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**13.1 Minerals and Rocks**

**Key Concepts**

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

keyMinerals 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.

keyForces 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.

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**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 rocks change between igneous, sedimentary, and metamorphic types of rock | The word *cycle* lets me know that this process includes events that happen repeatedly. |

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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**

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

|  |  |
| --- | --- |
| **Ways That Minerals Can Form** | **Description** |
| Crystallization from magma or lava |  |
| Precipitation |  |
| Pressure and temperature |  |
| Produced by organisms |  |

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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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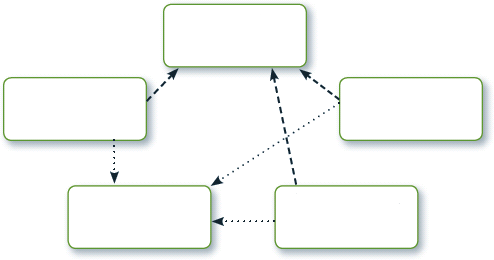
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**Organize Information**

**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 |  |

aaaaaaaaaaa

*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**

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

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

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

skillbuilder **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 layers of surface soil and rock are removed from large areas to expose the resource | When you *strip* something off, you pull away layers, just as *strip mining* pulls away layers of soil and rock. |
| Subsurface mining |  |  |
| Open pit mining |  |  |
| Mountaintop removal |  |  |

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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.

saaaaaaat

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

**strip mining subsurface mining undersea mining**

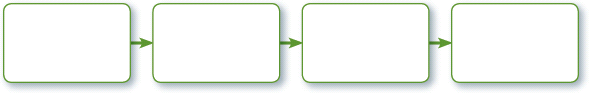
involves sifting through material in riverbeds. Companies use  
the method when a resource is near Earth’s surface in horizontal  
deposits. In , miners dig a large hole to extract a resource. With  
 , mining companies clear cut forests, remove topsoil, and then blast  
away rock to reach a resource. 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**

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



Minerals are  
removed from  
the ground.

**11.** Why are minerals processed?