



Standard #: SC.912.P.8.1

This document was generated on CPALMS - www.cpalms.org

Differentiate among the four states of matter.

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
2002110:	M/J Comprehensive Science 3, Advanced (Specifically in versions: 2014 - 2015, 2015 - 2022 (current), 2022 and beyond)
2001350:	Astronomy Solar/Galactic (Specifically in versions: 2014 - 2015, 2015 - 2022 (current), 2022 and beyond)
2020910:	Astronomy Solar/Galactic Honors (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)
2003380:	Physics 1 (Specifically in versions: 2014 - 2015, 2015 - 2022 (current), 2022 and beyond)
2003390:	Physics 1 Honors (Specifically in versions: 2014 - 2015, 2015 - 2022 (current), 2022 and beyond)
2003600:	Principles of Technology 1 (Specifically in versions: 2014 - 2015, 2015 - 2022 (current), 2022 and beyond)
2003610:	Principles of Technology 2 (Specifically in versions: 2014 - 2015, 2015 - 2018 (course terminated))
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)
2003385:	Physics 1 for Credit Recovery (Specifically in versions: 2014 - 2015, 2015 - 2020 (course terminated))
2003836:	Florida's Preinternational Baccalaureate Physics 1 (Specifically in versions: 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.1:	Classify states of matter as solid, liquid, and gaseous.
SC.912.P.8.Su.1:	Identify examples of states of matter as solid, liquid, and gaseous.
SC.912.P.8.Pa.1:	Select an example of a common solid, liquid, and gas.

Related Resources

Lesson Plans

Name	Description
Modeling the Kinetic Theory:	Students will engage in a directed inquiry lab to model the kinetic theory of matter. In the end, students should have a firm grasp of how matter's behavior is changed when its structure is changed during phase transitions.
Why so dense?:	<ul style="list-style-type: none"> This lesson is designed as an introduction to standard SC.912.P.8.1 and allows students to compare the properties of the three main phases of matter (solid, liquid, and gas) before competing cooperatively to build the most dense or solid structure possible in a guided inquiry activity. The lesson plan follows the 5E model and incorporates elements of the guided inquiry and POE (predict, observe, and explain) models. Students will be evaluated summatively with the use of argument building.
BIOSCOPEs Summer Institute 2013 - States of Matter:	This lesson is designed to be part of a sequence of lessons. It follows CPALMS Resource #52957 "BIOSCOPEs Summer Institute 2013 - Thermal Energy" and precedes CPALMS Resource #52961 "BIOSCOPEs Summer Institute 2013 - Solutions." The lesson employs a predict, observe, explain approach along with inquiry-based activities to enhance student understanding of states of matter and phase changes in terms of the kinetic molecular theory.
Behavior of Gases: Disaster at Lake Nyos:	Students, through discussion and structured inquiry, will learn about the behavior of gases under various conditions. Students will be able to apply these concepts to everyday objects such as soda bottles, fire extinguishers, hot air balloons, propane tanks, and aerosol products.
Shake it up:	Students will model molecular motion with everyday materials (shaker bottles) then associate their model/actions to the phase transitions of water while graphing its heat curve from data collected during a structured inquiry lab.

Perspectives Video: Professional/Enthusiast

Name	Description
See the Four States of Matter in Welding!:	A welder wields a plasma torch to cut solid metal like a hot knife through butter. It's one-stop shopping to see all four states of matter. Download the CPALMS Perspectives video student note taking guide .

Text Resource

Name	Description
Paintball: Chemistry Hits its Mark:	This informational text is intended to support reading in the content area. The article discusses how the concept of paintball originated and how it has changed into the sport of today. It also describes how the different states of matter are all present in the components of paintball.

Virtual Manipulatives

Name	Description
Gas Properties:	Students will pump gas molecules to a box and see what happens as they change the volume, add or remove heat, change gravity, and more. Measure the temperature and pressure, and discover how the properties of the gas vary in relation to each other. <ul style="list-style-type: none"> Students can predict how changing a variable among pressure, volume, temperature and number influences other gas properties. Students can predict how changing temperature will affect the speed of molecules. Students can rank the speed of molecules in thermal equilibrium based on the relative masses of molecules.
Under Pressure:	Explore pressure under and above water. See how pressure changes as one change fluids, gravity, container shapes, and volume. With this simulation you can: <ul style="list-style-type: none"> Investigate how pressure changes in air and water. Discover how to change pressure. Predict pressure in a variety of situations.
States of Matter:	Watch different types of molecules form a solid, liquid, or gas. Add or remove heat and watch the phase change. Change the temperature or volume of a container and see a pressure-temperature diagram respond in real time.

Student Resources

Perspectives Video: Professional/Enthusiast

Name	Description
------	-------------

[See the Four States of Matter in Welding!](#)

A welder wields a plasma torch to cut solid metal like a hot knife through butter. It's one-stop shopping to see all four states of matter.

Download the [CPALMS Perspectives video student note taking guide](#).

Virtual Manipulatives

Name	Description
Gas Properties:	<p>Students will pump gas molecules to a box and see what happens as they change the volume, add or remove heat, change gravity, and more. Measure the temperature and pressure, and discover how the properties of the gas vary in relation to each other.</p> <ul style="list-style-type: none">• Students can predict how changing a variable among pressure, volume, temperature and number influences other gas properties.• Students can predict how changing temperature will affect the speed of molecules.• Students can rank the speed of molecules in thermal equilibrium based on the relative masses of molecules.
Under Pressure:	<p>Explore pressure under and above water. See how pressure changes as one change fluids, gravity, container shapes, and volume. With this simulation you can:</p> <ul style="list-style-type: none">• Investigate how pressure changes in air and water.• Discover how to change pressure.• Predict pressure in a variety of situations.
States of Matter:	<p>Watch different types of molecules form a solid, liquid, or gas. Add or remove heat and watch the phase change. Change the temperature or volume of a container and see a pressure-temperature diagram respond in real time.</p>

Parent Resources

Perspectives Video: Professional/Enthusiast

Name	Description
See the Four States of Matter in Welding!	<p>A welder wields a plasma torch to cut solid metal like a hot knife through butter. It's one-stop shopping to see all four states of matter.</p> <p>Download the CPALMS Perspectives video student note taking guide.</p>

Virtual Manipulatives

Name	Description
Gas Properties:	<p>Students will pump gas molecules to a box and see what happens as they change the volume, add or remove heat, change gravity, and more. Measure the temperature and pressure, and discover how the properties of the gas vary in relation to each other.</p> <ul style="list-style-type: none">• Students can predict how changing a variable among pressure, volume, temperature and number influences other gas properties.• Students can predict how changing temperature will affect the speed of molecules.• Students can rank the speed of molecules in thermal equilibrium based on the relative masses of molecules.
Under Pressure:	<p>Explore pressure under and above water. See how pressure changes as one change fluids, gravity, container shapes, and volume. With this simulation you can:</p> <ul style="list-style-type: none">• Investigate how pressure changes in air and water.• Discover how to change pressure.• Predict pressure in a variety of situations.