

Rocks ▪ *Enrich*

Alternate Pathways

Rock can follow many different pathways through the rock cycle. Here are two examples.

Pathway 1

Between New Zealand and South America, at the bottom of the Pacific Ocean, molten material from the mantle erupts from the mid-ocean ridge. As the material comes into contact with the very cold ocean water, it cools quickly to become rock. Over time, this rock ever so slowly moves away from the mid-ocean ridge, as sea-floor spreading makes changes in the ocean floor. About 200 million years later, the rock is subducted at a deep-ocean trench. As the rock moves downward, it melts to become part of the mantle. Eventually, this melted material moves back up through the mid-ocean ridge to become rock again.

Pathway 2

Deep underground, a new rock forms as heat and pressure change its crystals and cause its grains to become foliated. Over millions of years, this rock is uplifted to become part of a mountain. Then, layers of rock above the foliated rock wear away, until it becomes exposed at the surface. Destructive forces wear it down, and its fragments are carried away by a river's swift-flowing water. Eventually, these fragments flow into the ocean. Ocean water carries the rock fragments away from the river, and they are deposited on a beach. Over time, more and more sediment is deposited there, until the fragments that came from the foliated rock become cemented into a new rock. Then more and more rock forms above this rock, until the heat and pressure change its crystals and cause its grains to become foliated.

Answer the following questions on a separate sheet of paper.

1. Which major group or groups of rocks are involved in the description of Pathway 1?
2. Make a flowchart that describes what occurs in Pathway 1.
3. Which major group or groups of rocks are involved in the description of Pathway 2?
4. Make a flowchart that describes what occurs in Pathway 2.
5. Write a description of another pathway through the rock cycle. In your description, tell how igneous rock changes to metamorphic rock, which then changes to sedimentary rock.