Module 5- Ecology

1. Cell-> Tissue-> Organ->organ system->Organism-> Population-> Community -> Ecosystem -> Biosphere
2. A population is a group of individuals of the same species living in the same location, while a community is composed of all the different species in an area. An ecosystem, in addition to organisms also includes non-living components.
3. Abiotic factors are nonliving (rocks, water, weather), while abiotic factors are alive (plants, animals, fungi)
4. Biomes
5. Most Biomes of the same type are located at similar latitudes around the world (for example, most tropical rainforests are located close to the equator, while tundra’s are close to the poles).
6. Desert, Grassland (savanna, chaparral), Forests (tropical, deciduous, boreal), and Tundra
7. Standing water (lentic: lakes or ponds), Flowing water (lotic: rivers or streams), and wetlands (marshes or swamps)
8. Marine Biome
9. Photosynthesis <-> Cellular Respiration
10. Nitrogen fixing and Nitrifying bacteria N2 -> NH4 -> NO3- gas -> ammonia -> nitrates
11. Phosphorus is critical for all organisms because as an ion it forms part of the DNA and RNA backbones and the energy molecule, ATP. Phosphorus comes from decaying organisms and eroding rocks.
12. Water in oceans, and even plants is heated by the sun and evaporates. (2) Water vapor is lifted up by air currents, condenses and forms into clouds (3) Water falls to the ground as precipitation (rain, snow, hail) (4) Water is taken up by plants and other organisms, stored in lakes and aquifers, move as part of rivers and groundwater, and eventually returns to the oceans.
13. Producer (grass) -> primary consumer (antelope) -> secondary consumer (lion)
    1. \* examples of organisms can vary as long as the producer ois an autotroph (usually a plant), the primary consumer is either an omnivore or a carnivore
14. Food Webs
15. Because energy transfers in living organisms are not fully efficient , less energy is available at each subsequent level of a food pyramid. For example, there are many more producers than consumers.
16. Crowding which affects competition for water, nutrients and shelter; climate; and predation
17. Symbiosis
18. Commensalism
19. Parasitism is a symbiotic relationship between 2 organisms in which one organism benefits while harming another; example: tape worms live ing in the gut of another organism while robbing it of its nutrients.
20. Mutualsm
21. During primary succession new plant life begins growing on surfaces devoid of living matter or soil (like after a volcanic eruption or glacier passage); wheras, in secondary succession new plants begin growing on matter left by other living things (like after a fire or flood).
22. (1) Human beings have polluted air, water and soil with harmful chemicals. (2) Our actions (such as rain forest deforestation) have caused the extinction of numerous species (3) Use of fossil fuels has released dangerous levels of carbon dioxide in our atmosphere which is leading to a drastic climate change (global warming) (4) Use of various chemicalsd (chlorofluorocarbons, CFC’s) has led to ozone depletion, which results in loss of protection against the damaging UV radiation from the sun.
23. Our natural resources are limited and once we use them , they will be gone forever; also, processing of most resources results in dramatic pollution of our environment.
24. Recycle, reduce, reuse
25. Discovering how a chemical works is pure science and producing it is applied science
26. Technology is application of science
27. Scientific data presented to others should be verifiable and not made up; experiments that include vertebrate animals, need to be approved by an impartial IRB (institutional review board).
28. Some of the greatest threats to Earth’s environment are human overpopulation, misuse of natural resources, pollution, landfill expansion, and extinction of numerous species due to human overdevelopment. We can positively affect the environment by reducing our impact on it. If we ignore these problems, the planet will become less hospitable not only to other organisms but also to us.
29. Students need to explain that verifying scientific claims needs to include checking several sources, especially peer reviewed journals. Answers about recent research will vary but can include molecular biology (stem cell research, RNA interference, gene therapy), medicine (diagnostic techniques/ equipment, preventative studies, treatments) and environmental sciences (bioengineering, alternative energy sources, improved efficiency and conservation).
30. Answers can vary….Some examples include careers in: research (lab/field technician, research professor), academia (high school teacher, University journalist), medicine (physician, Pharmacist, dentist).