



## Reading 8.1 – Recycling for Earth and Cycling within Earth

What does the principle of conservation of matter say? How is this related to Earth's plates?



### *Why Do People Recycle?*

Recycling is important and has become increasingly popular in the United States. Humans produce large amounts of trash, most of which ends up in landfills. This is a problem, not only for the health of people, but also for the health of the earth and the environment. When you were young, you may have learned about recycling in school or because your family recycles at home. Recycling is the practice of reusing material for another purpose. Many people recycle newspaper, mail, and other paper, plastic containers, cardboard, bottles, and cans. By recycling, humans reduce the amount of material that ends up buried in landfills.

For example, if you were to drink a can of soda and throw the can away, it would end up going to a trash center, being compressed into a smaller volume, and then eventually being buried in the earth. Instead, after drinking the can of soda, imagine if you were to put the aluminum can in a recycling bin. The can would then go to a recycling center where it might be melted down, and the metal would be used again to form another soda can. By recycling a single can, you have (1) kept the can out of the landfill, and (2) allowed the can to be recycled to form a new product that can then be used and then recycled again. People recycle when they recognize that the Earth has limited natural resources. Items that are thrown away can never be used again, but recycling allows natural resources to be used over and over.

It is important to note that when material is taken from the Earth and used (as in the case of the aluminum soda can), if placed into a landfill, it can still be a resource on Earth. However, in its current form, it is not very useful. The materials become less accessible in landfills. If, instead, materials are recycled, they are more easily accessible and less expensive to obtain. This is analogous to the rock cycle—if one step in the cycle is changed (for example, the earth eventually cools down and less rock is being melted), this will have an effect on the rest of the cycle (less volcanism would occur, meaning new rock material would not be formed).

### *How Does the Earth Cycle?*

Cycling has been occurring for as long as Earth's plates have been subducting. Plates float on top of an almost entirely solid layer of rock. In some places, the plates move toward each other. This is called *convergence* and can occur at a subduction boundary. Other times, magma from the mantle rises up to force a space to form in the plate. This can result in the plate breaking apart, with the sides moving away from each other. This is known as *ocean floor spreading*, which you learned about in Lesson 1. You know that magma comes from the earth's interior. Magma also erupts from volcanoes. Does the earth have an unlimited supply of magma?



The earth is actually cycling its plate material and making more magma. When an oceanic plate subducts (slides underneath another plate), rock material melts and rises upward. According to the principle of conservation of matter, magma, plates, and all matter on and within the earth cannot be created nor destroyed. Therefore, while it seems that new ocean floor is forming, it is actually existing rock material beneath the surface that was melted and recrystallized to form new ocean floor plate material. At subduction zones, existing rock material moves deeper into the earth. Rock material from the interior melts and may one day form part of the ocean floor at a divergent boundary. Due to Earth processes such as convection and differences in density, the earth cycles its rock material. The rock material can take on different forms and be found in different locations.

*How Else Is the Earth Cycling?*

Water also moves through a cycle, in which the form of water can change between three phases: solid, liquid, and gas. The changing environmental conditions (temperatures rising and falling) are what moves the water through this cycle. For example, a snowstorm brings large amounts of water in the solid phase (snow and ice) to the surface of the earth out of the atmosphere. If the snow melts a week later due to an increase in air temperature, the solid water becomes liquid water. If that water collects in a lake or sits on the surface of the earth in a different reservoir, it can evaporate and become a gas or soak into the ground to become groundwater.

These are some of the ways that the Earth cycles its materials, including plates (made of rock) and water. Explain your ideas about why humans need to recycle.



Explain plate tectonics as one way that the Earth cycles.

