



Be a Scientist!

You have learned about the minerals used inside a computer. What are some mineral resources that are mined in your state or local area? Research a nearby mine that provides a mineral resource. In a science journal, explain why the mineral is important. Describe how the mine works. Also mention any possible pollution, hazards, or damage that can occur during the mining process.

Is it good or bad to have a mine near your school or neighborhood? Prepare for a debate with your classmates. Prepare notes so that you can take *either* side in the debate. After the debate, write a report. Summarize the arguments of both sides.



Beyond the Book

Research how different parts of a computer can be reused or recycled. Where could you recycle an old computer?

FOCUS Book

MINERALS in a COMPUTER

: Science A-Z

MINERALS in a COMPUTER



FOCUS Question

Why do we use Earth's minerals in computers?

Structure and Function

Photo Credits:

Front cover: © iStock/Fab photos; page 2: © Gleb Semenov/Dreamstime.com; page 3 (top): © Martin Novak/123RF; page 3 (center): © iStock/studiocasper; page 3 (bottom): © GC Minerals/Alamy; page 4 (top): © Detail Photography/Alamy; page 4 (bottom): © PjrStudio/Alamy; page 4 (center): © Yury Shirokov/Dreamstime.com; page 5 (left): © Volkan Ertörer/123RF; page 5 (right): © Vladimir Tronin/Dreamstime.com; page 6: © mother image/cultura/Corbis; page 7: © Li Xuejun/123RF; page 8: © David R. Frazier Photolibrary, Inc./Alamy; page 9: © iStock/Baran Özdemir

Illustration Credits:

page 6 (top) and page 7: © Q2A Media Inc.

Minerals in a Computer
© Learning A-Z

All rights reserved.

www.sciencea-z.com

Everyday Minerals

What occurs in nature but is not alive? Minerals! All minerals are solid. They are all around you—you use them every day.

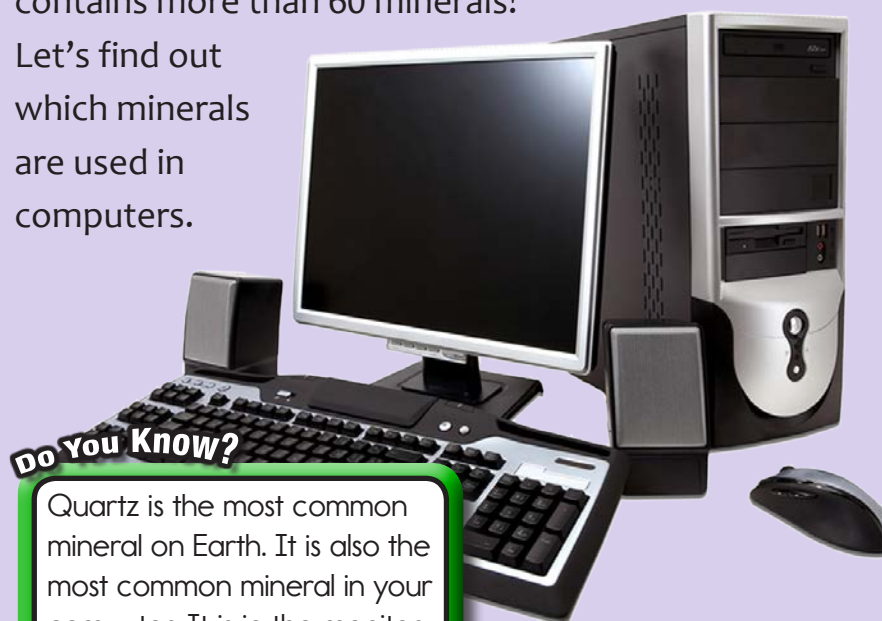
Some minerals, such as rubies and diamonds, are used to make jewelry. Minerals are in your pencil and your bicycle. Others are added to food. Minerals are even in toothpaste and deodorant.

Still others are used in electronics. A computer contains more than 60 minerals!

Let's find out which minerals are used in computers.

Do You Know?

Quartz is the most common mineral on Earth. It is also the most common mineral in your computer. It is in the monitor and the computer itself.



Minerals in Computers

Computers use some minerals that are common on Earth. They also use some minerals that are rare.

The mineral *quartz* is in rocks all over Earth's surface. Even though it is common, quartz is extremely important. Quartz is a hard mineral. It is used in glass, ceramics, and construction materials.

In computers, quartz is in the circuits and chips that control your computer. A *computer chip* is a tiny electrical conductor. Quartz can be used in many different ways. Your computer would not work without it!

Certain minerals are rare and useful. Gold and silver are examples. They are hard to find. Another rare and valuable mineral is *cassiterite* (kuh-SIT-ur-ite). We get the metal tin from cassiterite. Gold, silver, and cassiterite are all used to make computer chips.



quartz

gold

cassiterite

Lithium Powers Up



Lithium is a lightweight mineral. It is often used as a power source in certain kinds of batteries. This includes batteries that power many computers. Lithium is also mixed with other substances to make lightweight metal alloys. An *alloy* is a combination of two or more metallic elements.

Many different rocks contain lithium. After lithium is removed from rock, it must be stored under special conditions. Why? It *corrodes*, or breaks down, in air. In other words, it is highly *reactive* to air.

Reactive substances can release energy. How might this be useful in a battery?

**lithium-powered
computer battery**



**lithium-powered
batteries**

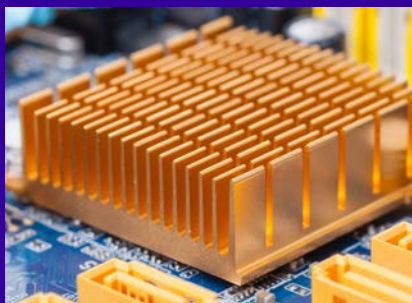


**Lepidolite is a rock
that contains lithium.**

Conductive Minerals



copper in a circuit board ↓



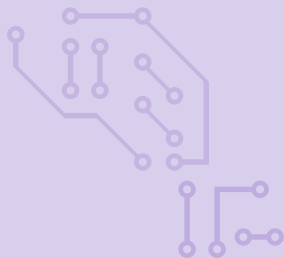
← copper wire

Have you ever seen a shiny, new penny? The penny has a copper coating. Copper is a *metallic* mineral. Gold, silver, and lithium are other metallic minerals.

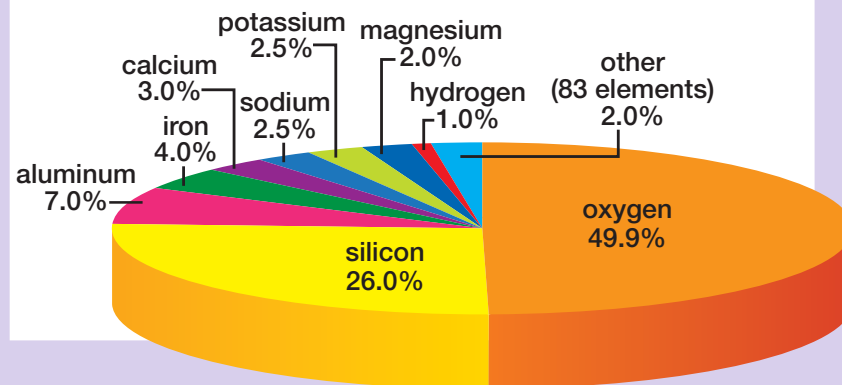
Metals are shiny. They can be bent and shaped. Heat and electricity move easily through them. This is why copper is used in electrical wires. Copper is also used in many different computer parts.

Think About It

Gold and silver are flexible, metallic minerals that conduct electricity, just like copper. Why aren't they used in common electrical wires?



ELEMENTS IN EARTH'S CRUST



Silicates All Around!

The outer layer of Earth is called the *crust*. The circle graph above shows the elements in Earth's crust. Silicon and oxygen are the most common elements. When they combine, they form *silicate* (SILL-uh-kit) minerals. Silicates are the most common kind of minerals in Earth's crust.

Can you guess the most common silicate mineral? That's right—quartz! It is made of only silicon and oxygen. Its chemical name is *silicon dioxide* (dye-OX-ide).

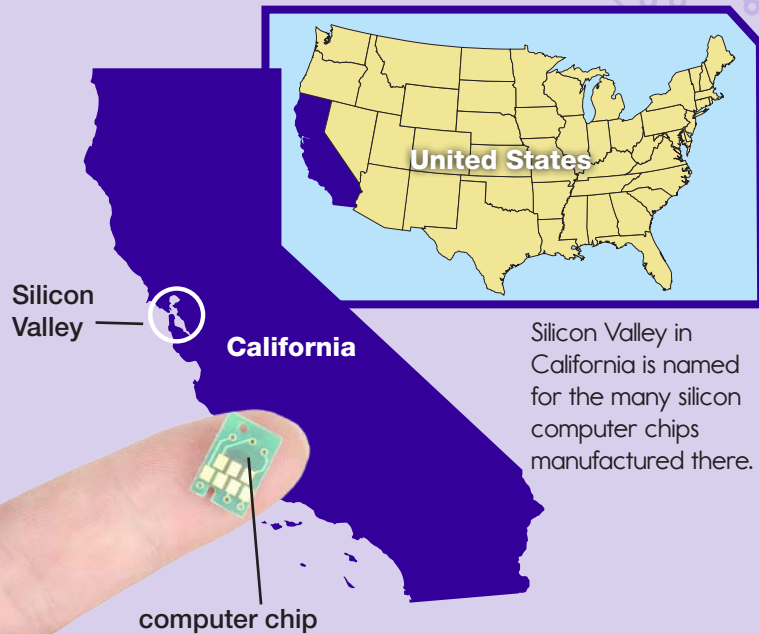


Sand is made mostly of quartz—a silicate mineral.

Silicate minerals are useful in many ways. Silicon is used to make computer screens. Quartz is used to keep time. It is used in watches, computers, and other clocks.

Many parts of a computer are plastic. Silicate minerals are commonly used to make plastics.

Computer chips also contain silicate minerals. Quartz crystals can create an electric current when they are squeezed. They conduct electricity without getting too hot.



Conserving Resources

Bauxite (BOX-ite) is a rock that contains many valuable minerals. We get aluminum from bauxite. Aluminum, like quartz, is used in computer screens and computer chips. It is also used to make products such as soft drink cans and aluminum foil.

Bauxite can be found near Earth's surface. It is removed at mines where layers of land get stripped away. Strip mines leave giant holes in the ground. Pollution can occur near strip mines. Soil can get washed away and clog rivers.

This is why people try to conserve aluminum and other metals. Using fewer new metals means less strip mining is needed. Pollution is reduced, and we protect our supplies of minerals for the future.



bauxite strip mine

Reusing and Recycling

You can conserve minerals in many different ways. One thing you can do is use less stuff. Another thing you can do is reuse the materials you already have.

When possible, you can *recycle*. To recycle

means to turn old things into new things. A new computer might contain minerals that have been recycled from an older one.

Old computers contain some minerals that could pollute the environment. So don't throw them in the trash! Most computer stores will take your old computers and recycle them.

Did you ever think that your computer contained so many minerals? The next time you use your computer, thank the silicates, metals, and other minerals that make it possible!



Taking apart an old computer to recycle parts

Read-Think-Write

Write your answers on separate paper. Use details from the text as evidence.

- 1 How are silicate minerals used in computers?
- 2 Name three objects in your classroom that are made from minerals.
- 3 Look at the diagram on page 6. What is the third-most common element found in Earth's crust?
- 4 Why do you think computers use so many different types of minerals?
- 5 Explain why someone might recycle an old computer.



FOCUS Question

Why do we use Earth's minerals in electronic devices? Describe how the properties of lithium, copper, and quartz make them useful in computers.

