parent Resources

Perspectives Video: Expert

Name	Description
Physical and Chemical Changes in Food :	Don't overreact when this chemist describes physical and chemical changes that you can observe in your own kitchen! Download the CPALMS Perspectives video student note taking guide.