



BIOGEOCHEMICAL CYCLES
COMIC STRIPS/STORY

{Living World}

INTRODUCTION

The Earth is a closed system for matter, except for small amounts of cosmic debris that enter the Earth's atmosphere. This means that all the elements needed for the structure and chemical processes of life come from the elements that were present in the Earth's crust when it was formed billions of years ago. This matter, the building blocks of life, continually cycle through Earth's systems, the atmosphere, hydrosphere, biosphere, and geosphere, on time scales that range from a few days to millions of years. These cycles are called biogeochemical cycles, because they include a variety of biological, geological, and chemical processes.

INTRODUCTION

Many elements cycle through ecosystems, organisms, air, water, and soil. Many of these are trace elements. Other elements, including carbon, nitrogen, oxygen, hydrogen, sulfur, and phosphorus are critical components of all biological life. Together, oxygen and carbon account for 80 percent of the weight of human beings. Because these elements are key components of life, they must be available for biological processes. Carbon, however, is relatively rare in the Earth's crust, and nitrogen, though abundant in the atmosphere, is in a form that is not useable by living organisms.

INTRODUCTION

The biogeochemical cycles transport and store these important elements so that they can be used by living organisms. Each cycle takes many different pathways and has various reservoirs, or storage places, where elements may reside for short or long periods of time. Each of the chemical, biological, and geological processes varies in their rates of cycling. Some molecules may cycle very quickly depending on the pathway. Carbon atoms in deep ocean sediments may take hundreds to millions of years to cycle completely through the system. An average water molecule resides in the atmosphere for about ten days, although it may be transported many miles before it falls back to the Earth as rain.

INTRODUCTION

Biogeochemical cycles are subject to disturbance by human activities. Humans accelerate natural biogeochemical cycles when elements are extracted from their reservoirs, or sources, and deposited back into the environment (sinks). For example, humans have significantly altered the carbon cycle by extracting and combusting billions of tons of hydrocarbons in fossil that were buried deep in the Earth's crust, in addition to clearing vegetation that stores carbon. Global release of carbon through human activities has increased from 1 billion tons per year in 1940 to 6.5 billion tons per year in 2000. About half of this extra carbon is taken up by plants and the oceans, while the other half remains in the atmosphere.

INTRODUCTION

In addition to carbon cycle, humans have altered the nitrogen and phosphorus cycles by adding these elements to croplands as fertilizers, which has contributed to over-fertilization of aquatic ecosystems when excess amounts are carried by runoff into local waterways.

INTRODUCTION

Researchers are trying to understand all of the various pathways and flows of each of the biogeochemical cycles in order to understand how human activities affect these cycles. While many important processes have been understood for more than century, there are many phenomena that scientists are just beginning to investigate. Satellite technology, among other tools, has revealed new information about interactions between the oceans and atmosphere that contribute to knowledge about the carbon cycle, but there remain many unanswered questions.

ASSIGNMENT

You will be creating a comic strip or story for each of the biogeochemical cycles. There will be a total of 5 stories!!!

THEY NEED TO BE....

- **Educational**
- **Colorful**
- **Funny and entertaining!**

NOTE

You may work with partner, but you BOTH need to know the cycles for the quiz on next Block Day. Use the Notes provided on google classroom to help you make your comics and study for the quiz.

The more colorful, entertaining and funny your assignment is, the better your grade will be

You will have daily check-ins with your teacher. You will receive a grade up to 10 formative points, everyday based on your progress towards the daily goal.

- **Start Hydrologic Cycle**



- **Finish Hydrologic Cycle**
- **Start and Finish Carbon Cycle**

DAY
2

- **Start and Finish Nitrogen Cycle**

A glass hourglass is the central focus, with thick white smoke or vapor rising from its top bulb and swirling around it. The background is dark and textured, possibly representing a forest or a natural setting. The overall mood is mysterious and scientific.

Day 3

● Start and Finish Sulfur Cycle



DAY 4

● Start and Finish Phosphorus Cycle

DAY 5



- You will present your favorite story (pick only 1)
- After 40 mins you will have a quiz on the Biogeochemical cycles



KEEP
CALM
TODAY
IS THE
LAST DAY