

Name \_\_\_\_\_

Class period \_\_\_\_\_

## Biogeochemical Cycles

### ECO 4 CDL 14

Nutrients are classified as being either available or unavailable. Nutrients are available in the biotic world in the form of living organisms and waste, but become unavailable through fossilization, forming coal, oil and peat. The burning of fossil fuels and the processes in organisms (such as respiration, decomposition, and excretion) make inorganic nutrients available in the atmosphere, soil and in water. Some of these materials are able to be cycled back into organisms through photosynthesis and digestion. Inorganic nutrients become unavailable when they are involved in the formation of sedimentary rock, making them unavailable until processes such as weathering and erosion make them available again.

**Water Cycle.** The **water cycle**, also known as the **hydrologic cycle**, describes the movement of water through an environment. **Evaporation**, in which liquid water becomes gaseous vapor, and **transpiration**, in which water vapor is released from plants, are processes that are responsible for water entering the atmosphere. Once in the atmosphere, water vapor is converted back to liquid form through **condensation**. That liquid water is then return to Earth's surface as **precipitation**, in the form of rain, sleet, or snow.

**Carbon Cycle.** The **carbon cycle** describes the flow of carbon, which is essential to the synthesis of organic matter in the biosphere. Carbon in the form of carbon dioxide resides in the atmosphere until it is absorbed by plants and converted into organic molecules through the process of **photosynthesis**. Plants are then consumed by primary consumers where the carbon enters the food web. It is later released in two forms: carbon dioxide from **cellular respiration**, which is released into the atmosphere, and as **detritus**, either from **excretion** or **decomposition**. Abiotic producers of carbon dioxide include burning of fossil fuels and wood as well as carbon dioxide released from volcanic eruptions.

The **nitrogen cycle** describes the various forms that nitrogen takes as it is cycled among the atmosphere, soil, and organisms. Nitrogen enters into organisms through **nitrogen fixation** of bacteria, which is converted into nitrogenous organic compounds, and to a lesser degree through lightning, which converts nitrogen gas into inorganic nitrogen compounds. Organic nitrogenous compounds are converted into ammonia compounds through the process of **ammonification**. The ammonia compounds are then converted into nitrates through **nitrification**. Plants assimilate

nitrates, which are then passed along to organisms that eat them. Decomposers convert amino acids and other organic nitrogenous compounds back into ammonia

### The Water Cycle

evaporation	sunny	precipitate	condenses
evaporates	clouds	vapor	atmosphere
heating	heavy	oceans	lakes
droplets	plants	hail	glaciers
runoff	snow	cycle	crystals
rain	rivers	streams	

#### **Evaporation**

On a warm \_\_\_\_\_ day, water in a glass of water seems to slowly disappear. This is because the energy from the sun is \_\_\_\_\_ the water up and turning the liquid water into water \_\_\_\_\_. This process is called \_\_\_\_\_. When the water \_\_\_\_\_ it becomes an invisible \_\_\_\_\_ in the atmosphere. Evaporation takes place all over the world but especially in the \_\_\_\_\_ and \_\_\_\_\_ where there is lots of water.

#### **Condensation**

As the water vapor rises it cools off and \_\_\_\_\_ into water \_\_\_\_\_. If the water vapor becomes extremely cold, it will form ice \_\_\_\_\_ instead of water droplets. As the water droplets or ice grow bigger and become more numerous, they form \_\_\_\_\_.

#### **Precipitation**

If water droplets or ice crystals become too \_\_\_\_\_, they don't stay in the air. They \_\_\_\_\_. Water droplets precipitates as \_\_\_\_\_ and ice crystals precipitate as \_\_\_\_\_. Sometimes the rain freezes and precipitates as \_\_\_\_\_.

#### **Runoff**

This precipitation gathers into \_\_\_\_\_ and \_\_\_\_\_ that flow down to lakes and oceans. This is called \_\_\_\_\_. Not all the water makes it back to the lakes and oceans. Some of it is used by animals and \_\_\_\_\_. some of it is frozen into \_\_\_\_\_. Eventually the animals and plants breathe the water out and the glaciers melt, releasing the water back into the water \_\_\_\_\_.