Guided Notes: Human Impact and Improvement

1. Water Cycle Processes:

* **Precipitation:** water moves from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to Earth’s surface
* **Evaporation**: water moves from Earth’s \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to atmosphere
* **Runoff**: water moves to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ point, due to gravity
* **Infiltration**: water seeps through soil to become \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* **Transpiration**: water \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from leaves
* **Condensation:** water vapor cools and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to form water droplets that make clouds

2. Carbon Cycle Processes:

* **Photosynthesis:** removes carbon dioxide from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* **Aerobic and anaerobic respiration**: adds \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to atmosphere
* **Burning**: adds carbon dioxide to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* **Consumption**: when an animal eats another \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, transferring carbon
* **Decomposition**: removes \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from dead organisms and returns it to the soil
* **Diffusion**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ carbon dioxide between atmosphere and water

3. Nitrogen Cycle Processes:

* **Nitrogen fixation**: bacteria, algae or lightening convert \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ gas into ammonia
* **Nitrification**: bacteria \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ammonia to nitrates
* **Nitrogen uptake**: plants \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ nitrogen (nitrates) from the soil to make DNA and Proteins
* **Decomposition**: removes \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from dead organisms and returns it to the soil
* **Denitrification**: bacteria \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ nitrogen from soil to atmosphere

1. Burning of fossil fuels leads to increased levels of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the atmosphere. Carbon dioxide is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_, which effectively retains heat, increasing global temperatures. Therefore, burning *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_* contributes to *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_* by increasing levels of carbon dioxide
2. Recall through photosynthesis that plants take in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and release oxygen. *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_* (massive removal of trees) leads to an *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_* in carbon dioxide levels. *INCREASING* the global warming effect.
3. Humans impact the environment in a variety of ways, including:

(a) Through \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ growth

(b) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ destruction (deforestation)

(c) Water and trash \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(d) Introduction of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ species

(e)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_/climate change

1. Recall human population growth is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. As a result, we need more space to live, which results in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to make homes. We generate more waste (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_) and consume more resources, outcompeting local flora and fauna for the same limited food and water sources. We generate better quality of life through new technology (mass production, pesticides, gas engines, etc), which leads to burning of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and air and water \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

8. Acid rain is any \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (snow, rain, sleet, and fog) that has a low pH value. Water in atmosphere becomes acidified due to: coal burning factories, car exhaust, etc. Results in damage to plant tissue and can affect aquatic \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ability to survive.

9. Mt. Mitchell is the highest point east of the Mississippi River. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ has decimated trees high on mountaintops…why? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

10. NC has lots of hog and poultry farms and utilizes concentrated animal feeding operations (CAFO-lots of animals in close quarters) for maximum \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in food processing. All of those animals = LOTS of waste….where does it go?

11. Waste collects in a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ outside hog house; when it rains and the lagoon overflows, water mixed with waste flows into nearby \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

12. Excess fertilizer and *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_* runoff are carried into streams, rivers, and lakes. These \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ allow algal blooms to occur. As the algae dies and decays, it removes \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from the water, killing the fish and creating \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

13. Bioaccumulation is used to describe the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in concentration of a substance in an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ over time. Bioaccumulative substances tend to be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ soluble and not to be broken down by the organism.

14. DDT was used as a very effective \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the 1980s, until it was determined that due to bioaccumulation, bird \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ had great quantities of DDT in their bodies. Result of increased DDT levels led to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ eggshells that broke, killing the embryo; saw birds of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ populations decrease – consumed fish.

15. In our world driven by convenience, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and trash pollution leads to the death of many animals each year. Abandoned fishing nets \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ marine animals.

16. An invasive species is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ species whose introduction causes or is likely to cause economic, environmental, or harm to human health. Can be an animal, plant, or microbes. Detrimental to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_…why?

17. Kudzu introduced intentionally to US as an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ plant and to help reduce soil \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. However, it grows rapidly, smothering areas of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ plants. Zebra mussels were introduced unintentionally to Great Lakes from ballasts of ships. These fast growing \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ clear the water, but block many food chains.

18. Kudzu, Japanese Honeysuckle, Queen Anne’s Lace, Chinese Privet. African Clawed Frog. Asian Shore Crab, Asian Tiger Shrimp, Rock bass, Blueback herring, Blue tilapia, Nile tilapia

19. More humans = more space to live. Build on beaches, but they constantly \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Must \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ sustain beaches through beach \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ projects.

19. Heavy use of chlorofluorocarbons (\_\_\_\_\_\_\_\_\_) during the 1900s led to the destruction of the ozone layer. CFC’s are a group of organic compounds commonly used as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and aerosol propellants.

20. CFCs are \_\_\_\_\_\_\_\_\_\_\_\_\_- they do not participate in chemical reactions.  Unfortunately it also means that these compounds persist in the environment for \_\_\_\_\_\_\_\_\_\_\_\_ periods of time.  CFCs eventually rise into the upper atmosphere. Here high energy radiation from the sun impacts the atmosphere and causes a variety of chemical reactions to occur.  One of the most important is the absorption of ultraviolet (UV) light by ozone, and its CFC molecule, a highly reactive halogen atom, such as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, gets released.  This chlorine atom then destroys ozone.

21. Consequences of Loss of Biodiversity:

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – disappearance of a species when the last of its members dies; current rate of extinction has accelerated
* Ecosystem collapse – if keystone species is removed, the entire \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ could collapse (EX: sea otter in kelp forests)
* Possible Medicinal cures for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – unknown how many or what types of plants could contribute to medicine
* Unknown – many ecosystems are so \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that ecologists cannot begin to predict ramifications of biodiversity loss

22. *Conservation biology* – the study and implementation of methods to protect biodiversity

* Legislation
* Preserving \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Reintroduction and Captive Breeding Programs
* Reducing “ecological footprint”