

Topic 4.3: Carbon Cycling

4.3.U1 Autotrophs convert carbon dioxide into carbohydrates and other carbon compounds.

4.3.U2 In aquatic ecosystems carbon is present as dissolved carbon dioxide and hydrogen carbonate ions.

1. List where carbon is stored in abiotic reservoirs in both terrestrial and aquatic ecosystems.

4.3.U3 Carbon dioxide diffuses from the atmosphere or water into autotrophs.

4.3.U4 Carbon dioxide is produced by respiration and diffuses out of organisms into water or the atmosphere.

4.3.U5 Methane is produced from organic matter in anaerobic conditions by methanogenic archaeans and some diffuses into the atmosphere or accumulates in the ground.

4.3.U6 Methane is oxidized to carbon dioxide and water in the atmosphere.

2. Define the term oxidation.

3. Describe how carbon moves between abiotic reservoirs and living organisms. Be sure to outline each process briefly.

a. Absorption of carbon through photosynthesis

c. Methanogenesis and oxidation of methane

b. Release of carbon through cellular respiration

4.3.U7 Peat forms when organic matter is not fully decomposed because of acidic and/or anaerobic conditions in waterlogged soils.

4.3.U8 Partially decomposed organic matter from past geological eras was converted either into coal or into oil and gas that accumulate in porous rocks.

4.3.U10 Animals such as reef-building corals and mollusca have hard parts that are composed of calcium carbonate and can become fossilized in limestone.

4. Define the term peat and describe the conditions under which peat forms.

5. Complete the table below:

Abiotic Carbon Reservoir	Biological origins	Where it is found	Timescale for production
Peat			1000 – 5000 years
Coal	Ancient forests		
Oil and natural gas			
Limestone			Millions of years

4.3.U9 Carbon dioxide is produced by the combustion of biomass and fossilized organic matter.

6. Suggest how humans have decreased the amount of carbon in many ecosystems over the last 1,000 years.

7. Define the term carbon flux.

8. Reread Section 4.3 and fill in the table below:

Carbon is removed from the atmosphere by	Carbon is added to the atmosphere by
1.	1.
2.	2.
3.	3.

9. Read the Application: Carbon fluxes page 227 and complete the DBQ: Oak woodland and carbon dioxide concentrations.