

Rocks Rock! Part 2

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¹ You are familiar with the metamorphosis of butterflies, the cycle that begins with an egg and goes through caterpillar to chrysalis to butterfly. You know that butterflies are metamorphic, but did you know that rocks are metamorphic as well? It's true!

² We covered igneous and sedimentary rocks in Part 1. They are related to the third type of rock. When certain processes are applied to igneous or sedimentary rocks, they become metamorphic rocks, the third type of rock found on Earth.

³ Metamorphism occurs within the Earth's crust rather than on the surface. Most metamorphism takes place from 6 to 19 miles below the Earth's surface. That means we don't see metamorphic rock nearly as often as the igneous (from lava or magma) or sedimentary (layers of pressed sediment) types of rocks.

⁴ There are three main causes of metamorphism. The first is heat, which breaks down the chemical bonds in a rock's minerals, causing them to form new minerals. This results in a new rock. The type of rock that is formed depends on the type of rock it was originally.

⁵ The second cause is pressure. The deeper inside the crust rock material is, the more it is being squeezed, resulting in a denser rock. Heat from deep within the crust -- near the mantle -- softens the dense rock, giving it folding ability. As the Earth's plates collide and move, the pressure forces the rock into new shapes.

⁶ The third cause is extremely hot, mineral-rich water. Found near magma, this water runs from 570° - 930° F. The nearby rocks not only get heated, they either gain minerals or have minerals washed away. Voilá! Once again a rock changes its structure and becomes a new rock!

⁷ Most metamorphism occurs around plate boundaries. This is called regional metamorphism. Metamorphism may also occur deep inside the Earth and under volcanoes, when magma rises up through rock layers, bringing enough heat to create new rocks. This is called contact metamorphism.

⁸ Metamorphic rocks can be divided into two groups. Foliated rocks have visible layers or bands. Gneiss (nice) is a foliated metamorphic rock that comes from granite, an igneous rock. Gneiss usually has visible bands of light and dark minerals. Nonfoliated rocks do not appear to be layered. Marble is a nonfoliated metamorphic rock that comes from limestone, a sedimentary rock. Pure marble is white. The presence of different elements causes marble to be different colors.

⁹ This may seem hard to believe, but rocks go through a cycle of change and renewal. We call it the rock cycle. It goes something like this: magma flows deep inside the Earth. It erupts as lava from a volcano. It cools and becomes igneous rock. Weathering and erosion break the igneous rock down and carry away the sediment. The sediment is deposited in layers, building up over the years. Pressure changes it to sedimentary rock. (Sedimentary rock can also erode and weather, returning to sediment again.) Sedimentary rock gets pressed deeper into the Earth. It changes into metamorphic rock. (Metamorphic rock, if it comes to the surface, can also erode and weather away.) It gets pressed still deeper into the Earth. Heat and pressure cause the rock to melt. It is magma once again, and the cycle continues.

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<p>1. Which of these is not a cause of metamorphism?</p> <p><input type="radio"/> A Mineral-rich water</p> <p><input type="radio"/> B Pressure</p> <p><input type="radio"/> C Erosion</p> <p><input type="radio"/> D High heat</p>	<p>2. Most metamorphism takes place:</p> <p><input type="radio"/> A In the water</p> <p><input type="radio"/> B Outside the Earth's crust</p> <p><input type="radio"/> C Inside volcanoes</p> <p><input type="radio"/> D Deep within the Earth</p>
<p>3. Regional metamorphism occurs under volcanoes.</p> <p><input type="radio"/> A False</p> <p><input type="radio"/> B True</p>	<p>4. Two types of metamorphic rocks exist. They are:</p> <p><input type="radio"/> A Weathered and Eroded</p> <p><input type="radio"/> B Foliated and Nonfoliated</p> <p><input type="radio"/> C Gneiss and Marble</p> <p><input type="radio"/> D Igneous and Sedimentary</p>
<p>5. The process through which rocks change is called:</p> <p><input type="radio"/> A Rock Life</p> <p><input type="radio"/> B Foliating</p> <p><input type="radio"/> C Rock Cycle</p> <p><input type="radio"/> D Erosion</p>	<p>6. The three types of rock - igneous, sedimentary, and metamorphic - all have something in common. What is it?</p> <p><input type="radio"/> A They are all made from plate boundaries.</p> <p><input type="radio"/> B They are all foliated.</p> <p><input type="radio"/> C They are all nonfoliated.</p> <p><input type="radio"/> D They all weather and erode.</p>

