

# 13.5 Cycling of Matter

## KEY CONCEPT

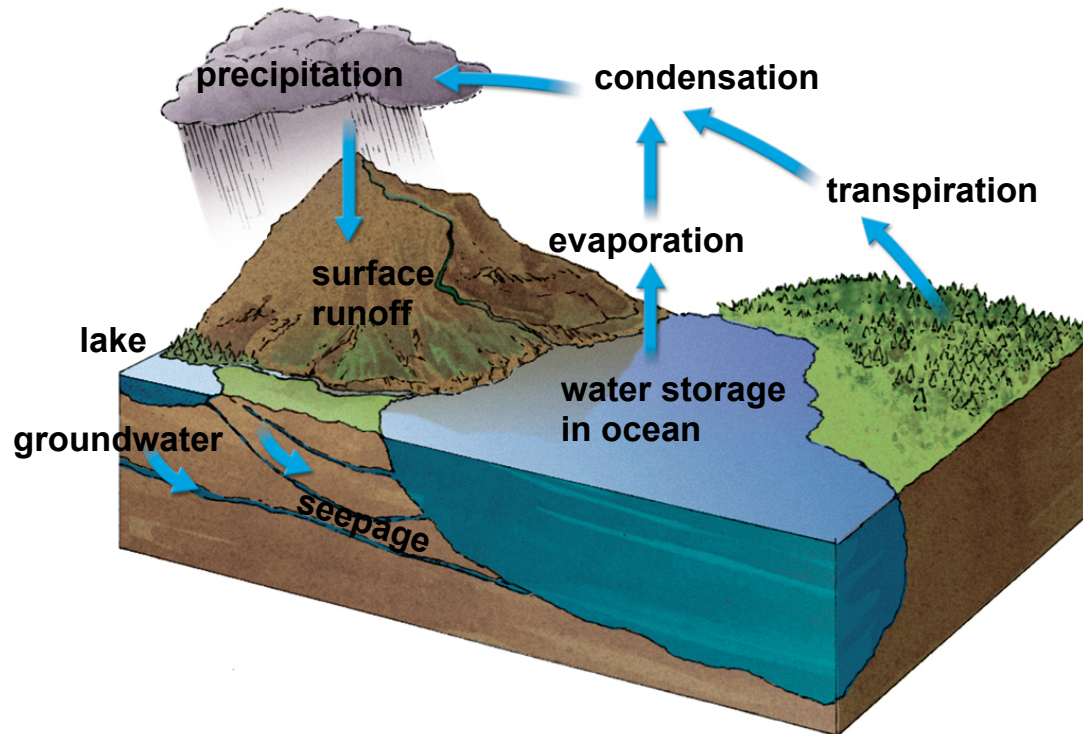
**Matter cycles in and out of an ecosystem.**



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## ▶ Water cycles through the environment.

- The **hydrologic**, or **water**, cycle is the circular pathway of water on Earth.
- Organisms all have bodies made mostly of water.

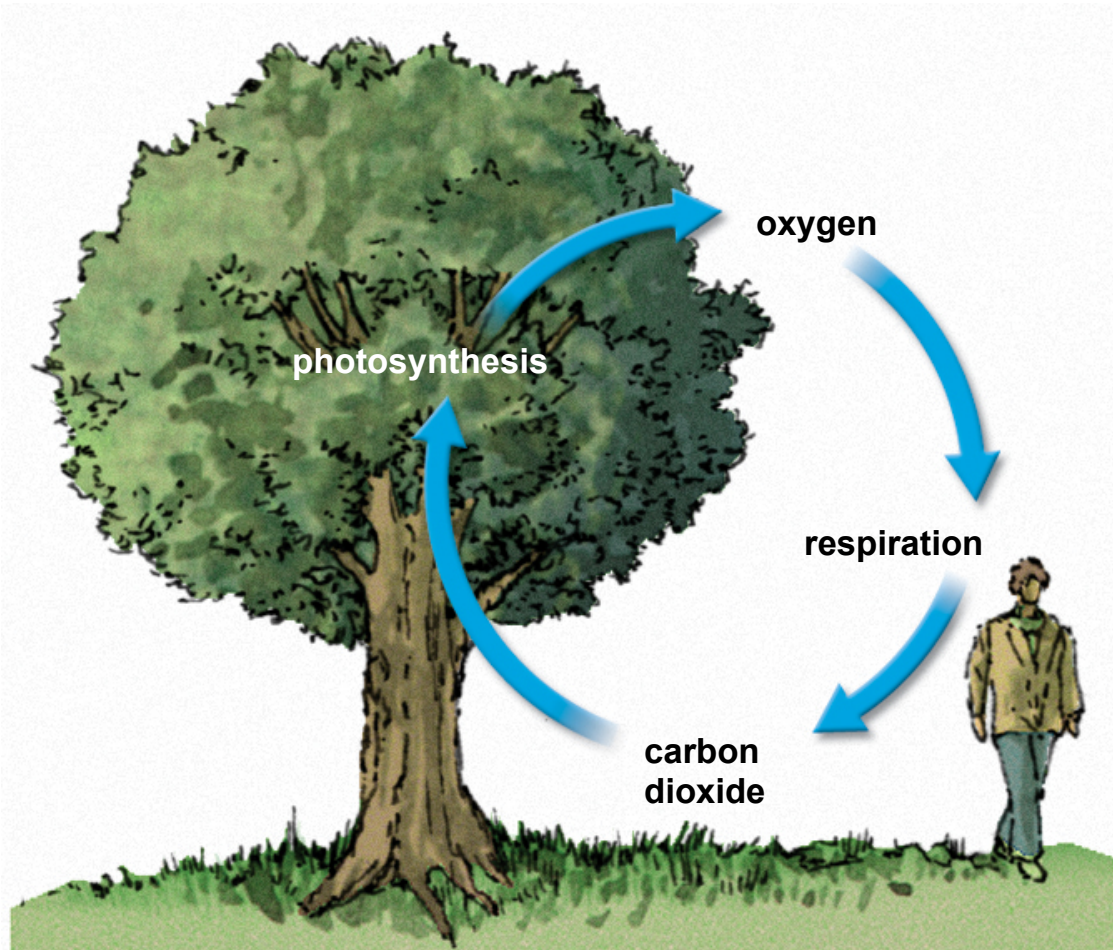


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- ▶ **Elements essential for life also cycle through ecosystems.**
  - A **biogeochemical cycle** is the movement of a particular chemical through the biological and geological parts of an ecosystem.
  - The main processes involved in the oxygen cycle are **photosynthesis** and **respiration**.

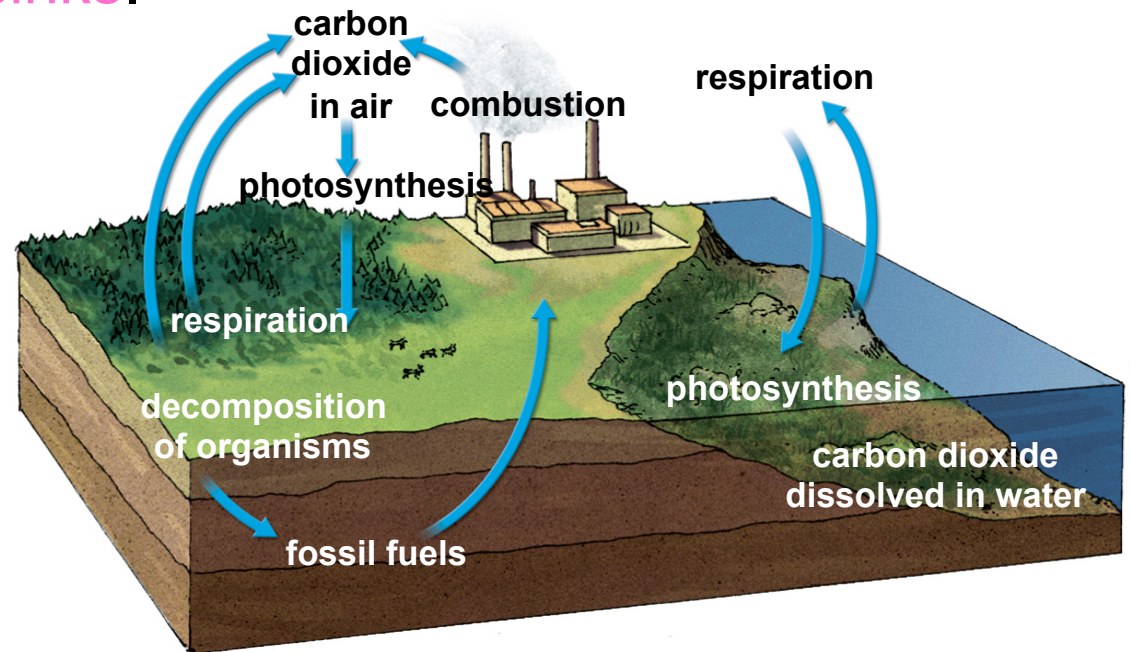
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- Oxygen cycles indirectly through an ecosystem by the cycling of other nutrients.



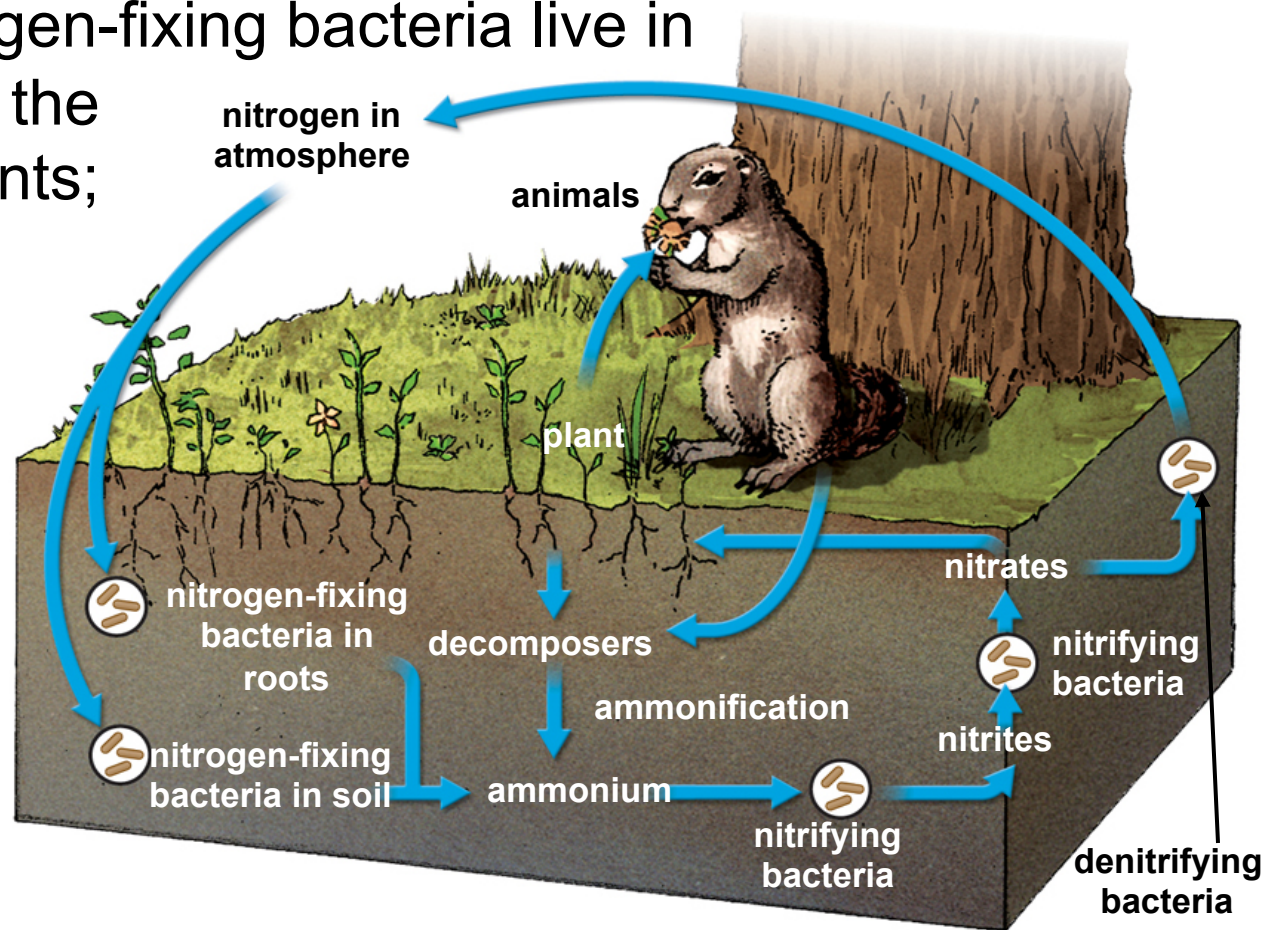
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- **Carbon** is the building block of life.
  - The carbon cycle moves carbon from the atmosphere, through the food web, and returns to the atmosphere.
  - Carbon is emitted by the burning of **fossil fuels**.
  - Some carbon is stored for long periods of time in areas called **carbon sinks**.



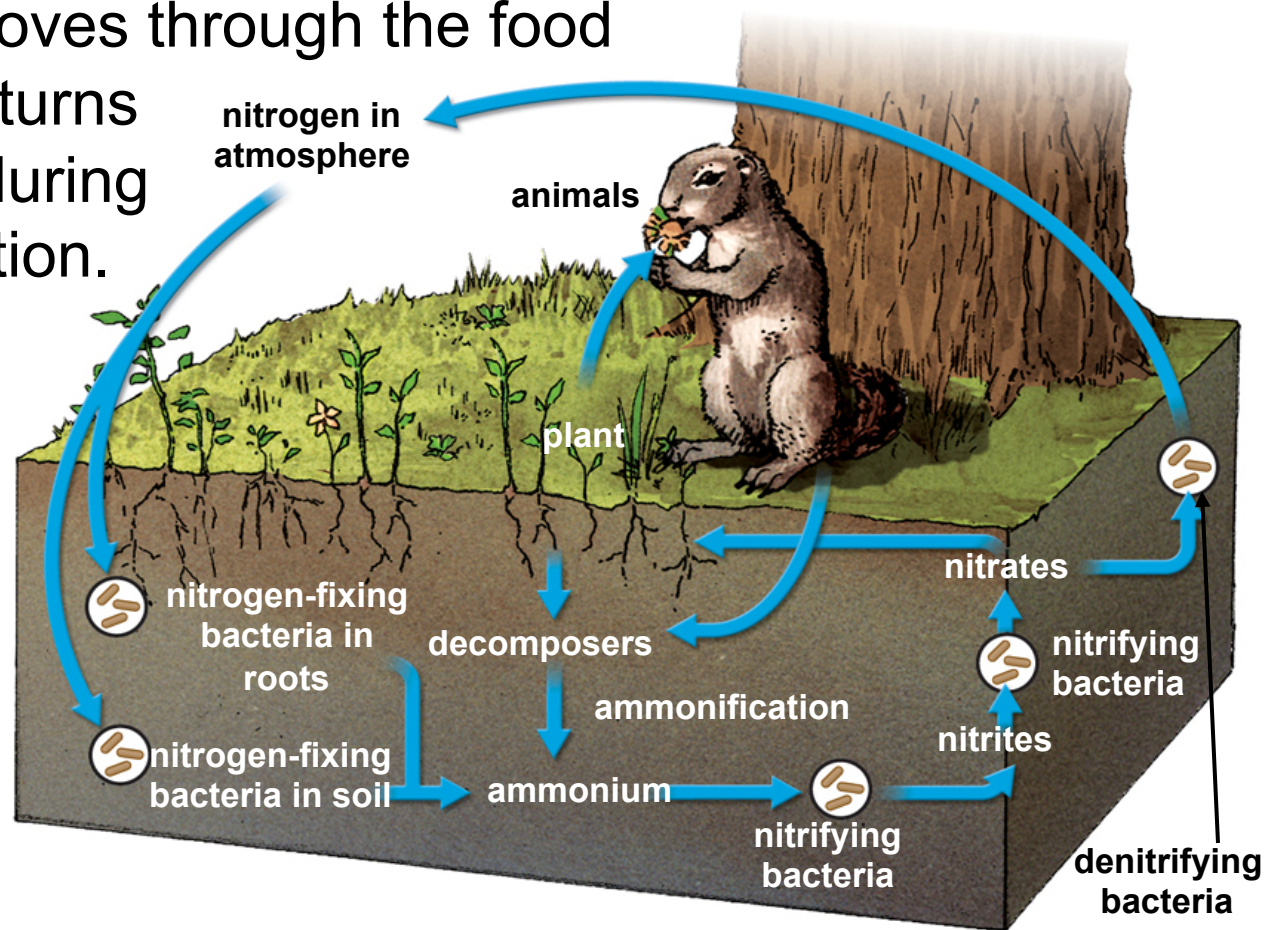
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- The **nitrogen cycle** mostly takes place underground.
  - Some **bacteria** convert gaseous nitrogen into ammonia through a process called **nitrogen fixation**.
  - Some nitrogen-fixing bacteria live in nodules on the roots of plants; others live freely in the soil.



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- Ammonia released into the soil is transformed into ammonium.
- Nitrifying bacteria change the ammonium into nitrate.
- Nitrogen moves through the food web and returns to the soil during decomposition.



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- The **phosphorus cycle** takes place at and below ground level.
  - Phosphate is released by the **weathering of rocks**.
  - Phosphorus moves through the food web and returns to the soil during decomposition.
  - Phosphorus leaches into groundwater from the soil and is locked in sediments.
  - Both mining and agriculture add phosphorus into the environment.

