

# Minerals

---

**Say Thanks to the Authors**

Click <http://www.ck12.org/saythanks>

*(No sign in required)*



To access a customizable version of this book, as well as other interactive content, visit [www.ck12.org](http://www.ck12.org)

CK-12 Foundation is a non-profit organization with a mission to reduce the cost of textbook materials for the K-12 market both in the U.S. and worldwide. Using an open-content, web-based collaborative model termed the **FlexBook®**, CK-12 intends to pioneer the generation and distribution of high-quality educational content that will serve both as core text as well as provide an adaptive environment for learning, powered through the **FlexBook Platform®**.

Copyright © 2014 CK-12 Foundation, [www.ck12.org](http://www.ck12.org)

The names “CK-12” and “CK12” and associated logos and the terms “**FlexBook®**” and “**FlexBook Platform®**” (collectively “CK-12 Marks”) are trademarks and service marks of CK-12 Foundation and are protected by federal, state, and international laws.

Any form of reproduction of this book in any format or medium, in whole or in sections must include the referral attribution link <http://www.ck12.org/saythanks> (placed in a visible location) in addition to the following terms.

Except as otherwise noted, all CK-12 Content (including CK-12 Curriculum Material) is made available to Users in accordance with the Creative Commons Attribution-Non-Commercial 3.0 Unported (CC BY-NC 3.0) License (<http://creativecommons.org/licenses/by-nc/3.0/>), as amended and updated by Creative Commons from time to time (the “CC License”), which is incorporated herein by this reference.

Complete terms can be found at <http://www.ck12.org/terms>.

Printed: August 25, 2014

**flexbook**  
next generation textbooks



---

**CHAPTER 1****Minerals**

---

**Lesson 3.1: True or False**

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

*Write true if the statement is true or false if the statement is false.*

- \_\_\_\_\_ 1. Some minerals are chemical compounds.
- \_\_\_\_\_ 2. Each mineral has a specific chemical composition.
- \_\_\_\_\_ 3. Minerals are inorganic substances.
- \_\_\_\_\_ 4. Table salt is an example of a sulfide mineral.
- \_\_\_\_\_ 5. Fracture is the tendency of a mineral to break along flat surfaces
- \_\_\_\_\_ 6. Minerals are classified in groups based on their physical properties.
- \_\_\_\_\_ 7. Scientists use the physical properties of minerals to identify them.
- \_\_\_\_\_ 8. There are only 40 known minerals.
- \_\_\_\_\_ 9. The largest mineral group is called the native elements.
- \_\_\_\_\_ 10. Minerals with similar crystal structures are grouped together.

---

**Lesson 3.1: Critical Reading**

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

*Read this passage based on the text and answer the questions that follow.***What are Minerals?**

Minerals are solids formed by natural processes that take place on or under Earth's surface. For example, some minerals form when hot lava cools. Other minerals form when solids precipitate out of water. Still other minerals form when rocks are exposed to high pressures and temperatures. Minerals are generally not made by living organisms, so they are called inorganic substances. Substances made by living things are called organic substances. Everything else is inorganic.

Minerals have a definite chemical composition. A few minerals are made of only one kind of element. For example, silver is a mineral that consists only of the element silver, and diamond is a mineral that consists only of the element carbon. However, most minerals are chemical compounds, which consist of two or more elements. For example, the mineral quartz is the compound silicon dioxide. It contains one atom of silicon for every two atoms of oxygen. Like quartz, all mineral compounds have a definite ratio of elements.

Almost all minerals form crystals. A crystal is a solid structure in which atoms are arranged in a regular repeating pattern. Some minerals, such as table salt, form crystals that are cube-shaped. Other minerals form crystals with different shapes, such as pyramids. Different minerals can have the same chemical composition but different crystal structures. For example, graphite (the "lead" in pencils) and diamond both consist only of carbon. However, their atoms are arranged in different patterns, giving them different crystal structures. As a result, graphite and diamond

have very different physical properties and are considered to be different minerals. Graphite is dull and gray and so soft that it breaks easily. Diamond, in contrast, is shiny and clear and the hardest of all minerals.

### Questions

1. What are minerals?
2. What are some specific ways that minerals form?
3. Describe the chemical composition of minerals.
4. Graphite and diamond are minerals that have the same chemical composition. Describe the physical properties of these two minerals, and explain why they are so different from one another.

---

## Lesson 3.1: Multiple Choice

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

*Circle the letter of the correct choice.*

1. Examples of minerals include
  - a. silver.
  - b. table salt.
  - c. quartz.
  - d. all of the above
2. All minerals
  - a. have a definite chemical makeup.
  - b. are pure elements.
  - c. form crystals.
  - d. contain carbon.
3. Minerals may form when
  - a. rocks are heated to high temperatures.
  - b. rocks are exposed to high pressure.
  - c. lava cools and hardens.
  - d. all of the above
4. The color of a mineral's powder is its
  - a. streak.
  - b. luster.
  - c. color.
  - d. cleavage.
5. The mineral gypsum is a common
  - a. sulfide.
  - b. sulfate.
  - c. carbonate.
  - d. silicate.
6. Minerals known as salts are classified as
  - a. oxides.
  - b. phosphates.
  - c. halides.
  - d. silicates.

## 7. Oxides include

- hematite.
- feldspar.
- calcite.
- none of the above

---

### Lesson 3.1: Matching

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

*Match each definition with the correct term.***Definitions**

- \_\_\_\_\_ 1. atom that has become electrically charged by gaining or losing electron(s)
- \_\_\_\_\_ 2. positively charged particle in the nucleus of an atom
- \_\_\_\_\_ 3. smallest particle of an element that has all the element's properties
- \_\_\_\_\_ 4. center of an atom consisting of protons and neutrons
- \_\_\_\_\_ 5. negatively charged particle that orbits the nucleus of an atom
- \_\_\_\_\_ 6. smallest possible particle of a chemical compound
- \_\_\_\_\_ 7. uncharged particle in the nucleus of an atom

**Terms**

- atom
- electron
- ion
- molecule
- neutron
- nucleus
- proton

---

### Lesson 3.1: Fill in the Blank

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

*Fill in the blank with the appropriate term.*

1. A(n) \_\_\_\_\_ is a substance made of two or more elements in a certain ratio.
2. An inorganic solid that forms by a natural process is a(n) \_\_\_\_\_.
3. Organic substances are made by \_\_\_\_\_.
4. The atoms of most minerals are arranged in a regular repeating pattern called a \_\_\_\_\_.
5. \_\_\_\_\_ are scientists who study minerals.
6. Minerals known as \_\_\_\_\_ contain silicon and oxygen.
7. \_\_\_\_\_ are minerals that contain one carbon atom bonded to three oxygen atoms.

---

## Lesson 3.1: Critical Writing

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

*Thoroughly answer the question below. Use appropriate academic vocabulary and clear and complete sentences.*

Identify two groups of minerals. Then compare and contrast their chemical compositions, and give an example of each.