The Cycles: March Break Homework

BIOSPHERE and C-Cycle

1. The most important process that removes CO_2 from the atmosphere is done by living organisms. The process is called___photosynthesis_____.

2. When animals(or plants) break down sugar to release energy, the process is called respiration.
   a) Write the chemical equation for the overall process of respiration:

   $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O$

   b) Is this the most significant contributor of CO_2 to the atmosphere?
   cellular respiration

3. What other natural processes add CO_2 to the atmosphere?
   ___forest fires___and ___decomposition(more important)____

LITHOSPHERE (technically HYDROSPHERE too) **and C-Cycle(without man-made pollution)**

4. a) What removes CO_2 from the atmosphere and creates H_2CO_3?
   _____oceans_____and _____rain
   b) Write a chemical equation for the reaction between carbon dioxide and water.
   $H_2O + CO_2 \rightarrow H_2CO_3$
   c) What tall structures containing the right minerals also remove CO_2 from the atmosphere?

   Some mountains

5. What is the source of the CO_2 emitted by volcanoes?_____limestone_____
6. What living organisms of the ocean are the source of limestone?_____ clams

LITHOSPHERE (technically HYDROSPHERE too) **and C-Cycle(with man-made pollution)**

7. What fossil fuel forms over millions years from dead plants?_____coal____

8. Which fossil fuels form over millions years from the oils of dead algae?_____natural gas_____and _____petroleum_____

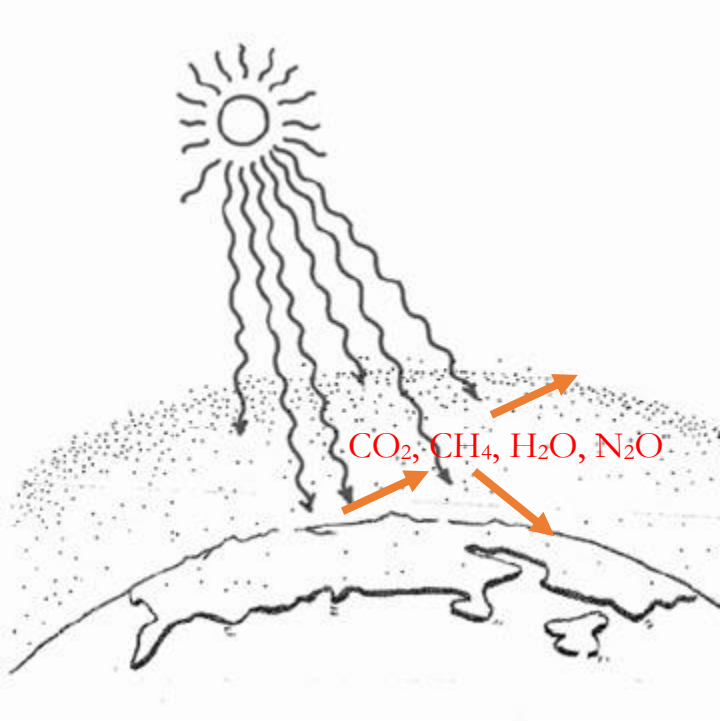
9. What element is abundant in fossil fuels and leads to the formation of CO_2 when they're burnt?_____carbon_____

10. a) What carbon compound is used by cement companies?_calcium carbonate

b) What does heating this compound release?_____ CO_2 _____

CLIMATE CHANGE

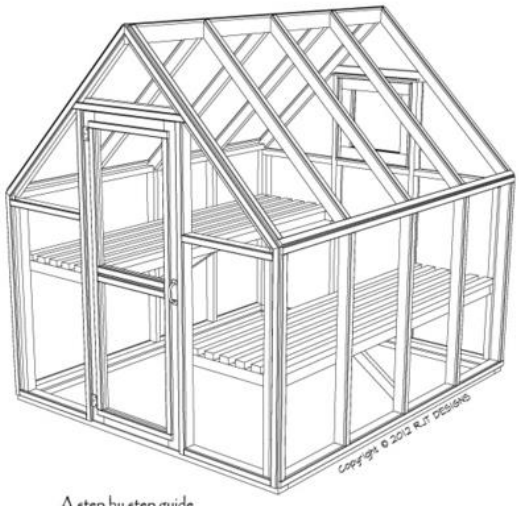
11. a)In the diagram show the location of CO_2, CH_4, H_2O and N_2O.



b) Show what happens to heat energy.

c) Does heat energy escape regardless of the amount of CO_2? yes

d) Which of the greenhouse gases are see-through and colorless? all



e) Which part of the greenhouse acts like the greenhouse-gases of the atmosphere?

glass

f) What penetrates both the glass and the greenhouse gases?

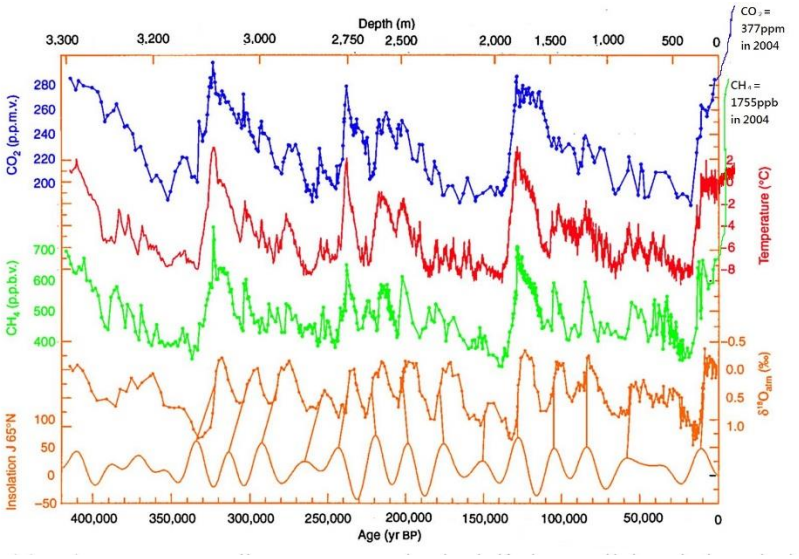
Visible light

g) Where does the heat(infrared) come from—which energy transformation?

From the transformation of visible light after materials on the surface absorbed the former.

12. a) What this graph evidence for ?

That temperature is correlated with concentration of CO_2.



b) Give an obvious example of something measured in the Arctic revealing that global warming has taken place.

Glaciers and sea ice are both shrinking from year to year.

c) What two human activities account for 75% of the 9 gigatons of CO_2 pumped into the atmosphere every year?

Burning of fossil fuels for electricity generation and transportation

13. Give three consequences of climate change.

Rise in sea levels as sea ice and glaciers melt
Flooding of coastal cities
Impact on agriculture

14. Aside from conserving energy and consuming less, what else can be done to fight climate change? Give four examples of alternative energy sources.

Geothermal, solar, wind and hydro

STE ONLY

N-CYCLE

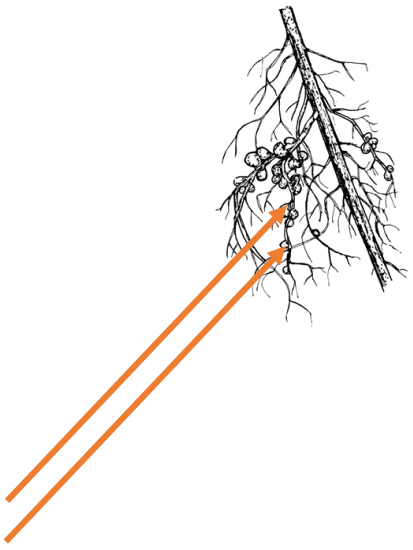
1. In the nitrogen cycle what organisms convert nitrogen from the air to ammonium?
   Bacteria (Rhizobium-type)

2. What is the difference between denitrification and nitrogen fixation?
   Fixation (fixes it) turns useless nitrogen into useful ammonium or nitrates.
   Denitrification occurs when other bacteria convert ammonium or nitrates back into N_2.
3. What are natural sources of nitrates or ammonium? List 4.
   Fertilizer, legumes(nitrogen fixation), lightning

4. a) What's going on in the roots of legumes?
   bacteria convert N_2 into ammonium

   b) Label the nodules in the roots.

   c) Why do plants need nitrogen?
   To make amino acids(proteins eventually), DNA



P-CYCLE

5. a) In the diagram, show where the runoff is.
   It's the arrows they drew.

   b) Show where eutrophication occurs. In the body of water

   c) Show where dead algae can decrease the depth of the lake and consume oxygen. At the bottom of the lake

6. Why do plants need phosphates or hydrogen phosphate?

To produce ATP(for energy), DNA,RNA (for genes and protein making), and for cell membrane fats

7. Why is the charge of hydrogen phosphate -2?

+1(from H+) + -3 (from phosphate) = -2

8. What is the major source of phosphates for plants?

Animal waste

9. What organisms convert organic waste into inorganic phosphate?

bacteria

10. What are the two sources of excess phosphates that lead to eutrophication?

Grey water, fertilizer