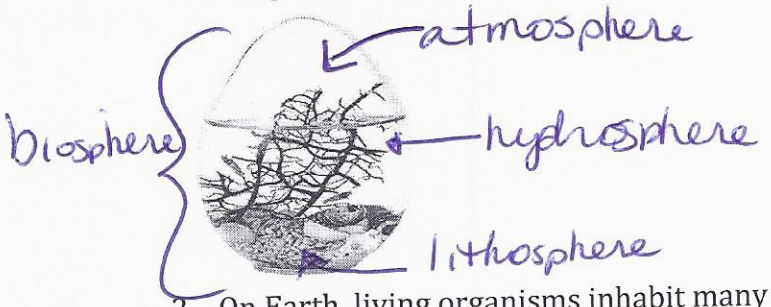
Cycles worksheet

1. In the picture below, label the substance or area that represents the biosphere, lithosphere, hydrosphere and atmosphere.



2. On Earth, living organisms inhabit many different environments: the ocean floor, the soil, the desert, etc. What is the entire system of living organisms and their habitats called? biosphere

3. Living organisms take in many of the elements essential to their development through biogeochemical cycles.
   a) What does the term *biogeochemical* mean?
   When an element passes from 1 environment to the next & eventually goes back to the original form.
   b) Why is the term *cycle* used in this context?
   Because it is a continuous process.

4. What process matches each of the following descriptions?
   a) the process by which bacteria take atmospheric nitrogen and change it into ammonia Nitrogen fixation
   b) the process by which bacteria change ammonium into nitrites nitrification
   c) the process by which bacteria change nitrates into nitrogen denitrification

5. The nitrogen cycle is disrupted by human activity.
   a) Which farming practice is the main source of this imbalance?
   over fertilization
   b) What are the consequences of this practice?
   death of water creas & global warming

6. The *Azotobacter* bacterium lives in soil and water. It is an oval-shaped bacterium that needs oxygen and feeds on organic matter. *Azotobacter* has the ability to convert atmospheric nitrogen into ammonia, using the enzyme nitrogenase. What is the name of this process?
   Nitrogen fixation

7. Bacteria are necessary to the nitrogen cycle. Describe, in order, the different roles bacteria play in this cycle.

① N_2 → ammonia + ammonium ③ decomposition

② ammonium → nitrites + nitrates ④ nitrites → N_2

8. The various stages of the carbon cycle involve all of the Earth's layers.

a) Which stage takes place in the hydrosphere and benefits marine organisms?

CO_2 dissolves in water + reacts w/ O_2 in water to form $CaCO_3$

b) What happens to the substance formed in the stage you just described?

It becomes shells + skeleton to ocean marine life

c) Which stage of the carbon cycle takes millions of years to complete?

converting decomposed marine remains to fossil fuels

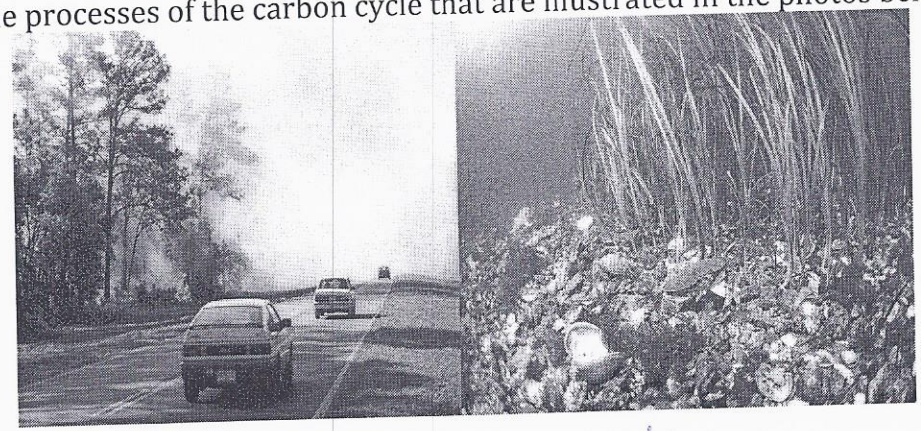
9. Name 2 different compounds that carbon can be found in.

CO_2 CH_4 $CaCO_3$

10. How have human activities contributed to disrupting the carbon cycle?

↑ CO_2 ↑ CH_4

11. List the processes of the carbon cycle that are illustrated in the photos below.



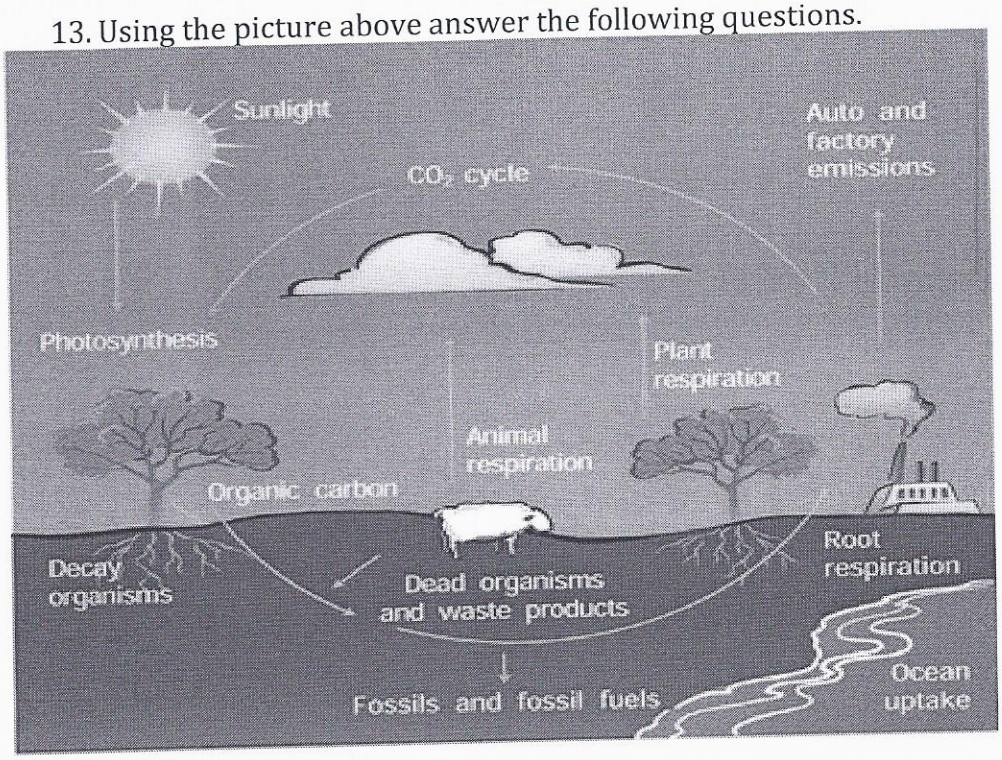
↙ Cars releasing CO_2

↓ Shells produced by $CaCO_3$

12. Carbon dioxide (CO_2) is an important source of carbon for living organisms. Name two processes through which carbon can enter the biosphere?

- decomposition - volcanoes - fossil fuels
- Respiration - fire

13. Using the picture above answer the following questions.



A- Where in the picture could methane (CH_4) be produced?
Dead organisms & waste produced

B- What gas does the process of photosynthesis take in? CO_2

C- How does the sheep get the carbon it needs? eats plants

D- How are the fossil fuels produced?
decomposed organisms

E- Explain how the sheep increases the methane content.
Burps & farts & eventually dies.

14. The carbon cycle describes the movement of carbon throughout the biosphere. Some human activities can have an impact on the carbon cycle through either the production of excess carbon dioxide gas, CO_2, or through decrease in the production of carbon dioxide. Which of the following human activities will increase the amount of CO_2 in the atmosphere? Explain your answer.

a) A tree-planting initiative in the Boreal forest.
(b) Deforestation by a logging company

Less trees = more CO_2 because trees take in CO_2 in order for them to do photosynthesis

15. Five human activities are listed below.

1. Raising cattle
2. Driving a gasoline powered car
3. Using a natural gas fireplace
4. Walking
5. Swimming in a lake

Which of the above activities could contribute to the greenhouse effect?

A) 1 and 2 only (B) 1, 2 and 3 C) 2 and 3 only D) 4 and 5 only

16. The National Center for Policy Analysis released a newsletter in June 2009 highlighting "10 Cool Global Warming Policies". Two of the proposed policies for reducing the harm of global warming were:

Policy 1: Reduce forest wildfires through Alternative Forest Management Institutions

Policy 2: Subsidise the development of renewable energy resources

Explain how each policy could reduce global warming.

(1) By reducing forest fires you are releasing less CO_2 in the air & allowing less CO_2 to be in atmosphere because more trees will take in CO_2.

(2) Wind + sun renewable resources do not release greenhouse gases. Fossil fuels do release greenhouse gases.