The Nitrogen Cycle
5th Grade
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References: (Checked 1/2005)

- http://www.geog.ouc.bc.ca/physgeog/contents/9s.html

Benchmarks:

SLC 13: Demonstrate an understanding of the cycling of resources on Earth, such as carbon, nitrogen and/or water
SLC 3: Identify inferences that explain or help interpret their observation

Objective:

The students will learn yet another example of an important element that is cycled through the environment. They will become familiar with the terms decomposition and nitrification.

Materials:

- Nitrogen cycle cut-outs

Initial Demonstration:

Introduce nitrogen as one more example of how things can be cycled through the environment. Discuss and define the words decomposition and nitrification. Decomposition of animals (including humans) and plants puts ammonia compounds into the soil. Animals also create wastes, which include ammonia compounds. Specialized bacteria can transform these ammonia compounds into forms that are usable for plants (nitrification). Here, a food analogy may be drawn to make this more understandable. For example, a cake requires raw eggs, but egg salad requires hard-boiled eggs. Similarly, plants can’t use ammonia in the form it takes from decomposition and waste, but they can use the form that bacteria turn it into. It may also be worthwhile to mention that atmospheric nitrogen can be pulled out of the atmosphere with the help of specialized plants that “breathe” it in and convert it to more usable forms. This process is called nitrogen fixation.

Target Observations:

- Plants and animals make waste products, or decompose after death.
- Some of these waste products include ammonia, a nitrogen-containing molecule.
- Certain bacteria can digest ammonia, while plants and animals cannot.
- Some plants can get nitrogen from the air around us.
**Target Model:**

- Bacteria digest ammonia (which plants and animals cannot) and turns it into useable forms of nitrogen for plants.
- Plants get nitrogen either from the air or from bacteria.
- Animals get their nitrogen from plants or other animals.

**Procedure:**

Give the students the nitrogen cycle cut-outs and ask them to create a nitrogen cycle based on the ideas discussed as a class.

**Nitrogen Cycle:**

![Nitrogen Cycle Diagram](image)

The sketches are then removed and students are asked to reproduce them in groups using the nitrogen cycle cut outs supplied to them.

**Target Observations:**

- Some plants get nitrogen from the air, some from the soil (from bacteria).
- Animals get their nitrogen from plants.
- Bacteria get their nitrogen from decaying plant or animal matter, as well as animal waste products.

**Target Revised Model:**

- Nitrogen cycles in the environment from plants and animals to bacteria and the air.

**Summary:**

Students are now aware that other cycles exist in nature. They have familiarity with the terms decomposition and nitrification.