Date:\_\_\_\_\_\_\_\_\_\_

**4.4: Matter Cycles Through Earth’s Sphere’s**

**Water Cycle:**

1. What are the 4 processes that allow water to continuously cycle within an ecosystem?

|  |  |
| --- | --- |
| * Evaporation
 | * Condensation
 |
| * Precipitation
 | * Transpiration
 |

2. Some examples of *point sources* of water pollution are:

\_\_factorie, power plants, sewage treatment plants, and oil wells

3. Why are *non-point* *sources* of pollution more difficult to monitor, regulate, and treat in regards to water pollution?

\_\_Tend to be periodic, not coming from one set source. The atmosphere is the most challenging non-point source.

4. Define:

Bioaccumulation - \_\_the process by which pollutants collect in the cells and tissues of organisms

Biomagnification - \_\_the increase in concentration of pollutants in tissues of organisms that are at successively higher levels in a food chain or food web

5. Explain how these processes are related?

\_\_Bioaccumulation at the lowest trophic levels leads to biomagnification within a food chain or food web (ecosystem)

**Carbon Cycle:**

1. Define:

Source - \_\_is any process that releases more of the nutrient than it absorbs

Sink - \_any process that absorbs and stores more of the nutrient than it releases

2. What two processes allow Carbon to move from the atmosphere to the biosphere and back?

|  |  |
| --- | --- |
| * \_Photosynthesis
 | * \_Cellular Respiration
 |

3. What are some ways that we, as humans, are adding to increased levels of carbon dioxide in the atmosphere?

\_\_\_Burn trees, coal, oil, and natural gas for fuel. Have removed huge numbers of trees to make space for homes, buildings, and farmland, as well as to make products.

4. Describe some ways that excess carbon in the carbon cycle are negatively impacting Earth?

- \_Melting sea ice

- \_Melting land ice

- \_Rising sea levels

- \_Changing ocean chemistry (more acidic)

- \_Changing ecosystems

**Nitrogen Cycle:**

1. Explain the significance of nitrogen to living organisms? What do living organisms use nitrogen for? Where is it found in organisms?

-nitrogen an important component of DNA and proteins which are essential for human life

- plants use nitrogen for growth

- humans use proteins for muscle function

2. How does nitrogen to move from the atmosphere to the biosphere and back?

* Plants cannot directly absorb Nitrogen gas so it is converted by substances such as bacteria into usable forms such as nitrates (NO3-) and ammonia (NH4+)

3. How do producers obtain nitrogen? How is this different from how consumers obtain nitrogen?

Producers absorb nitrogen containing compounds through their roots. Consumers eat plants/other animals to obtain their nitrogen

4. What are two human activities cause excess nitrogen to enter the nitrogen cycle and what effects does it have?

* Fossil fuel combustion - excess nitrogen released into atmosphere can result in acid precipitation
* Chemical fertilizers that contain nitrogen - excess nitrogen that isn’t absorbed can make its way into waterways. This causes eutrophication where the excess nitrogen results in rapid algae growth causing other plants and animals to be deprived of oxygen and sunlight.

**Phosphorus Cycle:**

1. Explain the significance of phosphorus to living organisms? What do living organisms use phosphorus for? Where is it found in organisms?

* Essential element in the molecule (ATP) that carries energy to plant and animal cells
* Plants use phosphorus for root development, stem strength and seed production
* Animals use phosphorus to develop strong bones

2. Most phosphorus on Earth is trapped inside the Earth’s crust (geosphere). How does phosphorus move from the geosphere to the biosphere and back?

Weathering - different types of weathering break down rocks and release phosphate into the soil.

When plants and animals die, the phosphate is released back into the soil.

3. How do producers obtain phosphorus? How is this different from how consumers obtain phosphorus?

Producers absorb phosphate from the soil.

Consumers eat plants or other animals to obtain their phosphorus.

4. What human activities cause excess phosphorus to enter the phosphorus cycle and what effects does it have?

Fertilizers and detergents have phosphorus within them. This can also result in eutrophication.

Also mining and burning down forests can release large amounts of phosphorus into the ecosystems.