

Rock Classification

Answer Key

Vocabulary: classify, extrusive igneous rock, foliation, fossil, igneous rock, intrusive igneous rock, metamorphic rock, mineral, sedimentary rock, strata, texture

Prior Knowledge Questions (Do these BEFORE using the Gizmo.)

When you **classify** objects, you organize them into groups based on common characteristics.

[Note: The purpose of these questions is to activate prior knowledge and get students thinking. Students are not expected to know the answers to the Prior Knowledge Questions.]



What are some different ways you could classify these marbles?

Answers will vary. Sample answer: The marbles can be classified by size, color, or pattern.

1. What characteristics do you think scientists use to classify rocks?

Answers will vary. [Scientists classify rocks based on texture, composition, and how the rocks formed.]

Gizmo Warm-up

Rocks are classified by how they formed. The three types are:

- **Igneous rocks** form from cooling magma or lava.
- **Sedimentary rocks** form from the bonding of rock fragments such as sand, silt, or clay; from organic materials; and from chemicals dissolved in water.
- **Metamorphic rocks** form when other rocks are changed by heat and pressure.



In the *Rock Classification Gizmo™*, you will get to explore these three types of rocks. Think about how each type of rock is formed.

1. **Fossils** are the remains of ancient plants and animals. Which type of rock do you think is most likely to contain fossils? *Sedimentary*
2. **Foliation** occurs when minerals are flattened by heat and pressure. This results in a layered or banded texture. Which type of rock do you think is foliated? *Metamorphic*
3. Air pockets can form in rapidly cooling magma or lava. In which type of rock would you expect air pockets? *Igneous*

Activity A: Classifying rocks	<u>Get the Gizmo ready:</u> <ul style="list-style-type: none"> Click Reset. 	
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Introduction: You can classify rocks by examining characteristics such as **texture**. A rock's texture is determined by the sizes, shapes, and positions of the grains that make up the rock.

Goal: Classify rocks as igneous, sedimentary, or metamorphic.

1. **Summarize:** The three groups of rocks each have unique characteristics. For example, many igneous rocks have a texture of interlocking **mineral** crystals. Sedimentary rocks may have distinct layers of sediments, known as **strata**.

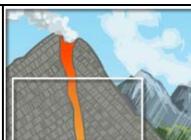
To learn other characteristics of igneous, metamorphic, and sedimentary rocks, turn on **Show common characteristics** in the CHARACTERISTICS pane. In the table below, summarize the textures that will allow you to identify and classify these rock types.

Rock type	Characteristics
Igneous	<i>Interlocking texture of grains. May display two different grain sizes. Usually dark-colored and dense. Some have vesicles (holes). Composed of crystals.</i>
Sedimentary	<i>Grains cemented together. May show presence of fossils. Usually light-colored and low density. Often show layers or bands.</i>
Metamorphic	<i>Interlocking texture of large grains. Often show foliation (layering). Sometimes show bands of light and dark colors.</i>

2. **Classify:** Select **Name** on the SIMULATION pane. Move your cursor over the rock pictures. Based on what you see, classify the rocks by dragging them into the correct box on the CHARACTERISTICS tab. Record your classifications (in pencil) in the table below.

Rock type	Rock names
Igneous	<i>basalt, gabbro, granite, pumice</i>
Sedimentary	<i>conglomerate, limestone, sandstone, siltstone</i>
Metamorphic	<i>gneiss, marble, schist, slate</i>

Click on **Status** to check your answers. If necessary, change your classifications of rocks on the Gizmo, and make any needed corrections to the table above. When you are done, click **tools** and take a **screen shot** (📷). Right-click the image, and click Copy Image, and paste the image into a blank document.

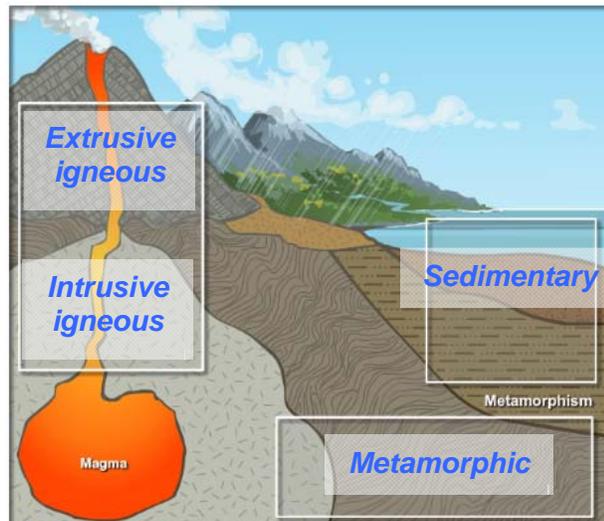
Activity B: Rock locations	<u>Get the Gizmo ready:</u> <ul style="list-style-type: none"> • Click Reset. • Select the LOCATION tab. 	
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Introduction: Igneous rocks that form under Earth's surface are called intrusive. **Intrusive igneous rocks** usually have large mineral grains because they form from magma that cools slowly. Igneous rocks that form above ground are extrusive. **Extrusive igneous rocks** have small mineral grains or no grains at all because they form from lava that cools quickly.

Question: Where do different kinds of rocks form?

1. Label: Review how the different types of rock form. On the diagram at right, label where you would expect the following types of rock to form:

- extrusive igneous rocks
- intrusive igneous rocks
- metamorphic rocks
- sedimentary rocks



Select **Show classification names** to check your labels. Correct any rock locations that you labeled incorrectly.

2. Classify: Drag the rocks from the SIMULATION pane to the correct positions on the LOCATION tab. Click on **Status** to check your placements. When you are done, click **tools** and take a **screen shot** (📷). Right-click the image, and click Copy Image. Then paste the image into your blank document.

Which rocks did you classify as extrusive and intrusive igneous rocks?

Extrusive: *Basalt*
Pumice

Intrusive: *Gabbro*
Granite

3. Analyze: What features did you use to classify igneous rocks as extrusive or intrusive?

Sample answer: I used mineral crystal size and the presence or absence of air holes.

4. Draw conclusions: Extrusive igneous rocks often have air pockets, but intrusive igneous rocks never do. Why do you think is this the case?

The pressure under Earth's surface is great enough that it would crush any forming air holes. [The gases in magma remain dissolved under high pressure.]