PEER Life Science Ecosystems Exchange Cycles Notes Outline

**Why It Matters**

* The \_\_\_\_\_\_\_\_\_ exchange of certain biological chemicals allows ecosystems to sustain life without the risk of \_\_\_\_\_\_\_\_\_\_\_\_\_ of resources.
* The amount of carbon present on earth right now is greater than/less than/equal to the amount that was present a million years ago.
* Human actions can \_\_\_\_\_\_\_\_\_ different phases of exchange cycles and cause \_\_\_\_\_\_\_\_\_ effects to all parts of the ecosystem involved with that cycle.

**How We Know**

* Write out the equation for photosynthesis:
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Scientists can follow the movement of oxygen throughout photosynthesis by using \_\_\_\_\_\_\_\_\_\_\_\_\_ oxygen. From this we learned that the oxygen from water is expelled as oxygen \_\_\_\_\_ and the oxygen in carbon dioxide from the air is captured in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*.*
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ discovered the process that uses energy from sunlight to turn the carbon in carbon dioxide into glucose.
* Oil and coal are \_\_\_\_\_\_\_\_\_\_\_\_\_\_. They are made from the remains of dead plants and animals buried several miles deep and under high \_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_ for tens of \_\_\_\_\_\_\_\_\_\_ of years.
  + Burning fossil fuels \_\_\_\_\_\_\_\_\_\_ our air and water with toxic compounds. Name an energy source that can be used instead of fossil fuels:
    - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Nitrogen is essential for life. It is found in our \_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
  + Nitrogen is found in the air as \_\_\_\_\_\_\_\_\_\_\_\_\_\_ and in soil as \_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_.
  + Nitrogen acts as a \_\_\_\_\_\_\_\_\_\_\_\_ in soil for plants.
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ enables carbon and nitrogen in dead plants and animals to be \_\_\_\_\_\_\_\_\_\_ back into the environment. This process can occur quickly if the right conditions are applied or slowly if it is left alone.

**What We Know**

* The major components of an ecosystem include:
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
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* The \_\_\_\_\_ either directly or indirectly provides energy for most organisms on earth.
* Through \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, plants use energy from sunlight to turn carbon dioxide into energy in the form of a carbohydrate called \_\_\_\_\_\_\_\_\_.
* Most/Very few carbon molecules are stored in an organism’s body and are not recycled until that organism \_\_\_\_\_\_.
  + Bacteria and fungi get their energy by \_\_\_\_\_\_\_\_\_\_\_\_\_ dead organic matter which releases carbon dioxide back into the atmosphere.
* While plants need \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from the environment, they can only use a certain amount at a time, and any extra CO2 can trap heat in the atmosphere.
* Oxygen is a very \_\_\_\_\_\_\_\_\_\_ element.
* The cells in your body need \_\_\_\_\_\_\_\_ to break down glucose for \_\_\_\_\_\_\_\_.
* When there were many plants photosynthesizing on earth and no animals undergoing respiration, atmospheric oxygen levels drastically increased/decreased.
* Oxygen exchange occurs as animals use oxygen to get energy and return it to the ecosystem as \_\_\_\_\_\_\_. During photosynthesis, sunlight splits water and releases \_\_\_\_\_\_\_\_ into the air for animals to breathe.
* In addition to water, glucose, and atmospheric O2, oxygen is present in other compounds as well, including O3 or \_\_\_\_\_\_\_.
* Ozone is harmful in the \_\_\_\_\_\_\_ atmosphere because it can harm our eyes and respiratory systems as well as plants and it is beneficial in the \_\_\_\_\_\_\_ atmosphere because it protects the earth from the sun’s ultraviolet radiation.
* Water is the major \_\_\_\_\_\_\_\_\_\_\_\_\_\_ medium for all elements.
  + Water \_\_\_\_\_\_\_\_\_\_\_\_\_\_ to form clouds and falls to the ground
  + Energy from the sun excites water molecules so that they escape into the atmosphere as \_\_\_\_\_\_\_.
* While nitrogen makes up about \_\_\_\_% of the atmosphere, in order for nitrogen to be used by organisms it must be converted into \_\_\_\_\_\_\_\_\_.
  + This conversion is done by \_\_\_\_\_\_\_\_\_ who “fix” nitrogen.
  + Fungi and bacteria decompose nitrogen in dead organic matter and release \_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_.
  + Addition of excess nitrogen disrupts the balance of this cycle and can result in the formation of \_\_\_\_\_\_\_\_\_\_\_\_\_ in the atmosphere which can cause acid rain.
* Sulfur is released from \_\_\_\_\_\_ deposits by weathering and decomposition of organic and inorganic soil and rock deposits. In the air, sulfur exists as hydrogen sulfide and sulfur dioxide. When it falls back down in rain, it becomes sulfuric acid and contributes to \_\_\_\_\_\_\_\_\_\_\_.
* Most of the phosphorus present on earth is located in \_\_\_\_\_\_\_. Phosphorus is released into the ecosystem through \_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_ and is taken up by plants.
* Name two ways that anthropogenic actions affect the major exchange cycles:
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_