

Taken from 'Investigating Terrestrial Ecosystems (Green Text)

pages 43-44

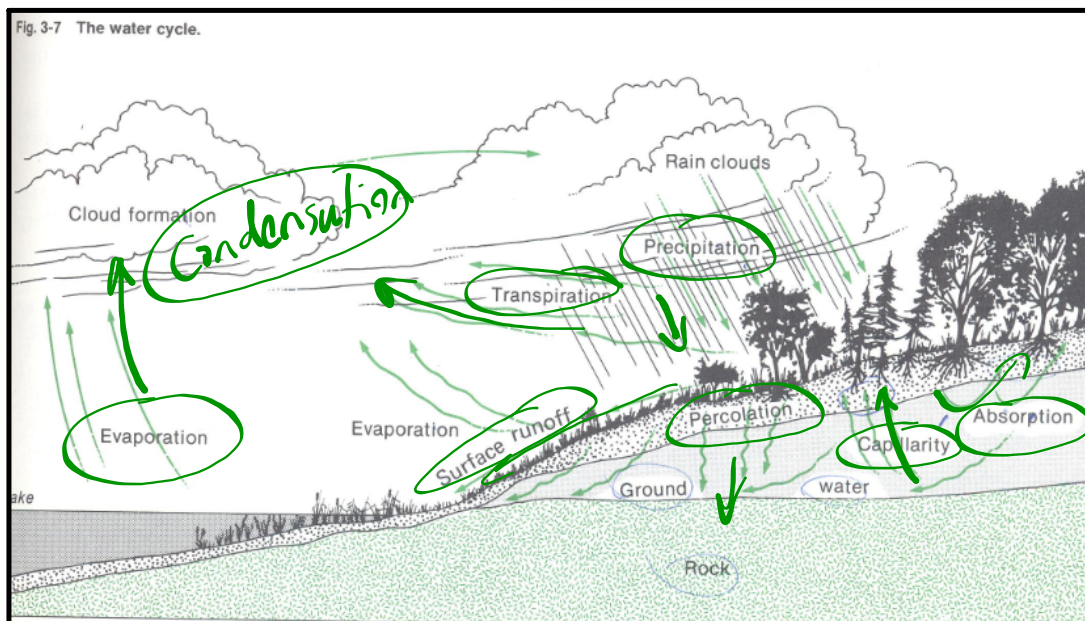
The Water Cycle

The hydrogen and oxygen atoms in water are nutrients organisms need. These nutrients are recycled through ecosystems as follows.

Water vapour enters the atmosphere through **transpiration** from vegetation. (Transpiration is the loss of water through pores in the leaves of plants.) It also enters the atmosphere by evaporating from bodies of water and the soil (Fig. 3-7). In the cool upper atmosphere this vapour condenses, forming clouds. In time, enough water collects in the clouds to cause **precipitation**. When this happens, some of the water that falls on the ground runs along the surface of the ground to a stream, pond, or other body of water. This water is called **surface runoff**. But some of the water also soaks into the ground by a process called **percolation**. Some water percolates down to the bedrock. Then it becomes **ground water** and gradually runs back to lakes and other bodies of water.

Some of the water in the soil moves up to the roots of plants by **capillarity**. The roots absorb the water. This is how most plants get the hydrogen and oxygen they need. Animals can obtain water by eating plants or by eating other animals. Of course, they can also obtain it by drinking water directly from a body of water.

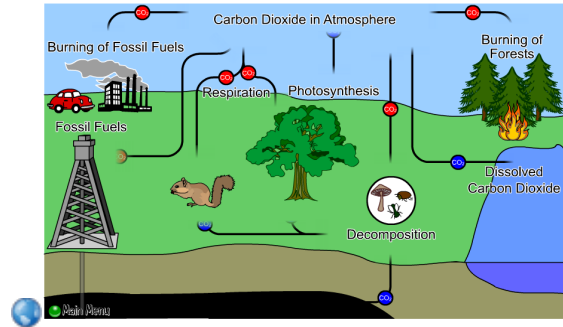
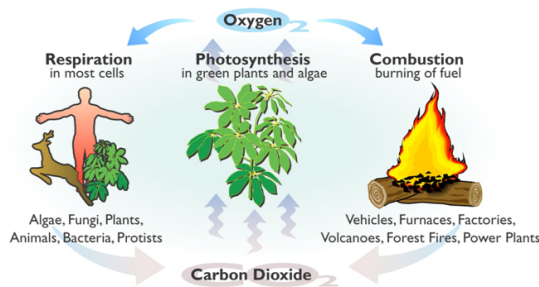
Finally, when plants and animals die, they decompose. During this process, the water in their tissues is released back into the environment.



Carbon Cycle

Carbon is needed by all living things and cycles through ecosystems.

Carbon-Oxygen Cycle

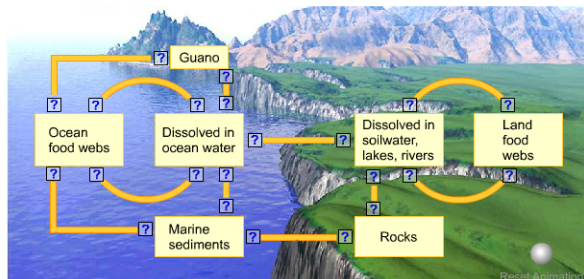


- Some organic matter does not decompose easily. Instead, it builds up in the earth's crust. Oil and coal were formed from the build-up of plant matter millions of years ago.
- At one time the carbon cycle was almost a perfect cycle. Carbon was returned to the atmosphere as quickly as it was removed. The increased burning of fossil fuels is adding carbon to the atmosphere faster than producers can remove it.

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Phosphorus Cycle

Many important molecules within cells contain phosphorous atoms. For example, ATP (adenosine triphosphate) is found in every living cell and plays a key role in energy storage and supply.



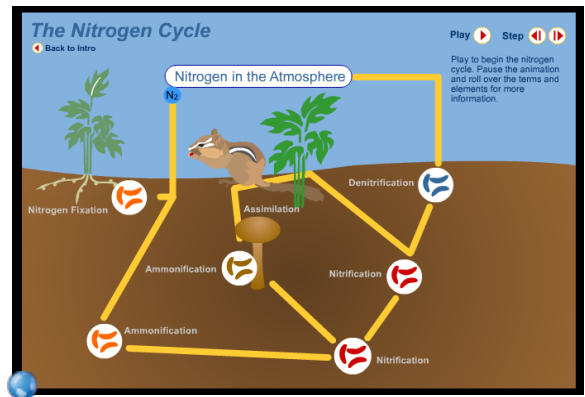
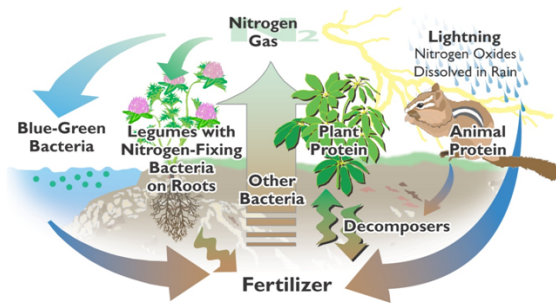
Complete this diagram by clicking on one end of each orange line to make it into an arrow that shows the direction of phosphorus flow. Mouse over the middle of a line to identify the process represented by that arrow.

Phosphorus normally occurs in water and soil in inorganic compounds. Phosphates (PO_4) are a common form. These compounds are absorbed by plants and used to make organic compounds such as ATP. When animals eat plants, phosphorus is passed on to them. When dead plants, dead animals, and fecal matter decay, organic forms of phosphorus are released into the water or soil. Bacteria decompose these organic forms into inorganic forms. Then, the cycle begins again.

Nitrogen Cycle

Nitrogen is an element essential to life. It is found in proteins, DNA (deoxyribonucleic acid), and in chlorophyll molecules.

Nitrogen Cycle



Environmental Problems Disrupting Natural Cycles by Humans

1. radioactive contamination
2. pollution of the ocean
3. depletion of fish stocks
4. use of fossil fuels
5. draining of underground aquifers
6. clearing of forests
7. use of fertilizers and pesticides

* we will look further into #1 since we in NB
rely on nuclear energy from...

WHERE???

1) Radioactive Contamination...



View of the Point Lepreau Generating Station



When Nuclear Energy Goes Wrong...

1) Fukushima, Japan (March 2011)



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Nuclear Basics

Information Library

The WNA

Home › Information Library › Safety and Security › Safety of Plants

Safety of Nuclear Power Reactors | Chernobyl Accident | Fukushima Accident 2011 | Three Mile Island accident | Tokaimura Criticality Accident | Earthquakes and Earthquakes | Liability for Nuclear Damage

Fukushima Accident 2011

(updated 2 April 2013)

- Following a major earthquake, a 15-metre tsunami disabled the power supply and cooling of three Fukushima Daiichi reactors, causing a nuclear accident on 11 March 2011.
- All three cores largely melted in the first three days.
- The accident was rated 7 on the INES scale, due to high radioactive releases in the first few days. Four reactors are written off - 2719 MWe net.
- After two weeks the three reactors (units 1-3) were stable with water addition but no proper heat sink for removal of decay heat from fuel. By July they were being cooled with recycled water from the new treatment plant. Reactor temperatures had fallen to below 80°C at the end of October, and official 'cold shutdown condition' was announced in mid December.
- Apart from cooling, the basic ongoing task was to prevent release of radioactive materials, particularly in contaminated water leaked from the three units.
- There have been no deaths or cases of radiation sickness from the nuclear accident, but over 100,000 people had to be evacuated from their homes to ensure this. Government nervousness delays their return.

