

## EXERCISE 9

### A STUDY OF METAMORPHIC ROCKS

**Purpose:** To become acquainted with typical metamorphic rocks.

**Background:** Metamorphic rocks are formed when rocks already in existence are altered by heat, pressure, and the chemical action of natural gases and liquids in the earth's crust. The new rocks formed may be denser, harder, or more crystalline than the rocks from which they are formed. They may contain new minerals. The new minerals may be squeezed flat and arranged in parallel bands.

**Materials:** 1) Specimens of gneiss, schist, slate, quartzite, marble, anthracite 2) hand lenses 3) dilute hydrochloric acid 4) glass rod or medicine dropper 5) glass plate or steel nail.  
(Rocks for comparison: granite, shale, sandstone, compact limestone, bituminous coal.)

**Problem 1 :** What Are the Origin and Characteristics of Banded or Foliated Metamorphic Rocks?

a) Examine your specimen of gneiss. Notice the alternating parallel bands of light and dark minerals. See if you can recognize quartz, feldspar, and either a mica or hornblende in this rock. Describe the appearance and location (in which bands) of each mineral you think

you can recognize. \_\_\_\_\_

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Many gneisses are believed to originate from granite. In what respects does gneiss resemble granite? \_\_\_\_\_

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In what ways does gneiss differ from granite? \_\_\_\_\_

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b) Examine your specimen of schist. Compare the colors of the mineral bands and their thickness with those of your gneiss specimen. Describe them. \_\_\_\_\_

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See if you can recognize-at least two minerals in the schist. Name and describe them.

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Is your schist a mica schist, a hornblende schist, a talc schist, or some other? --- .. \_\_\_\_\_ .

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If schist is most commonly formed from shale, how can you account for the new minerals and the many varieties of schist? --- \_\_\_\_\_ .

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c) Examine your specimen of slate. Describe its appearance and feel. \_\_\_\_\_

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Moisten it and describe its odor. - \_\_\_\_\_ .

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Notice the "salty cleavage" of your specimen. In what way does it appear different from the bedding planes of shale? \_\_\_\_\_ .

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Slates are derived from shales. Summarize their physical similarities and differences (odor, color, hardness, smoothness, splitting).. \_\_\_\_\_ .

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**Problem 2: What Are the Origin and Characteristics of Massive Metamorphic Rocks?**

a) Quartzite and marble are massive, rather than banded or foliated like gneiss and schist.

Describe the appearance of quartzite and marble as compared with the banded rocks. - \_\_\_\_\_ ---

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