

**Rocks** ▪ *Guided Reading and Study*

## Metamorphic Rocks

*This section explains how metamorphic rocks form, how they are classified, and how they are used.*

### Use Target Reading Skills

*Look at Figure 17 and write two questions you have about the visuals in the graphic organizer below. As you read about metamorphic rocks, write the answers to your questions.*

Q. Why do the crystals in gneiss line up in bands?
A.
Q.
A.

### Introduction

1. List the two forces that can change rocks into metamorphic rocks.
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_



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**Metamorphic Rocks** *(continued)*

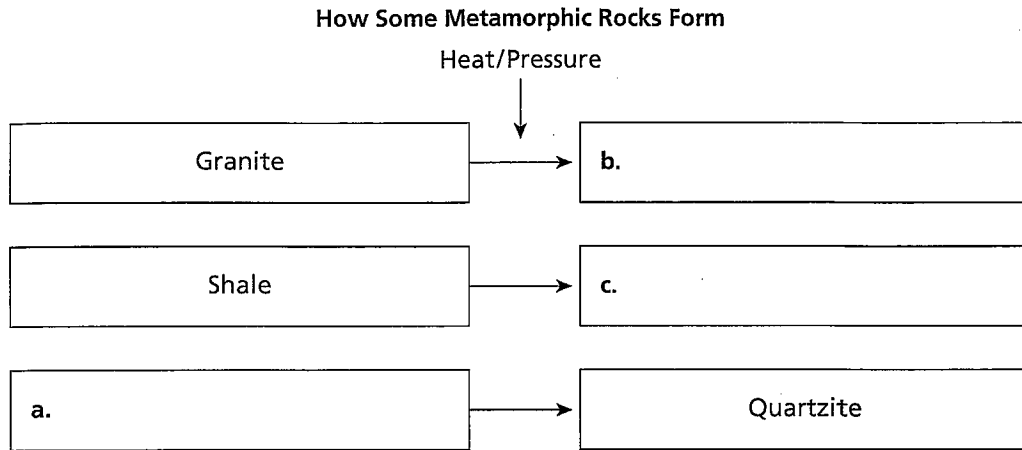
2. Is the following sentence true or false? Metamorphic rocks form deep beneath Earth's surface. \_\_\_\_\_
3. How do rocks change when they become metamorphic rocks?  
\_\_\_\_\_  
\_\_\_\_\_
4. What kinds of rocks can be changed into metamorphic rocks?  
\_\_\_\_\_  
\_\_\_\_\_
5. Is the following sentence true or false? The deeper a rock is buried in the crust, the less pressure there is on that rock. \_\_\_\_\_

**Types of Metamorphic Rocks**

6. Is the following sentence true or false? Geologists classify metamorphic rocks by the arrangement of grains making up the rocks.  
\_\_\_\_\_
7. Metamorphic rocks with grains arranged in parallel layers or bands are said to be \_\_\_\_\_.
8. Circle the letter of each type of metamorphic rock that is foliated.
  - a. slate
  - b. quartzite
  - c. gneiss
  - d. marble
9. Metamorphic rocks with grains arranged randomly are said to be \_\_\_\_\_.
10. List two examples of nonfoliated metamorphic rocks.
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_

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11. Complete the flowchart to show the metamorphic rocks that are formed.



d. What does the flow chart show is happening to the rocks to the left?

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**Uses of Metamorphic Rock**

12. Why is marble useful for buildings and statues? \_\_\_\_\_

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13. What are some of the ways that slate is used? \_\_\_\_\_

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**Rocks** • *Enrich*

# The Metamorphic Rocks

Tremendous pressure and high temperatures can change any rock into metamorphic rock. In addition, hot magma flows upward into rock near these boundaries. Such intense conditions change one kind of rock into another, such as shale, a sedimentary rock, into slate, a metamorphic rock. But what happens if the pressure and temperature continue to increase after shale becomes slate? Look at Figure 1 below. Increasing pressure and temperature change the slate into schist, and the schist changes into gneiss.

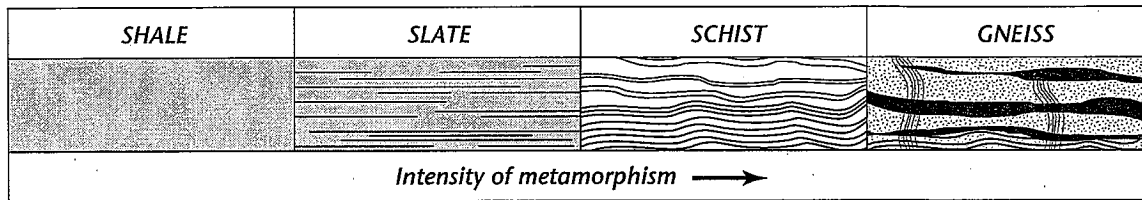


Figure 1

Gneiss and schist are the most common metamorphic rocks. Gneiss is a foliated rock usually composed of quartz and feldspar. Schist is also foliated, but its mineral composition varies. The terms gneiss and schist actually describe certain textures of metamorphic rock. That's why both shale and granite can change into gneiss, and both granite and basalt can change into schist. Figure 2 shows common metamorphic rocks to the right. The rocks on the left are igneous and sedimentary rocks. The arrows represent the pressure and temperatures that cause the formation of metamorphic rocks.

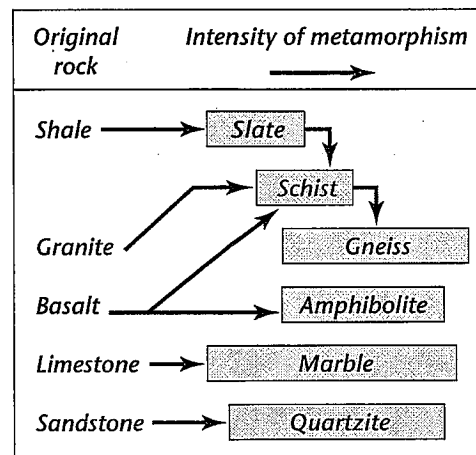


Figure 2

Answer the following questions on a separate sheet of paper.

1. What causes shale to change into slate?
2. What happens to the slate if these conditions increase?
3. What are gneiss and schist?
4. How do tremendous pressures and high temperatures affect limestone?
5. How does metamorphism affect basalt?
6. What rocks can change into schist?
7. How does increased metamorphism affect schist?