

Chemical Reactions

Lesson 1 Chemical Properties and Changes



Grade 8 Science Content Standards—7.c: Students know substances can be classified by their properties, including their melting temperature, density, hardness, and thermal and electrical conductivity. Also covers: 5.a

Accept all reasonable responses.

Scan the headings in Lesson 1 of your book. Identify three topics that will be discussed.

1. chemical and physical properties of matter
2. chemical and physical changes in matter
3. how substances change as they dissolve

Review Vocabulary

physical property

Define physical property, using your book or a dictionary. Then use the term in a scientific sentence.

any characteristic of a material that can be observed without
changing the material itself; Melting point is a physical property.

New Vocabulary

*chemical property
chemical change
dissolving*

Write a paragraph using all of the vocabulary terms.

A chemical property is any characteristic of a substance that can
be observed only when the identity of the substance is changed
(by a chemical reaction). For example, rusting is a chemical
property of iron that involves a chemical change. When iron
rusts, it combines with oxygen to form a new substance, called
rust. A physical change does not change the identity of a
substance. For example, when sugar dissolves in water, a
physical change takes place because the water and sugar are still
present, though you can't see the sugar when it is dissolved.

Academic Vocabulary

compound

Use a dictionary to define compound.

something formed by a union of parts

Lesson 1 Chemical Properties and Changes (continued)

Main Idea

Ability to Change

I found this information on page _____.

CA SE, p. 338

Have students gather pictures that show changes in matter. Ask them to use the pictures to develop an illustrated display that identifies the specific physical and chemical properties of matter shown in the photographs they select.

I found this information on page _____.

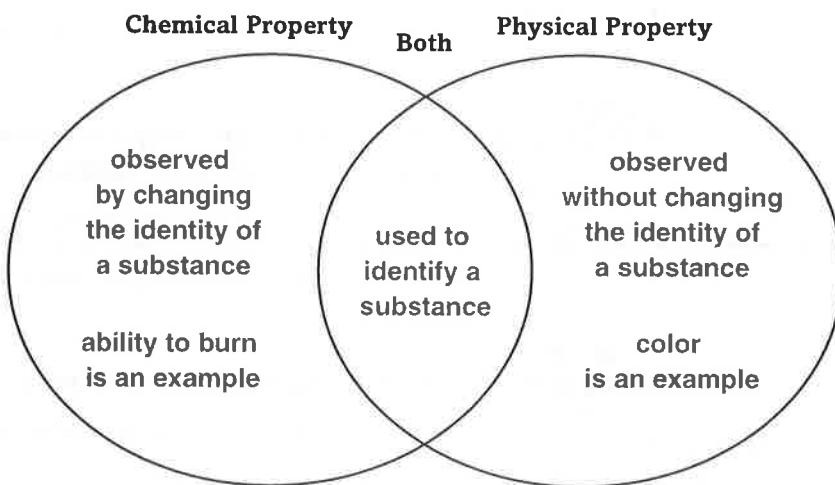
CA SE, pp. 338–339

Accept all reasonable responses.

Details

Compare and contrast chemical properties *and* physical properties *by filling in the Venn diagram using the phrases listed.*

- used to identify a substance
- observed without changing the identity of a substance
- ability to burn is an example
- color is an example
- observed by changing the identity of a substance



Identify at least one chemical property for each substance.

Substance	Chemical Property
Iron	nonflammable; rusts
Paper	burns
Helium gas	nonflammable
Hydrogen gas	flammable; burns in air
Copper	does not react with water

SUMMARIZE IT

Summarize the main ideas of the above section.

Accept all reasonable responses. Chemical properties are those that can be observed only by changing the identity of the substance. Physical properties can be observed without changing the identity of the substance.

Lesson 1 Chemical Properties and Changes (continued)

Main Idea

Ability to Change

I found this information on page _____, CA SE, pp. 338–340

Accept all reasonable responses.

Chemical and Physical Changes

I found this information on page _____, CA SE, pp. 341–343

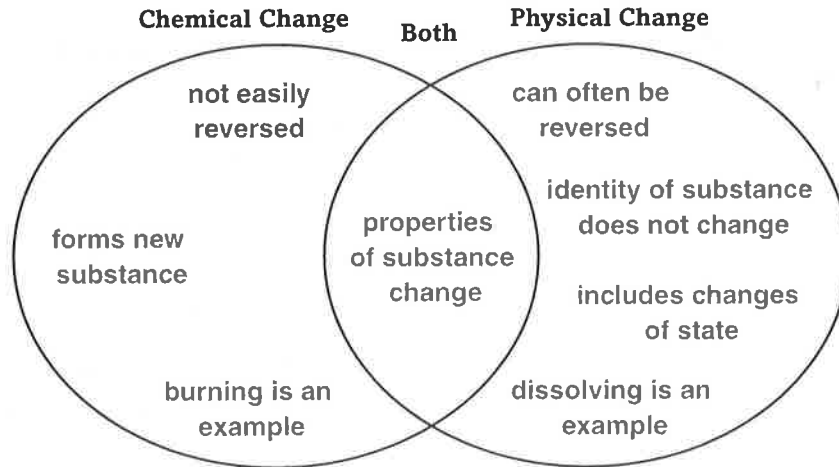
Details

Identify six examples of physical properties of matter.

Examples of Physical Properties of Matter	
1. color	4. malleability
2. shape	5. heat conductivity
3. melting point	6. electrical conductivity

Compare and contrast chemical changes and physical changes by completing the Venn diagram, using the phrases listed.

- properties of substance change
- identity of substance does not change
- can often be reversed
- dissolving is an example
- not easily reversed
- burning is an example
- forms new substance
- includes changes of state



SUMMARIZE IT

Summarize three main ideas of the above sections.

Accept all reasonable responses. Physical properties are characteristics that can be observed without changing the identity of a substance. A chemical change results in the formation of a new substance. A physical change alters a substance's physical properties but not the identity of the substance.

Chemical Reactions

Lesson 2 Chemical Equations



Grade 8 Science Content Standards—3.b: Students know that compounds are formed by combining two or more different elements and that compounds have properties different from their constituent elements. Also covers: 3.f, 5.b

Accept all reasonable responses.

Skim *Lesson 2 of your book. Write three questions that come to mind. Look for answers to your questions as you read the lesson.*

1. _____
2. _____
3. _____

Review Vocabulary

Define molecule, using your book or a dictionary.

molecule

neutral particle in which atoms share electrons

New Vocabulary

Read the definitions below. Write the correct vocabulary term on the blank to the left of each definition.

_____ product
 _____ law of conservation of mass

new substance formed in a chemical reaction

_____ diatomic molecule

scientific principle stating that the total mass before a chemical reaction is the same as the total mass after the reaction

_____ reactant

molecule that contains two atoms

_____ coefficient

starting substance in a chemical reaction

number in front of a symbol or formula that tells how many molecules or formula units take part in a reaction

Academic Vocabulary

Use a dictionary to define precise. Then use the term in a sentence to show how it is used in science.

precise

exact; In an experiment, you should use precise measurements.

Lesson 2 Chemical Equations (continued)

Main Idea

Is matter conserved in chemical reactions?

I found this information on page _____.

CA SE, pp. 346–347

How do you write a chemical equation?

I found this information on page _____.

CA SE, p. 349

Accept all reasonable responses.

I found this information on page _____.

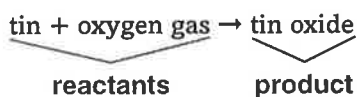
CA SE, pp. 349–350

Details

Rephrase *the law of conservation of mass in your own words.*

The law of conservation of mass states that the mass of the substances before a chemical reaction occurs equals the masses of the substances formed by the reaction.

Label *the reactants and product in the equation below.*



Summarize *two limitations of word equations.*

Word equations can be long, and they do not show that mass is conserved.

Distinguish *between an element, a diatomic molecule, and a compound. Give an example of each, including the symbol.*

	What is it?	Example	Symbol
Element	substance found on the periodic table	hydrogen	H
Diatomic molecule	a molecule containing two atoms	oxygen gas	O ₂
Compound	a molecule containing two or more different atoms	water	H ₂ O

SUMMARIZE IT

Summarize the main ideas of the above sections of this lesson.

Accept all reasonable responses. Mass is conserved during a chemical reaction.

A chemical equation describes a chemical reaction by showing the reactants that take part in the reaction on the left and the products formed on the right. Symbols are used to represent elements, molecules, and compounds.

Lesson 2 Chemical Equations (continued)

Main Idea

How do you balance a chemical equation?

I found this information on page _____ CA SE, pp. 351–353

Equations for Common Chemical Reactions

I found this information on page _____ CA SE, pp. 354–355

Have students make and use flash cards to practice reading chemical equations. Students should write a chemical equation that includes appropriate symbols and formulas on one side of the card and the word equation on the other side.

Copyright © Glencoe/McGraw-Hill, a division of The McGraw-Hill Companies, Inc.

Details

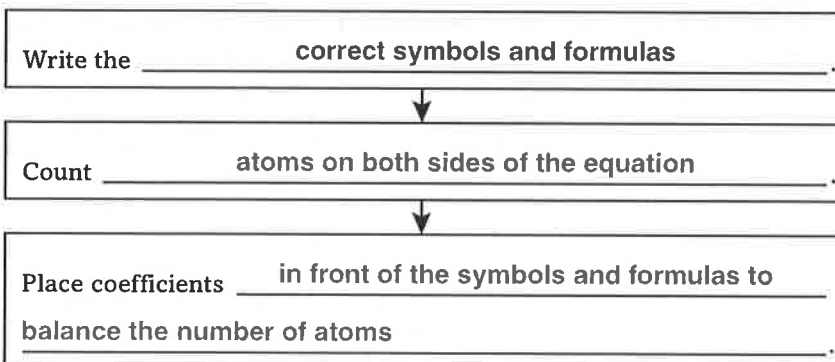
Analyze when a chemical equation is balanced.

A chemical equation is balanced when the same number of each kind of atom appears on both sides of the equation.

Contrast the use of subscripts and coefficients in chemical equations.

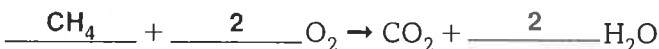
Subscript	Coefficient
Tells how many atoms of an element are found in one molecule or formula unit	Tells how many molecules or formula units are involved in the reaction

Sequence the steps involved in balancing an equation. Complete the flow chart.

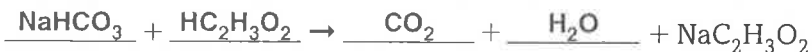


Complete each equation below to summarize its chemical reaction.

Reaction of methane:



Baking soda and vinegar:



SUMMARIZE IT

Summarize two main ideas from the above sections.

Accept all reasonable responses. Chemical equations must be balanced to show that mass is conserved. Coefficients can be used to balance equations.