

LAB

5.2

MAPPING



Locating Igneous Rocks on Earth

Intrusive igneous rocks form beneath Earth's crust when magma cools slowly. Extrusive igneous rocks form on the surface when lava cools very rapidly. Differences in cooling rate determine the texture of igneous rocks. When magma cools slowly, it forms large crystals and coarse-grained rocks. When magma cools quickly, it forms small crystals and fine-grained rocks. When magma cools even more rapidly, such as in water, it forms extremely small crystals and glassy rocks. At times, two stages of cooling occur, forming rocks that are porphyritic. These rocks have large crystals surrounded by small crystals.

The color of igneous rocks indicates their mineral composition. Dark rocks usually contain large amounts of iron and magnesium and are called mafic. Light rocks contain large amounts of feldspar and silicon and are called felsic. Intermediate rocks are a mixture of light and dark colors.

PREPARATION

PROBLEM

How can you identify where rocks originate?

OBJECTIVES

- **Classify** igneous rocks based on texture and color.
- **Recognize** that the characteristics of rocks are linked to their formation conditions and origins.
- **Plot** the location of igneous rocks on a map.

MATERIALS

9 igneous rocks

SAFETY PRECAUTIONS



Use caution when handling rocks; edges can be sharp. Do not wear sandals during the lab procedure.

PROCEDURE

1. Observe nine igneous rock samples. Using Table 1 and Figure 1 as guides, record your observations of color, texture, and type for each sample in Table 3.
2. Using the coordinates in Table 2, match each letter with the appropriate point on the map in Figure 2. Each labeled point is the origin of a rock sample that you have observed.
3. Using your data in Table 3, match each rock (1–9) with its proper point on the map. Write the rock number next to the labeled point (A–I). It may be possible that a rock originated in several places. List each potential point of origin in Table 3.



DATA AND OBSERVATIONS

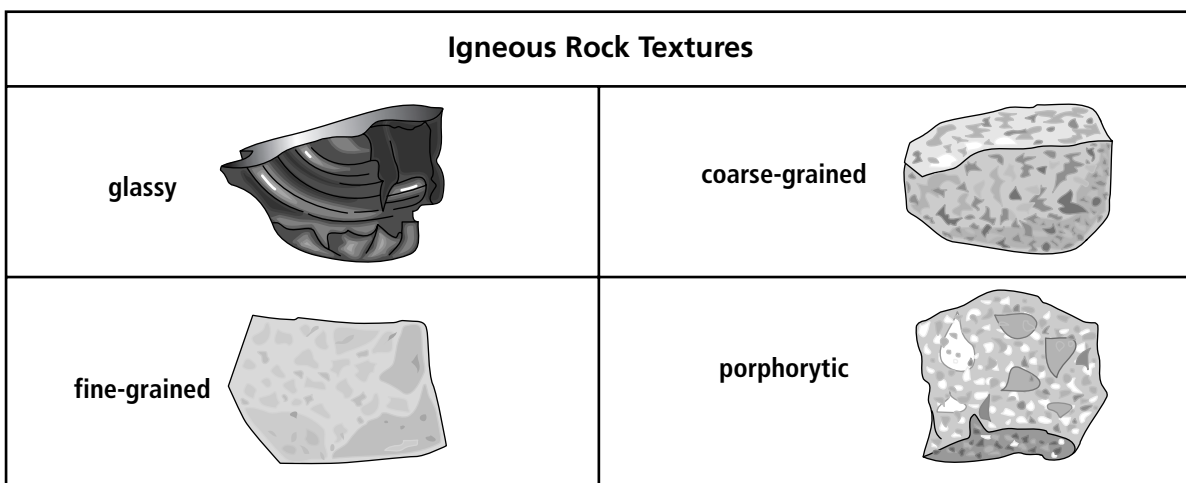
Table 1

Igneous Rock Type	Common Colors	Minerals
Felsic	white, tan, gray, pink, red	silica, quartz, orthoclase and plagioclase feldspar, some mica and hornblende
Intermediate	gray, green	plagioclase feldspar, hornblende, augite, biotite, amphibole, and pyroxene
Mafic	dark green, dark gray, black	iron, magnesium, plagioclase feldspar, augite, biotite, amphibole, pyroxene, and olivine

Table 2

Location	Latitude (N)	Longitude (W)	Depth (m)
A	21°	102°	-2.5
B	40°	120°	-195
C	27°	73°	-80 below water
D	52°	47°	-120 below water
E	17°	136°	-105 below water
F	38°	79°	-0.5
G	62°	112°	-93
H	28°	142°	-1.5
I	61°	162°	-772

Figure 1



LAB

5.2

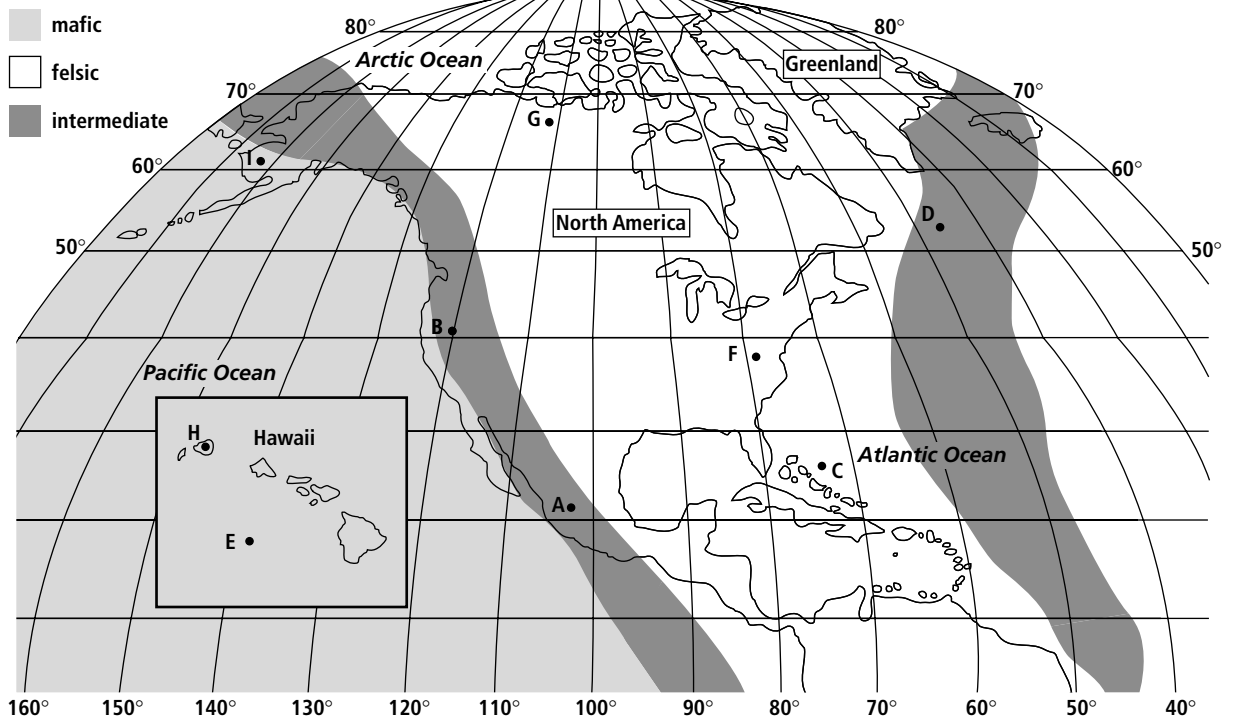
MAPPING



Table 3

Rock	Color(s)	Felsic, Mafic, or Intermediate	Texture (glassy, fine-grained, coarse-grained, or porphyritic)	Intrusive or Extrusive
1				
2				
3				
4				
5				
6				
7				
8				
9				

Figure 2



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ANALYZE

1. Where on the map is felsic rock found?

**ANALYZE, continued**

2. Where on the map is mafic rock found?

3. Where on the map is intermediate rock found?

CONCLUDE AND APPLY

1. How did you determine whether the rocks were felsic, mafic, or intermediate?

2. Explain how the texture of a rock indicates how the rock formed.

3. Hawaii is known for its beaches of black sand, while Texas has miles of beaches where the sand is as white as snow. Why do the beaches in these two states have such different types of sand? How do you think this sand was formed?

4. Extrusive rocks may be glassy, fine-grained, or porphyritic. Compare and contrast the conditions under which these rocks form.
