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**13.1 Minerals and Rocks**

**Key Concepts**

A mineral is a naturally occurring, inorganic solid that has an orderly crystalline
structure and a definite chemical composition.

Minerals can form by crystallization from magma or lava, from precipitation related
to evaporation or hydrothermal solutions, from exposure to high pressure and
temperature, or can be produced by organisms.

Forces deep inside and at the surface of Earth produce changes in rock that cause the
same material to cycle between igneous, sedimentary, and metamorphic rock stages.



 **Vocabulary Preview**

*Define each vocabulary term in your own words. Then, write yourself a quick note on
how you will remember each. One term has been done for you.*

|  |  |  |
| --- | --- | --- |
| **Term** | **Definition** | **How I Remember** |
| Mineral |  |  |
| Precipitation |  |  |
| Polymorph |  |  |
| Rock |  |  |
| Rock cycle | A very slow process in which rockschange between igneous, sedimentary,and metamorphic types of rock | The word *cycle* lets me know that thisprocess includes events that happenrepeatedly. |

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**What Are Minerals?**

*For Questions 1–5, write* True *if the statement is true. If the statement is false, replace
the underline word or words to make it true. Write your changes on the line.*

 **1.** Minerals are formed from inorganic materials.

 **2.** Each type of mineral has a unique crystal structure.

 **3.** Most minerals are compounds composed of one element(s).

**4.** List the five criteria a material must meet to be considered a mineral.

5. Name a mineral that is made of only one element.

**Mineral Formation**

**8.** Fill in the table with a description of the ways that minerals
can form.

|  |  |
| --- | --- |
| **Ways That MineralsCan Form** | **Description** |
| Crystallization frommagma or lava |  |
| Precipitation |  |
| Pressure andtemperature |  |
| Produced byorganisms |  |

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**11.** Name an example of a mineral formed by an organism.

**Rocks**

*For Questions 12–14, circle the letter of the correct answer.*

**12.** Rock that forms as magma cools slowly and solidifies below Earth’s surface is called

**A.** intrusive igneous rock. **C.** clastic sedimentary rock.

**B.** extrusive igneous rock. **D.** chemical sedimentary rock.

**13.** Which of the following is NOT a factor in the formation of metamorphic rock?

**A.** deposition **C.** recrystallization

**B.** high pressure **D.** high temperature

**14.** An example of metamorphic rock is

**A.** shale. **C.** marble.

**B.** basalt. **D.** limestone.

**15.** What causes rocks to move, and how does that movement relate to the rock cycle?

**16.** Describe how sedimentary rocks are formed.



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 **Organize Information**

**17.** Complete the following diagram to show the various geologic processes involved in the
rock cycle. Draw different arrows to represent each process and complete the key below
the map. Note that one process can affect more than one type of rock material. On the
lines below the key, explain where minerals that make up the rocks in the rock cycle
originally come from.



Sediment

Sedimentary rock

Igneous rock

Magma or lava

Metamorphic rock

|  |  |
| --- | --- |
| **KEY** |  |
| Weather and erosion way | Melting mam |
| Sediment settles | Cooling and crystallization |
| Heat and pressure |  |



*Answer the questions to test your knowledge of lesson concepts. You can check your
work using the answers on the bottom of the page.*

**18.** Name two polymorphs of carbon.

**19.** What are the three different types of rock?



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**13.2 Mining**

**Key Concepts**

 Mining companies seek and gather valuable resources such as metals, nonmetallic
minerals, and fuel sources.

 Mining companies have developed many techniques to access resources close to the
surface of Earth, deep underground, and even underwater.

 After mining, ores and other extracted materials are processed to separate the desired
materials, combine them with other materials, or alter their properties.

 **Vocabulary Preview**

*Define the vocabulary term in your own words. Then, write yourself a quick note on
how you will remember it.*

|  |  |  |
| --- | --- | --- |
| **Term** | **Definition** | **How I Remember** |
| Ore |  |  |
| Strip mining | A method of mining in which layersof surface soil and rock are removedfrom large areas to expose theresource | When you *strip* something off, youpull away layers, just as *strip mining*pulls away layers of soil and rock. |
| Subsurfacemining |  |  |
| Open pitmining |  |  |
| Mountaintopremoval |  |  |

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|  |  |  |
| --- | --- | --- |
| **Term** | **Definition** | **How I Remember** |
| Placer mining |  |  |
| Tailings |  |  |
| Smelting |  |  |

**What Is Mined?**

*For Questions 1–5, complete each statement by writing in the correct word or words.*

**1.** Some minerals are widespread throughout Earth’s crust, but occur in such low
 that mining is not economically practical.

**2.** An ore is mined so that can be removed from it.

**3.** For material to be considered an ore, the of a mineral must be of a
certain level.

**4.** About 100 minerals are considered gemstones, which are minerals.

**5.** Some substances used for sources, such as coal, are mined.

**7.** What does mining involve?



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**Mining Methods**

**8.** Complete the following paragraph with terms from the word bank.



**mountaintop removal open pit mining placer mining solution mining**

**strip mining subsurface mining undersea mining**

 involves sifting through material in riverbeds. Companies use
the method when a resource is near Earth’s surface in horizontal
deposits. In , miners dig a large hole to extract a resource. With
 , mining companies clear cut forests, remove topsoil, and then blast
away rock to reach a resource. When a resource is found in pockets deep underground,
 is used. One way to extract a resource without removing ore from the
ground is . The least used method is , because
it is so expensive.

**9.** Describe solution mining.

**Processing Minerals and Metals**



**10.** Fill in the flowchart with the main steps involved in
processing minerals.



Minerals are
removed from
the ground.

**11.** Why are minerals processed?