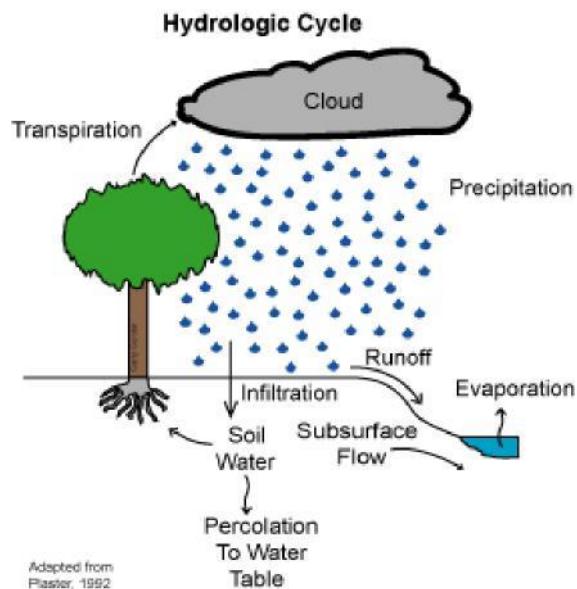


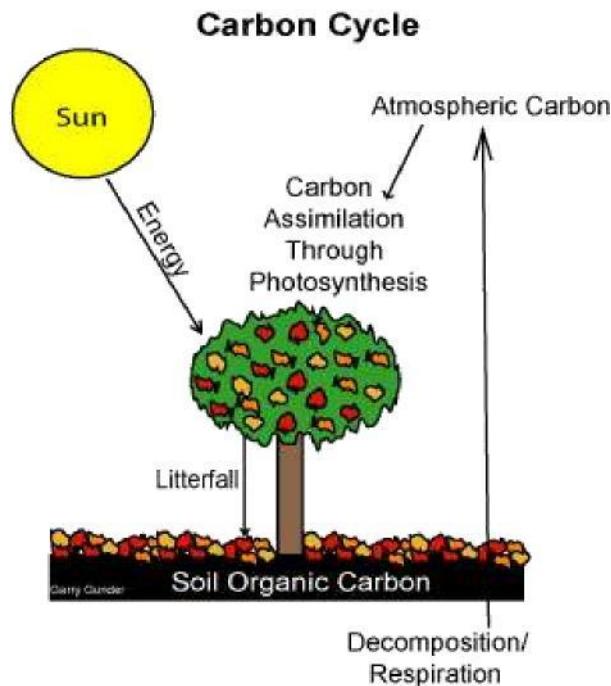
## Soil is Essential in the Hydrologic, Carbon, and Nutrient Cycles.

### The Hydrologic Cycle



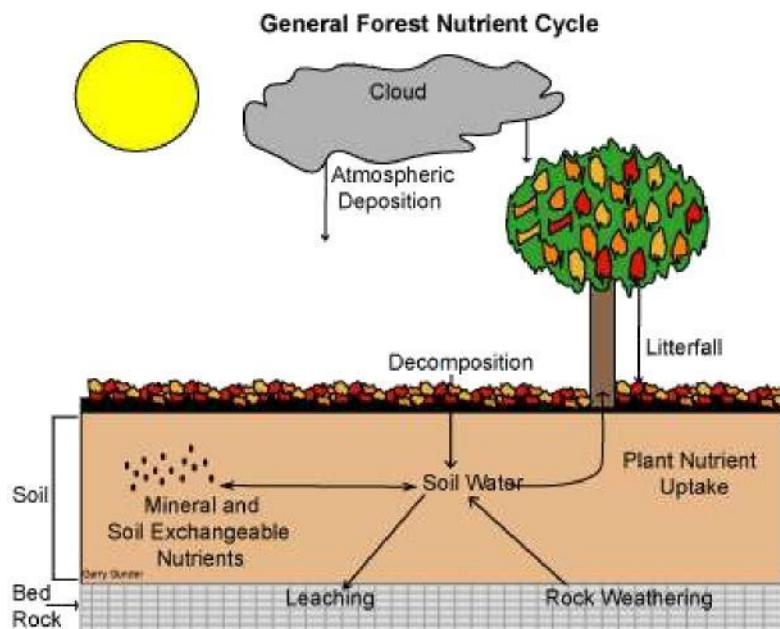
A large proportion of precipitation falling onto Earth's land surface area falls directly or indirectly onto soil. Depending on soil factors such as soil moisture status, texture, organic matter content, and soil structure, precipitation may infiltrate into soil where it may be stored for plant use. Additionally, some of the water may percolate downward through the soil or run over the soil surface (surface runoff). Percolation plays an important role in recharging groundwater aquifers, whereas surface runoff often flows directly into surface water bodies (rivers, streams, and lakes) where it may be used to support aquatic ecosystems and provide sustainable water supplies.

### The Carbon Cycle



Soil is an integral component of carbon cycling on Earth. Soil provides a medium for plant growth, thus permitting plants to assimilate carbon into their biomass through photosynthesis. Upon plant or animal death, soil organisms decompose organism remains and incorporate a portion of carbon stored within these organisms into soil to form soil organic matter or humus. A portion of carbon not incorporated into soil is released to the atmosphere as carbon dioxide ( $\text{CO}_2$ ) via decomposer respiration. Soils have a great capacity to store soil carbon in the form of soil organic matter. Therefore, proper soil management can be used to increase soil organic matter content thus reducing atmospheric  $\text{CO}_2$  concentrations. This is very beneficial because  $\text{CO}_2$  is a known greenhouse gas that contributes to global warming.

## The Nutrient Cycle



Soils have a large capacity to retain and provide nutrients for plant growth in natural or managed ecosystems. Nutrients in soils may be derived from atmospheric deposition, plant decomposition, and rock and mineral weathering. These nutrients may then be retained on clay surfaces or organic matter where they can be slowly released into soil water. Plants and other organisms can then uptake nutrients from soil water to sustain and enhance growth. However, a portion of these nutrients may be lost from soils or the plant rooting zone through a process called leaching.

For information related to The Critical Zone check out the following links: [National Critical Zone Observatory](#)  
[CZNet](#)