



Virtual Classroom - Week #5 - Science

Mrs. Jones :)

Science assignments for **ALL** Junior High students for the week of April 20 - April 24th
2020

Welcome to week five of virtual learning here at Saint Anthonys. I know that this has been a time of trials, adjustments, patience, and hopefully personal growth for all of us. Please take the time each day to reflect, pray and look for the positive. I know that I positively miss my kiddos and can't wait to get back into the classroom!

Virtual Hugs,
Mrs. Jones :)

During our weekly Zoom meeting (Tuesday the 21st) please be prepared to take the remainder of the notes on **Chapter 4.1 Habitats and Niches**. We will begin discussing Water, Carbon and Nitrogen Cycling as it relates to our ecosystem. We will also dive deeper into the differences between an ecosystem, a habitat and a niche.

During our Zoom meeting we will also be playing another game (I'll be putting another 'twist' on an old favorite) so please be prepared by having memorized/be familiar with the ecology vocabulary words (46) from last week.

Assignment #1: Please complete the *Exploration* The BIG role of the Hippopotami at the bottom of explore 2 (this has also been assigned to you in DE). If you are able to print out the student exploration worksheet, please do so. If not, you may copy the questions and the chart on a separate piece of paper to answer all of the questions. This assignment is due on Friday, April 24th by 3 pm.

Assignment #2: Please create 3 charts or 3 illustrations that summarize each of the 3 cycles: the carbon cycle, water cycle and the nitrogen cycle. The following paragraphs (from Ducksters) are great summaries/resources for each of the 3 cycles and have them broken down really well! Please read through them and truly understand what they do. We will be going over them on Tuesday. This assignment is due on Friday, April 24th by 3 pm.

The Carbon Cycle

One of the most important elements to life on planet Earth is [carbon](#). All living organisms have carbon as the basis for life. It is so important that animals are often called "carbon-based" life forms.

How much carbon is in the human body?

Carbon makes up about 18% of the human body. So if you weigh 100 pounds, your body contains around 18 pounds of carbon.

The Carbon Cycle

Some carbon atoms are constantly moving around. This is because carbon atoms are used by all sorts of processes on our planet. Some of these processes put carbon into the atmosphere (air) and some take it out. The carbon cycle is often very tied in with the [oxygen cycle](#).

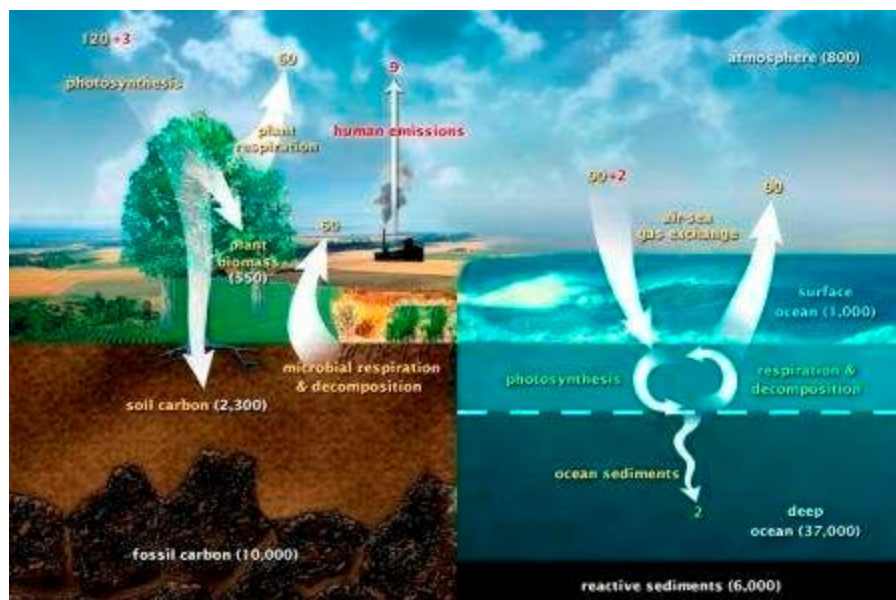


Diagram of the Carbon Cycle

Taking Carbon out of the Atmosphere

Nature is constantly taking carbon out of the atmosphere. These processes are sometimes called carbon sinks.

- Photosynthesis - Plants use [photosynthesis](#) to make energy and grow. They take carbon dioxide (CO₂), sunlight, and water and turn it into oxygen and sugar. Large areas of plants like the rainforest help to remove lots of carbon from the atmosphere.
- The ocean - Ocean water does a lot to remove excess carbon from the atmosphere. Carbon dioxide in the air reacts with the sea water to make carbonic acid in the ocean. However, if there is too much carbonic acid, it can cause acid rain, which is not good. Some carbon dioxide in the ocean is good as the carbon combines with calcium to form calcium carbonate, which is used by sea organisms to make their shells. These shells will eventually become sedimentary rock like limestone.

Moving Carbon into the Atmosphere

At the same time that some processes of nature are removing carbon from the air, other processes are adding more carbon to the air. These processes are called sources.

- Respiration (breathing) - Every time you breathe you turn oxygen into carbon dioxide. This is true of every animal on Earth.
- Decay - When plants and animals die they decay. When this happens, the carbon in their body will either be released into the atmosphere or stored in ground as fossil fuels.
- Combustion (burning) - When plants, trees, or fossil fuels are burned, carbon is released into the atmosphere.

The Carbon Cycle Balance

Carbon is essential for life and nature does a great job of balancing the carbon available through the carbon cycle. Carbon is needed in the atmosphere as well because it helps to keep the Earth warm. Without it we would all be freezing.

How Man Alters the Carbon Cycle

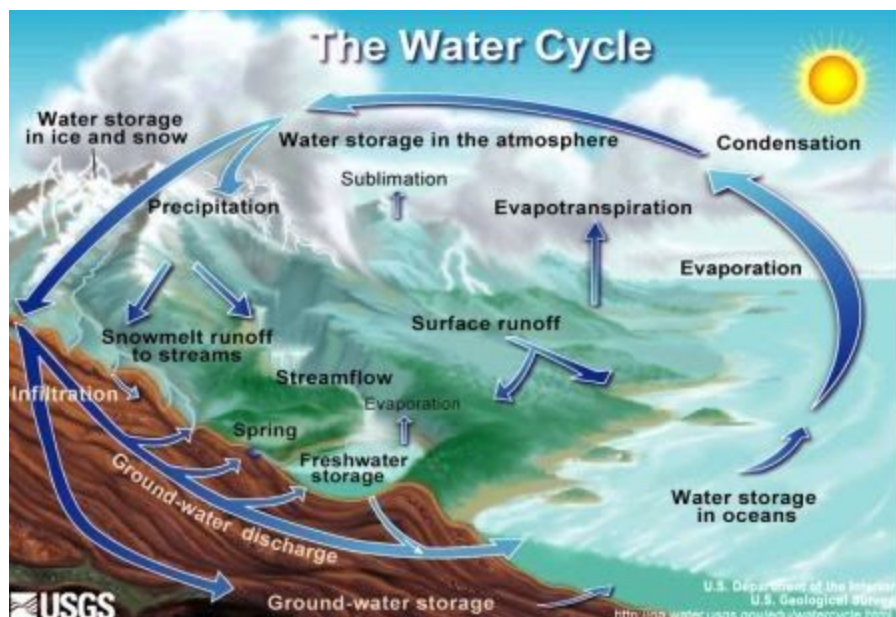
Although nature does a great job in balancing carbon through the carbon cycle, when man gets involved we can upset the balance. By burning fossil fuels like coal, gas, and

oil lots of carbon is released into the air. Also, cutting down trees for development reduces the amount of plants available to remove carbon from the air.

The Water Cycle

What is the Water Cycle?

The water cycle is a way that water moves all around the Earth. It never stops and doesn't really have a beginning or an end. It's like a big circle. We'll describe it by starting with water that's on land. For example, water that resides in the ocean or in a lake. Some water on the surface of the ocean will evaporate due to heat from the sun. When it evaporates it turns into vapor water and goes up into the atmosphere. This vapor water gets together with a lot of other vapor water and turns into [clouds](#). Clouds move about the earth with the weather and once they are so full of water they drop the water to Earth in some form of precipitation. It could be rain, snow, sleet, or hail. When the water hits the earth it may fall right back into the ocean or feed a flower or snow on the top of a mountain. Eventually this water will evaporate and start the whole cycle again.



How water goes from land to vapor in the atmosphere

There are three main ways that water on land turns into vapor:

Evaporation - This is the main process by which water goes from the ground to vapor in the atmosphere. Around 90 percent of the water vapor in the atmosphere got there through evaporation. Evaporation takes place only on the water's surface. It takes energy in the form of heat. Hot water will evaporate more easily than cold water. The sun provides a lot of the energy for evaporation in the water cycle, primarily causing evaporation from the surface of the ocean.

Sublimation - This is when water moves directly to vapor from ice or snow without ever melting into water. Good conditions for sublimation to occur is when ice or snow is in very cold conditions, but it is windy and the sun is shining.

Transpiration - Transpiration is when plants release water on to their leaves that then evaporates into vapor. Plants will release a lot of water as they grow. Around 10 percent of the water vapor in the atmosphere is estimated to come from transpiration.

Water in the atmosphere

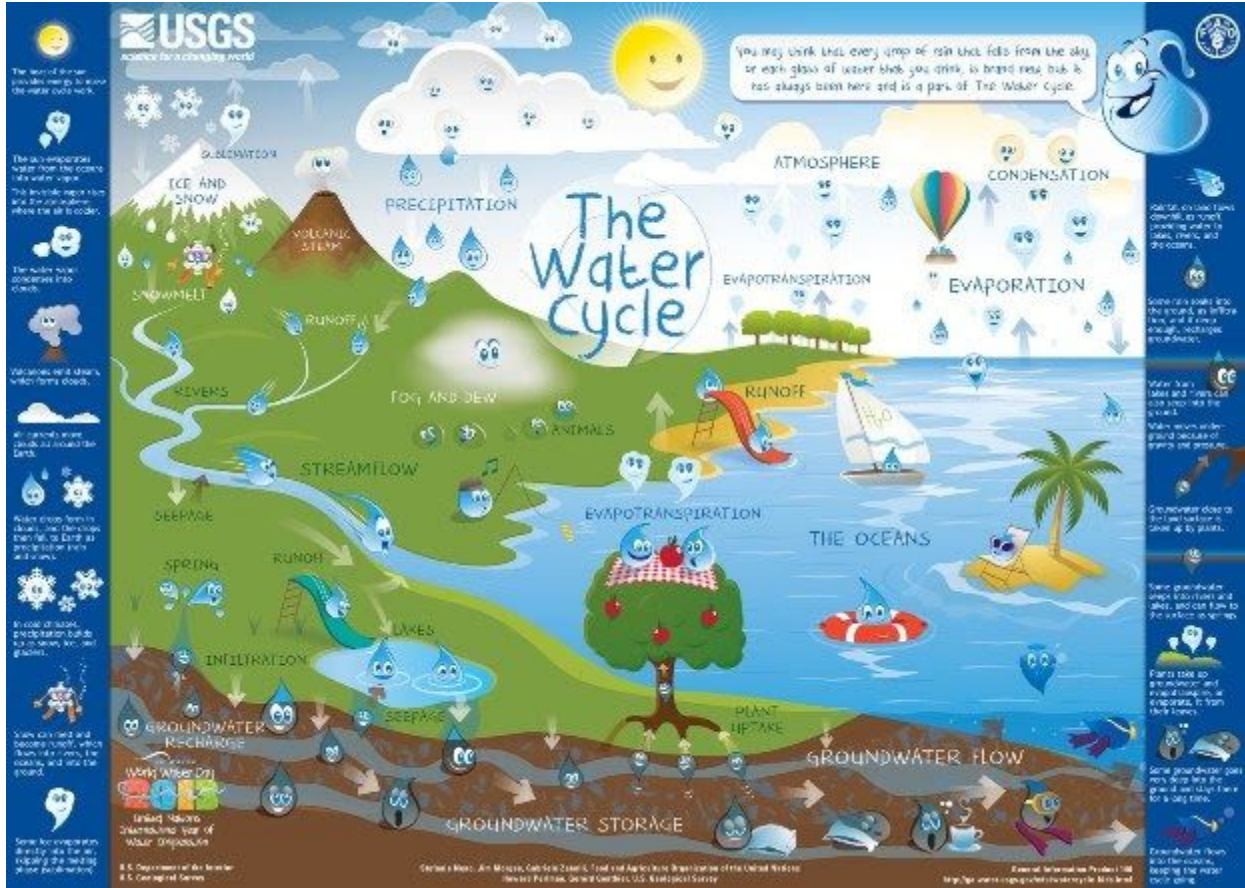
We see water in the atmosphere in the form of clouds. There is a small amount of water even in clear skies, but clouds are where water has started to condense. Condensation is the process of water vapor becoming liquid water. Condensation is a major step in the water cycle. The atmosphere helps to move water around the world. It takes water that evaporated from the ocean and moves it over land where clouds and storms form to water plants with rain.

Precipitation

Precipitation is when water falls from the atmosphere back to land. Once enough water gathers in a cloud droplets of water will form and fall to the earth. Depending on the temperature and weather this could be rain, snow, sleet, or even hail.

Water storage

A lot of the Earth's water does not take part in the water cycle very often., Much of it is stored. The Earth stores water in a number of places. The ocean is the largest storage of water. Around 96 percent of the Earth's water is stored in the ocean. We can't drink the salty ocean water, so fortunately for us, freshwater is also stored in lakes, glaciers, snow caps, rivers, and below the ground in groundwater storage.



The Nitrogen Cycle

The nitrogen cycle describes how [nitrogen](#) moves between plants, animals, bacteria, the atmosphere (the air), and soil in the ground. Nitrogen is an important element to all life on Earth.

Different Nitrogen States

For Nitrogen to be used by different life forms on Earth, it must change into different states. Nitrogen in the atmosphere, or air, is N_2 . Other important states of nitrogen include Nitrates (NO_3), Nitrites (NO_2), and Ammonium (NH_4).

Nitrogen Cycle

This picture shows the flow of the nitrogen cycle. The most important part of the cycle is [bacteria](#). Bacteria help the nitrogen change between states so it can be used. When nitrogen is absorbed by the soil, different bacteria help it to change states so it can be absorbed by plants. Animals then get their nitrogen from the plants.

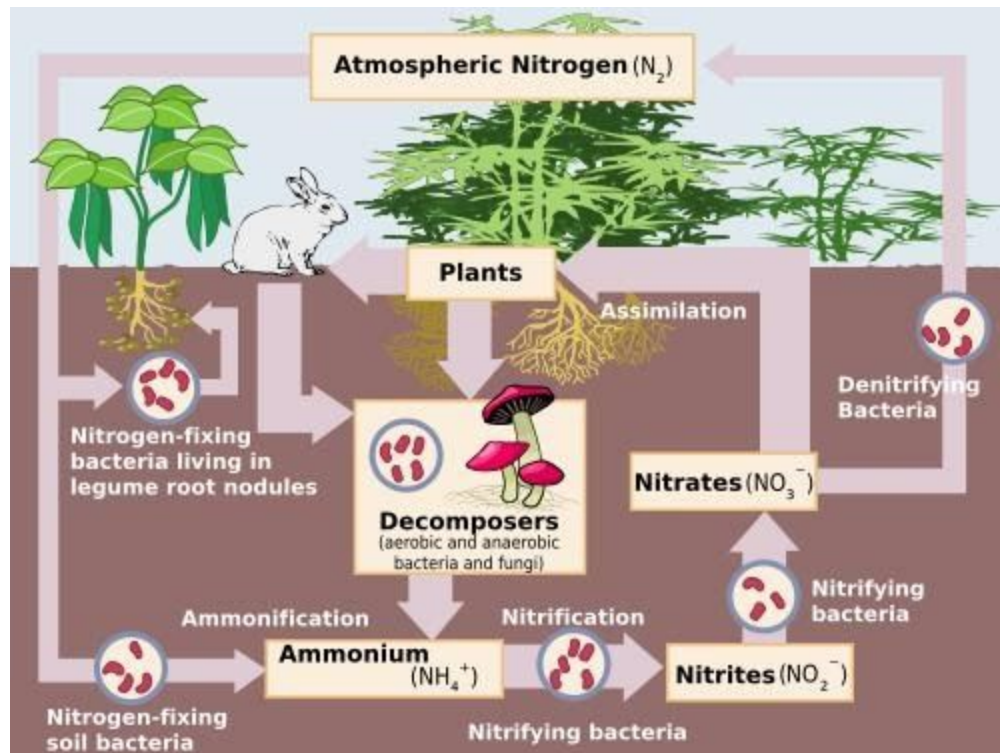


Diagram of the nitrogen cycle

Processes in the Nitrogen Cycle

- Fixation - Fixation is the first step in the process of making nitrogen usable by plants. Here bacteria change nitrogen into ammonium.
- Nitrification - This is the process by which ammonium gets changed into nitrates by bacteria. Nitrates are what the plants can then absorb.
- Assimilation - This is how plants get nitrogen. They absorb nitrates from the soil into their roots. Then the nitrogen gets used in amino acids, nucleic acids, and chlorophyll.
- Ammonification - This is part of the decaying process. When a plant or animal dies, decomposers like fungi and bacteria turn the nitrogen back into ammonium so it can reenter the nitrogen cycle.

- Denitrification - Extra nitrogen in the soil gets put back out into the air. There are special bacteria that perform this task as well.

Why is nitrogen important to life?

Plants and animals could not live without nitrogen. It is an important part of many [cells](#) and processes such as amino acids, [proteins](#), and even our [DNA](#). It is also needed to make chlorophyll in plants, which plants use in photosynthesis to make their food and energy.

How have humans altered the nitrogen cycle?

Unfortunately, human activity has altered the cycle. We do this by adding nitrogen into the soil with fertilizer as well as other activities that put more nitrous oxide gas into the atmosphere. This adds in more nitrogen than is needed by a normal cycle and upsets the cycle's balance.

Fun Facts

- Around 78% of the atmosphere is nitrogen. However, this is mostly not usable by animals and plants.
- Nitrogen is used in fertilizer to help plants grow faster.
- Nitrous oxide is a greenhouse gas. Too much of it can also cause acid rain.
- Nitrogen has no color, odor, or taste.
- It is used in many explosives.
- About 3% of your body weight is nitrogen.

Assignment #3: Complete the virtual field trip that you have been working on (I hope) for the past 3 weeks. Please feel free to turn this in and any other assignments early. It's a bit daunting on Friday afternoons to receive 100+ assignments! :) This is due by 3 pm on Friday, April 24th. *** This was originally assigned 3 weeks ago.*

PROJECT ALERT: I will be assigning a project next week that will be due on May 1st. If you need paper, poster board, cardboard, markers, foam (Kiana), clay etc. please allow your parents time to put these items on a shopping list. Please note: Shopping is **NOT** required and you may use items already in your home. Remember to continue practicing social distancing. You will have options - Your project can be a 3-D poster, model, detailed drawing or any other representation of the assignment. Details will be in my next letter. ***** See you on Tuesday at our Zoom meeting! - Mrs. Jones

