

The Water Cycle



The sun, which drives the water cycle, heats water in oceans and seas. Water evaporates as water vapor into the air. Ice and snow can sublime directly into water vapor. Rising air currents take the vapor up into the atmosphere where cooler temperatures cause it to condense into clouds. Air currents move water vapor around the globe, cloud particles collide, grow, and fall out of the sky as precipitation. Some precipitation falls as snow or hail, and can accumulate as ice caps and glaciers, which can store frozen water for thousands of years. Snowpacks can thaw and melt, and the melted water flows over land as snowmelt.



Most water falls back into the oceans or onto land as rain, where the water flows over the ground as surface runoff. A portion of runoff enters rivers in valleys in the landscape, with streamflow moving water towards the oceans. Runoff and groundwater are stored as freshwater in lakes. Not all runoff flows into rivers, much of it soaks into the ground as infiltration. Some water infiltrates deep into the ground and replenishes aquifers, which store freshwater for long periods of time. Some infiltration stays close to the land surface and can seep back into surface-water bodies (and the ocean) as groundwater discharge. Some groundwater finds openings in the land surface and comes out as freshwater springs. Over time, the water returns to the ocean, where our water cycle started.



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The Four Cycles of the Ecosystem:

Ecosystems are dynamic interactions between plants, animals, and microorganisms and their environment working together as a functional unit. Ecosystems will fail if they do not remain in balance. No community can carry more organisms than its food, water, and shelter can accommodate. Food and territory are often balanced by natural phenomena such as fire, disease, and the number of predators. Each organism has its own niche, or role, to play.



There are four parts or cycles to an ecosystem, the water cycle, food chain, nitrogen cycle and carbon cycle. If one of these are disrupted then the ecosystem can be in danger. The water cycle we mentioned above. The food chain is made up of the sun, producers (plants), consumers (animals) and decomposers (bacteria and fungi that help decompose dead objects). In the **nitrogen cycle**, nitrogen enters the food chain by means of nitrogen-fixing bacteria and algae in the soil. This nitrogen which has been 'fixed' is now available for plants to absorb. The nitrogen-fixing bacteria form nitrates out of the atmospheric nitrogen which can be taken up and dissolved in soil water by the roots of plants. Then, the nitrates are incorporated by the plants to form proteins, which can then be spread through the **food chain**. When organisms excrete wastes, nitrogen is released into the environment. Also, whenever an organism dies, decomposers break down the corpse into nitrogen in the form of ammonia. This nitrogen can then be used again by nitrifying bacteria to fix nitrogen for the plants. Finally, the **carbon cycle**, is the process through which carbon is cycled through the air, ground, plants, animals, and fossil fuels. Large amounts of carbon exist in the atmosphere as carbon dioxide (CO₂). Carbon dioxide is cycled by green plants during the process known as photosynthesis to make organic molecules (glucose, which is food).

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Activity: Build a Rain Barrel for School or Home

Step 1. Clean the barrel

Use food-quality containers, not ones that held harsh chemicals. Rinse the inside of the barrel with a mixture of 1/8 cup of bleach and 5 gallons of water to wash away food or juice remnants.

Step 2. Install a hose spigot

To install a 3/4" hose spigot, drill a 15/16" hole for the spigot threading just a few inches from the bottom of the barrel. This will provide a few inches of clearance for attaching a hose or filling a watering can and will allow for debris to settle below the outlet to reduce clogging.

Step 3. Build a platform

Concrete cinder blocks provide a strong, stable and level platform for your rain barrel. If you use more than one layer of blocks, stack them in a crisscross pattern so they won't tip over.

Step 4. Connect downspout to barrel

Position the barrel at its set height and measure where you need to cut or disconnect your downspout. Often you can disassemble the downspout at the gutter by taking out screws or drilling out rivets. If you do have to cut it off, use a fine-toothed hacksaw blade or tin snips. A flexible downspout extender makes an easy transition from the downspout to your barrel lid and eliminates the need for exact measurement because it bends and stretches to the length you need.

Step 5. Cut barrel opening

Place the downspout connection in the barrel. If your barrel comes with a lid, or if it has a sealed top, you will need to cut a hole in it.