# Types of Substances

**organic**

- always contain atoms of carbon and hydrogen
- often contains atoms of nitrogen and oxygen

**inorganic**

- do not contain a combination of carbon and hydrogen

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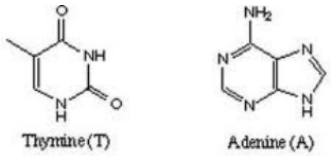
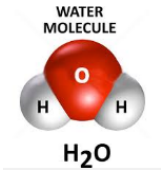
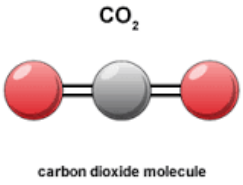
proteins
sugars
fats
} food

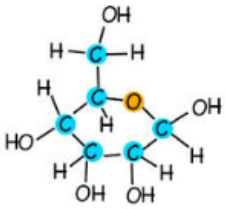
water ($H_2O$)
carbon dioxide ($CO_2$)
ammonia ($NH_3$)



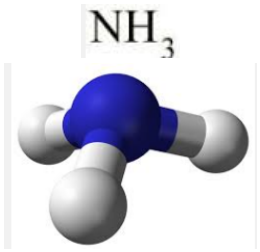




glucose



$C_6H_{12}O_6$




*__Energy__ flows through an ecosystem.

grass → grasshopper → frog

*__Matter__ cycles through an ecosystem.

# Cycling of Organic Matter

Page 50

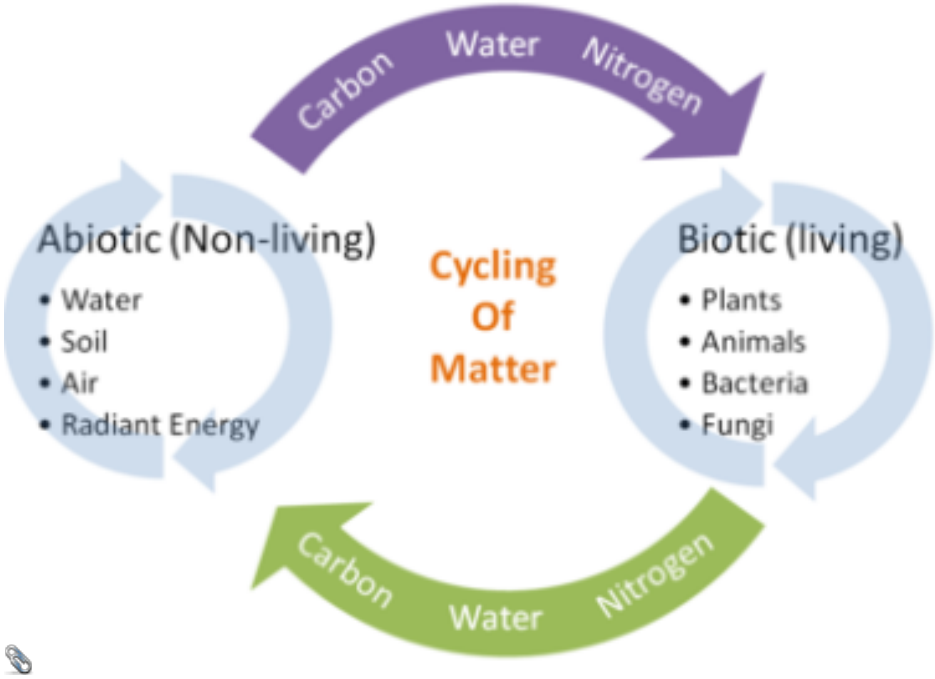
**Matter** is made up of **atoms,** takes up space and has mass.

In nature, matter is not destroyed; it is either transformed into different types of matter or moved from one location to another in processes we call **cycles**.

Matter must be recycled to maintain life on Earth.

**DO NOT COPY**

The atoms inside your body are billions of years old, having traveled through space, soil, rock, water, air, and other living organisms. In fact, it is likely that some matter inside your body was once found in a dinosaur...or its poop.



# Biogeochemical Cycles

Inorganic substances cycle through organisms, the atmosphere, the oceans, and even rocks. Since these ***chem***icals cycle through both the ***bio***logical and the ***geo***logical world, we call the overall cycles biogeochemical cycles We will study two of these cycles.

1. Carbon Cycle
2. Nitrogen Cycle

Reservoirs are those parts of a cycle where the chemical is stored in large quantities for long periods of time (ie/ the atmosphere, oceans and Earth's crust).

atmospheric carbon -> 0.039%
atmospheric oxygen -> 20.95%
atmospheric nitrogen -> 78.09%

# The Carbon Cycle

Page 62

http://safeshare.tv/w/dXDJjjuiss

Carbon is the key element in living things. Two key processes are involved in the carbon cycle: photosynthesis and cellular respiration.

## 1. Photosynthesis

carbon dioxide + water ---(light energy)---> glucose + oxygen

(from atmosphere)

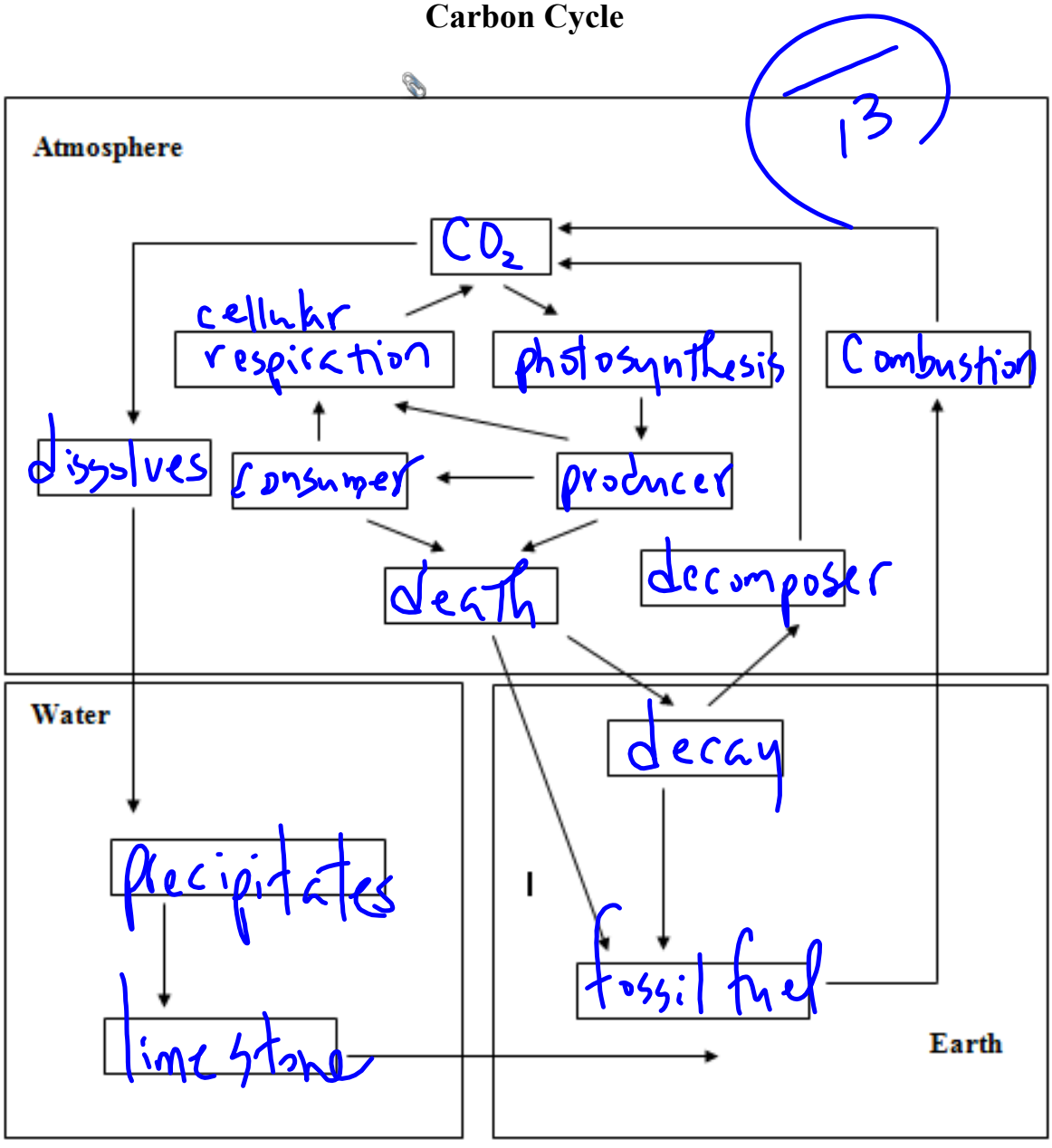
$6\ CO_2 + 6\ H_2O \xrightarrow[\text{energy}]{\text{light}} C_6H_{12}O_6 + 6\ O_2$

## 2. Cellular Respiration

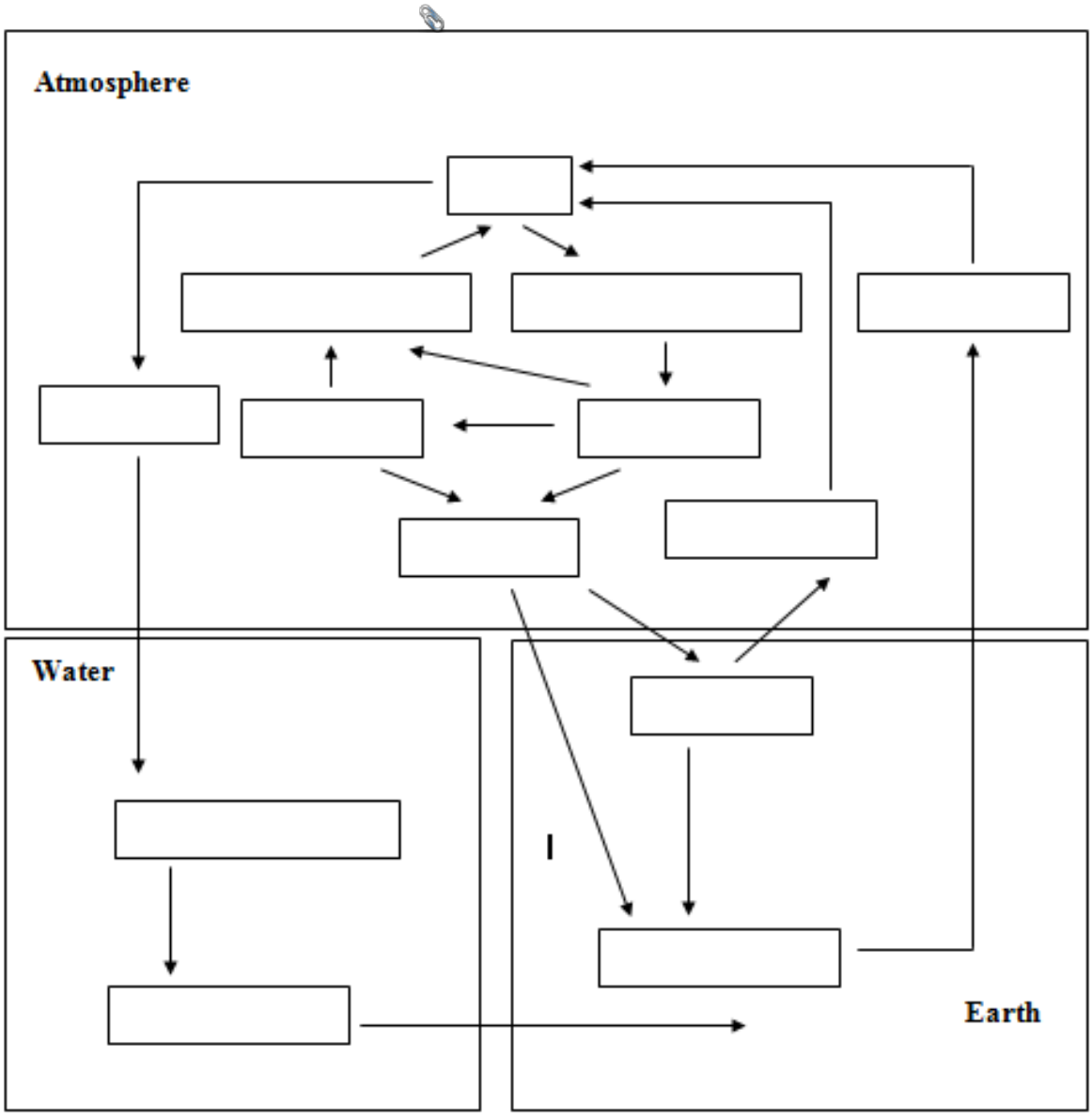
glucose + oxygen ----> carbon dioxide + water + energy

$C_6H_{12}O_6 + 6\ O_2 \longrightarrow 6\ CO_2 + 6\ H_2O + \text{energy}$

## Carbon Cycle



# Carbon Cycle



# The Nitrogen Cycle

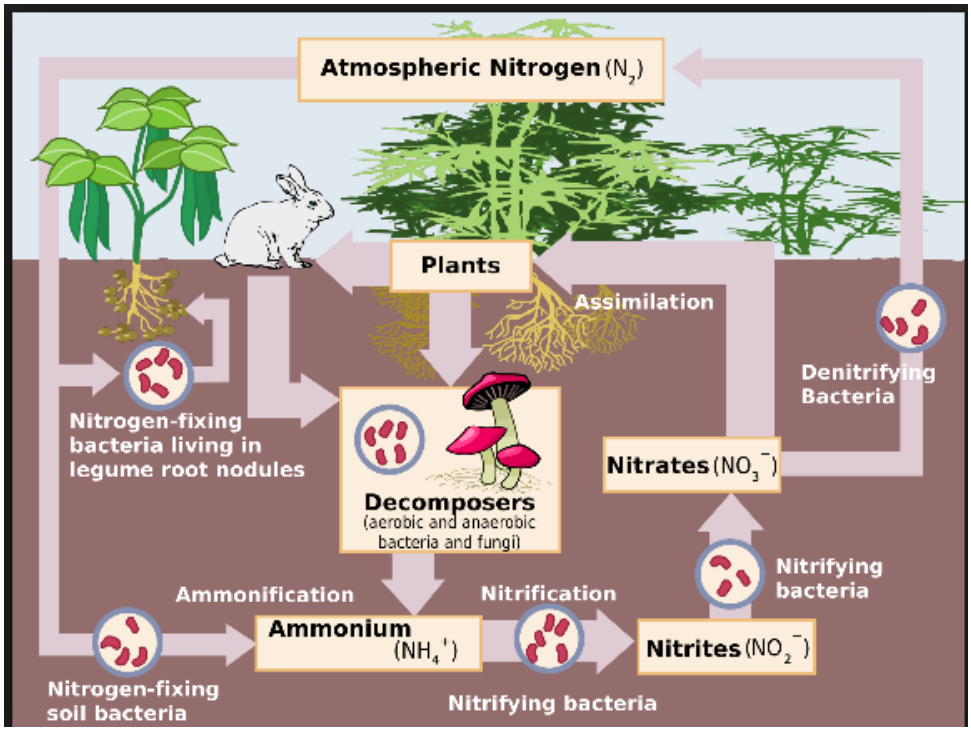
Life depends on the cycling of nitrogen. Nitrogen is required so cells can make proteins and for the synthesis of DNA*. The movement of nitrogen through ecosystems is called the nitrogen cycle and is complex.

*deoxyribonucleic acid

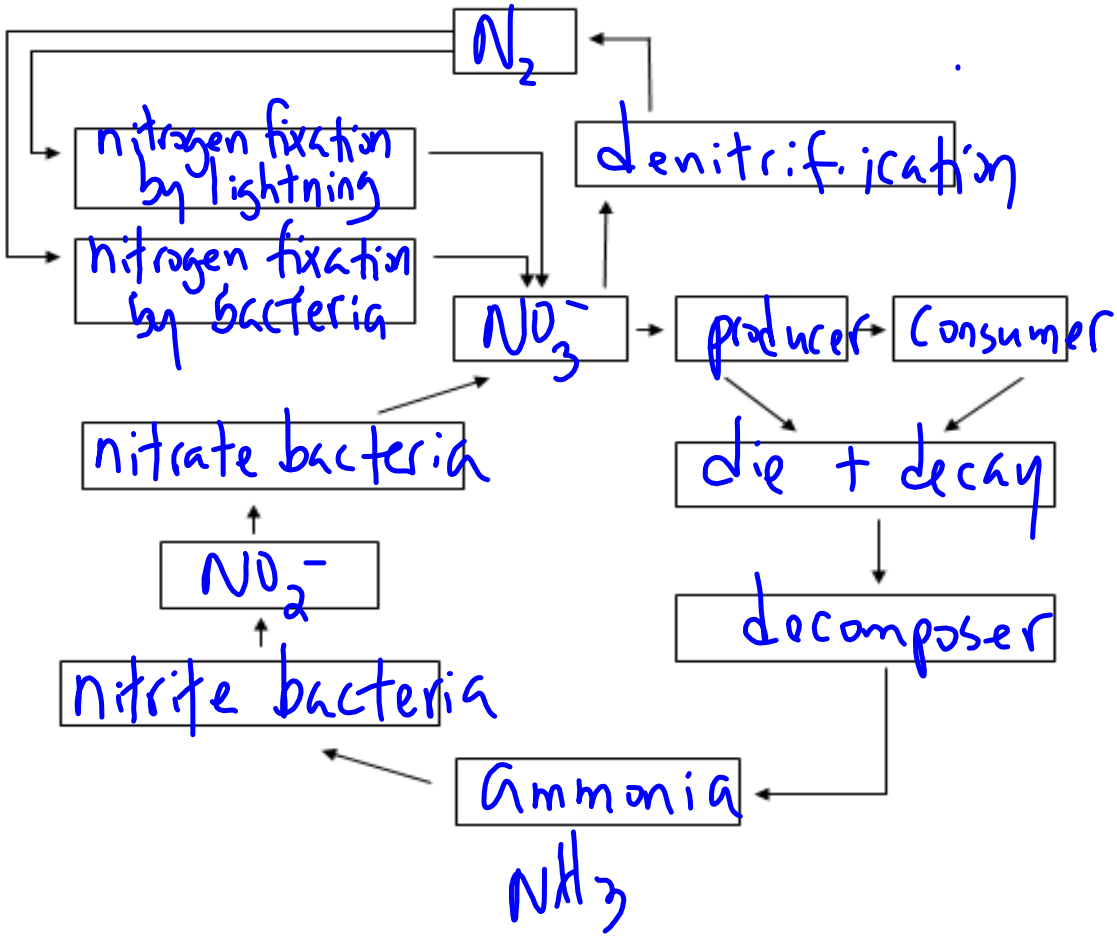
$N_2 \rightarrow NO_3^-$

To be useful to organisms, atmospheric nitrogen ($N_2$) must be supplied as nitrate ions ($NO^{3-}$). This occurs through the process of nitrogen fixation by lightning or bacteria.

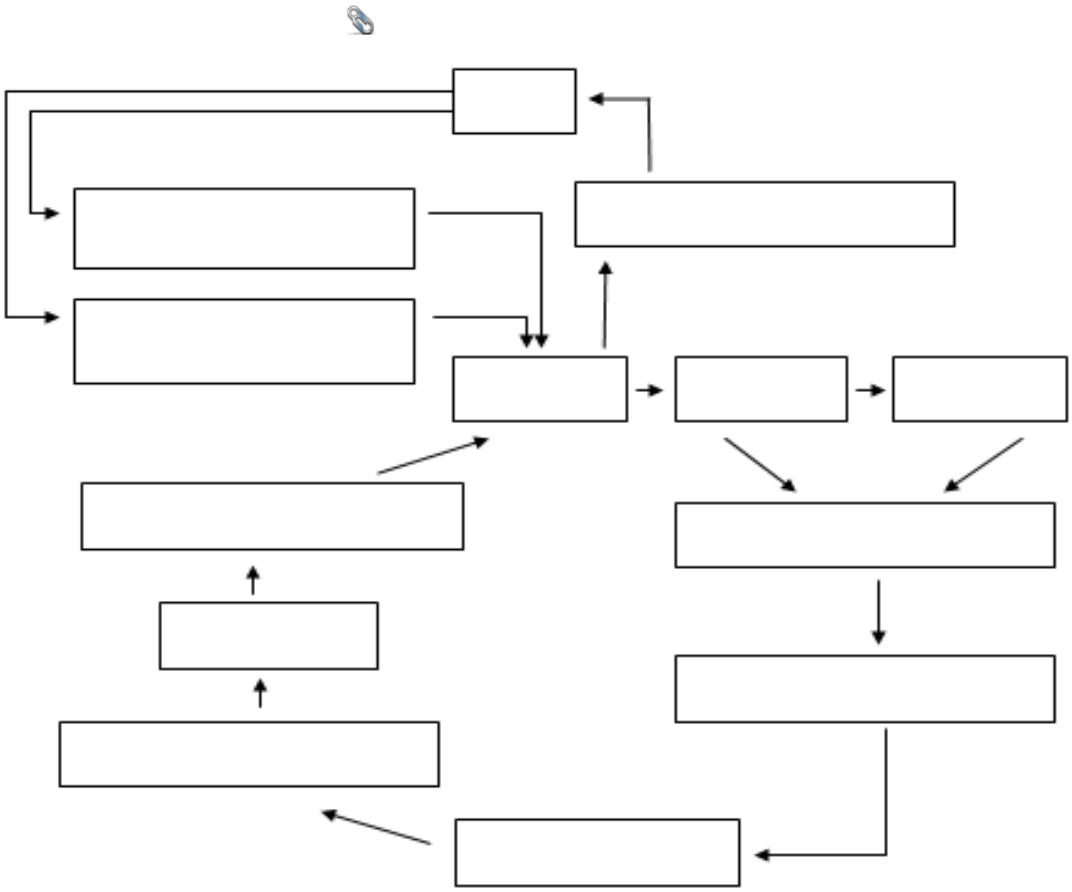
Denitrification is the process by which nitrites are broken down into nitrates by bacteria, then the nitrates are broken down into nitrogen gas. $N_2$ is then released into the atmosphere.



# Nitrogen Cycle



# Nitrogen Cycle



Attachments

Science 10 - Cycling of Matter.docx

Science 10 - Nitrogen Cycle.docx

Science 10 - Carbon Cycle.docx

Science 10 - Assignment - Indicator Species.docx

Article Review - Indicator Species.docx

borneo_cat_activity.doc

Science 10 - Bioaccumulation of Toxins.docx