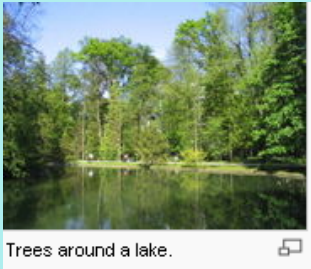
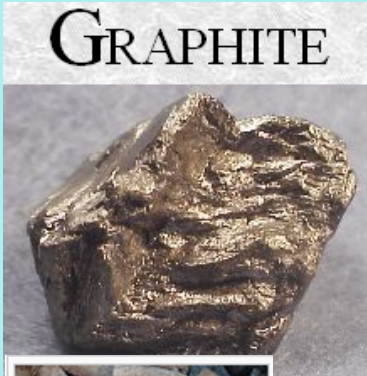


SCIENCE 10 - Lesson 17

STUDENT LEARNING TARGET

WHAT AM I GOING TO LEARN?	HOW WILL I SHOW WHAT I KNOW?	HOW WILL I KNOW HOW WELL I AM DOING – WHAT ARE MY LOOK-FORS?
<p>I AM GOING TO LEARN ABOUT:</p> <p>1.THE CARBON CYCLE</p> <p><u>WHY:</u></p> <p>1. TO HAVE AN UNDERSTANDING OF THE CARBON CYCLE</p>	<p>I WILL USE A PENCIL AND PAPER TO COMPLETE ANSWERS TO THE QUESTIONS ASKED AND /OR RESPOND ORALLY TO THE TEACHER</p>	<p>1. I HAVE ANSWERED THE QUESTIONS IN ASSIGNMENT 17.</p>

WHAT DOES EACH OF THESE HAVE IN COMMON?



IS EACH EXAMPLE OF CARBON -CONTAINING MATERIAL ALWAYS BEEN IN THE SAME FORM?



Lesson 17 - The Carbon Cycle.notebook

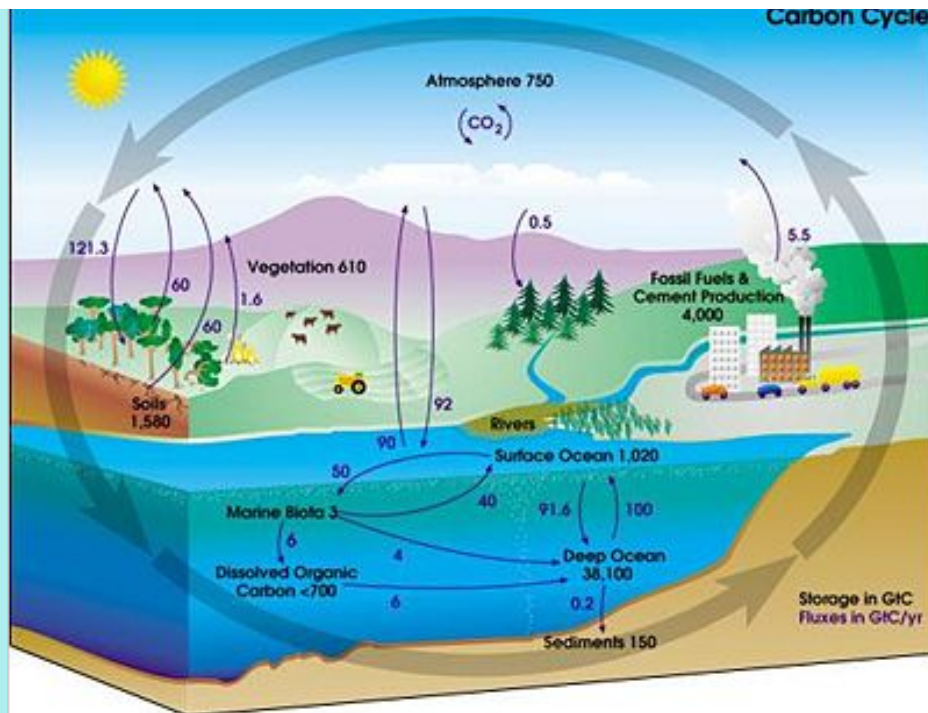
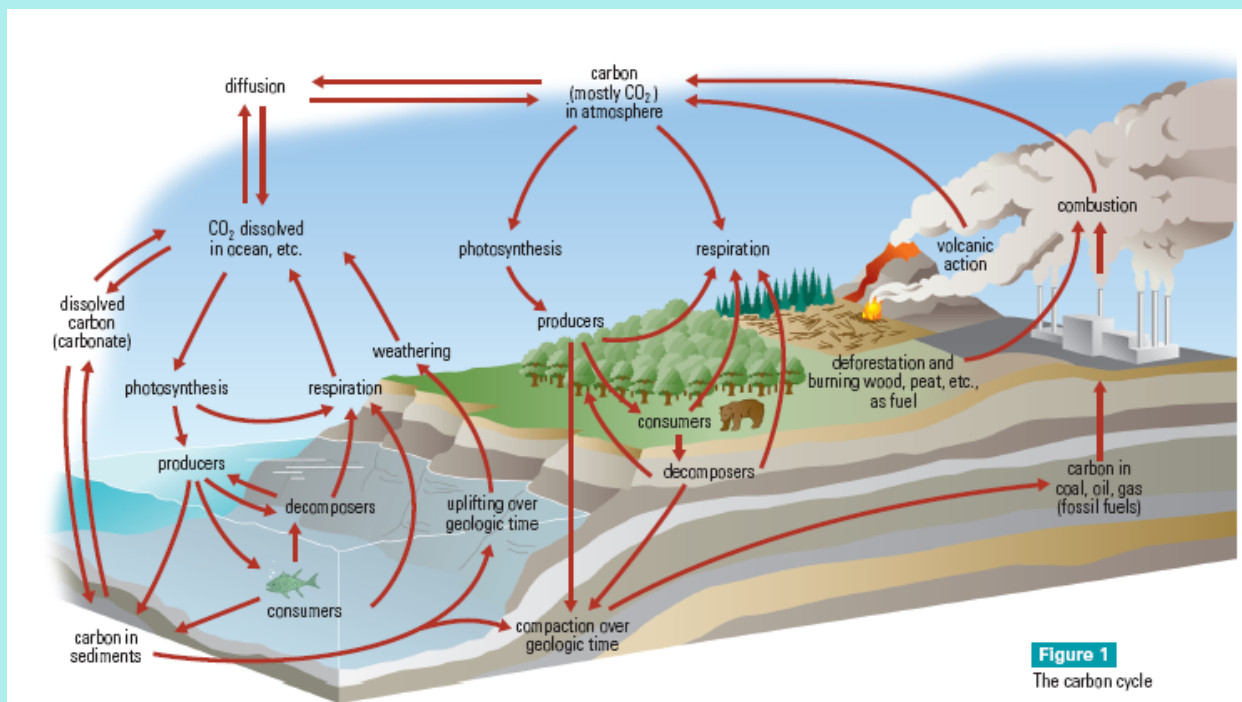


Diagram of the carbon cycle. The black numbers indicate how much carbon is stored in various reservoirs, in billions of tons ("GtC" stands for GigaTons of Carbon and figures are circa 2004). The purple numbers indicate how much carbon moves between reservoirs each year. The sediments, as defined in this diagram, do not include the ~70 million GtC of carbonate rock and kerogen



The relative lengths of time Carbon is involved in the various parts of the cycle:

INORGANIC

- a) (soil 25 -30 years)
- b) oceans 1500 years,
- c) rocks (millions of years)

ORGANIC

- a) lifetime of living body
- b) many years in a bog
- c) millions of years as fossil fuels)

THE CARBON CYCLE

❖ **CARBON IS A KEY ELEMENT FOR LIVING THINGS.**

❖ **EACH YEAR, ABOUT 50 TO 70 BILLION TONNES OF CARBON FROM INORGANIC CARBON DIOXIDE ARE RECYCLED INTO MORE COMPLEX ORGANIC SUBSTANCES.**

❖ **THIS IS DONE THROUGH PHOTOSYNTHESIS.**

❖ **DURING PHOTOSYNTHESIS, PLANTS USE LIGHT ENERGY TO COMBINE CARBON DIOXIDE FROM THE ATMOSPHERE AND WATER FROM THE SOIL TO PRODUCE SUGAR (GLUCOSE) AND OXYGEN.**

❖ **CARBON DIOXIDE + WATER + LIGHT ENERGY → GLUCOSE + OXYGEN**

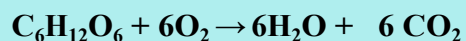


❖ MOST LIVING THINGS USE OXYGEN TO BREAK DOWN SUGARS, THEIR SOURCE OF ENERGY.

❖ CARBON DIOXIDE AND WATER ARE RELEASED AS THE SUGARS ARE BROKEN DOWN.

❖ THIS PROCESS IS KNOWN AS CELLULAR RESPIRATION -

❖ SUGAR + OXYGEN → WATER + CARBON DIOXIDE + ENERGY



❖ SO AS YOU CAN SEE THERE IS A COMPLEMENTARY CYCLE HERE AND THE FORMULAS ABOVE ARE EXACTLY THE REVERSE OF EACH OTHER.

BECAUSE CARBON IS CYCLED REPEATEDLY THROUGH BOTH PROCESSES, IT IS CALLED THE CARBON CYCLE

- ❖ **PLANTS STORE THE SUN'S ENERGY IN GLUCOSE MOLECULES.**
- ❖ **ANIMALS EAT PLANTS AND GET THEIR ENERGY WHEN THIS GLUCOSE IS BROKEN DOWN DURING CELLULAR RESPIRATION.**
- ❖ **CO₂ IS RELEASED INTO THE AIR FOR PLANTS TO REUSE IN PHOTOSYNTHESIS.**
- ❖ **PLANTS PRODUCE OXYGEN THAT IS NEEDED FOR ANIMALS TO BREATHE AND BREAK DOWN SUGAR.**
- ❖ **NOTE THAT PLANTS ALSO BREAK DOWN SUGAR BECAUSE THEY NEED ENERGY AS WELL TO MAINTAIN LIFE WITHIN THEIR CELLS.**

❖ A TREMENDOUS AMOUNT OF INORGANIC CARBON IS STORED IN THREE MAIN AREAS:

- 1) THE ATMOSPHERE
- 2) THE OCEANS
- 3) THE EARTH'S CRUST

❖ ONLY ABOUT .03% OF EXISTING CARBON IS IN THE AIR WE BREATHE.

❖ THE LARGEST STORAGE OF INORGANIC CARBON IS FOUND IN INORGANIC ROCK, SUCH AS LIMESTONE.

❖ LARGE RESERVOIRS OF ORGANIC CARBON OCCUR IN LIVING THINGS AND EVENTUALLY RETURN TO THE CYCLE BY DECOMPOSITION

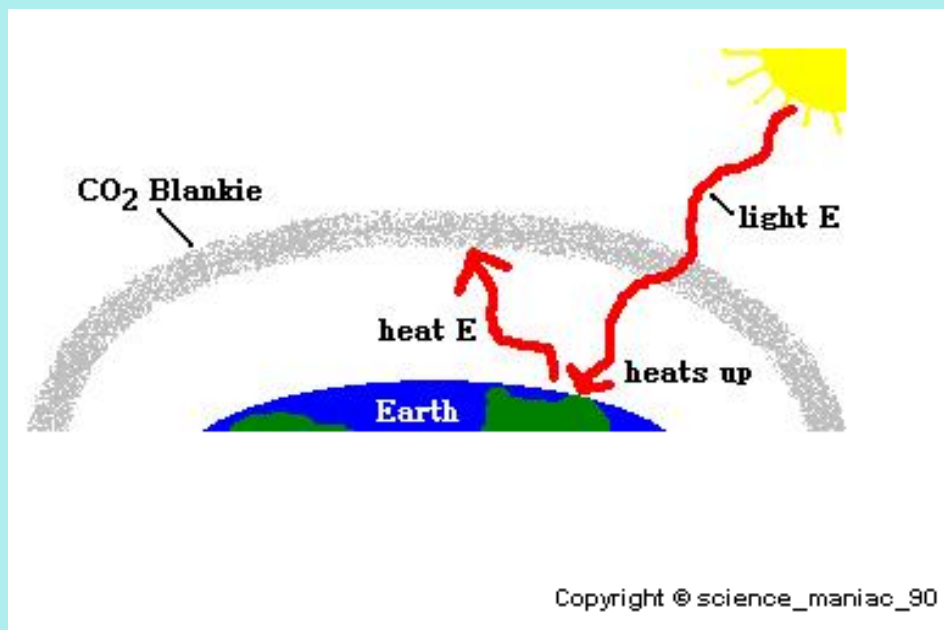
❖ ORGANIC CARBON CAN ALSO BE STORED IN BOG MANY YEARS BECAUSE THERE IS VERY LITTLE OXYGEN TO DECOMPOSE DEAD PLANT MATTER

❖ **THIS IS ALSO HOW WE GET OUR FOSSIL FUELS SUCH AS OIL, GAS, AND COAL WHEN SLOWLY DECAYING ORGANIC MATTER GETS TRAPPED BETWEEN LAYERS OF ROCK.**

❖ **HUMANS HAVE RELEASED CARBON FROM ORGANIC RESERVOIRS FASTER THAN WOULD NORMALLY OCCUR BY :**

- **MINING**
- **BURNING FOSSIL FUELS**
- **BURNING FORESTS**


❖ **MUCH OF THIS CARBON RELEASE AND THE BURNING OF VEGETATION INCREASES THE AMOUNT OF CARBON DIOXIDE IN THE ATMOSPHERE**




THE CARBON CYCLE

SCIENCE 10 ASSIGNMENT 17



1. Watch the You Tube videos :

 The Carbon Cycle

 The Carbon Cycle (2)

1. In your own words, explain why photosynthesis and cellular respiration are considered to be complementary processes.
2. In to what three main areas is Inorganic carbon stored?
3. Where is most of the organic carbon stored?
4. Explain the importance of decomposers in the carbon cycle.
5. The oceans are often described as a carbon reservoir. In what ways is carbon held within the oceans?
6. Explain how the burning of fossil fuels by humans affects the carbon cycle.
7. Carbon cycles more quickly through some ecosystems than others.
 - a) Why is carbon cycled more rapidly in northern grassland communities than in peat bogs and swamps?
8. How have humans released carbon from naturally occurring reservoirs faster than normal?

Attachments

-  The Carbon Cycle
-  The Carbon Cycle (2)