BIOGEOCHEMICAL CYCLES Review

1. Who has the cycle that involves the processes of photosynthesis, decomposition, respiration, and formation of limestone sedimentary rocks?
   I have THE CARBON CYCLE. This cycle is one of great controversy right now with atmospheric CO_2 on the rise.
2. Who has what we consider the atmosphere, terrestrial forests, oceans, fossil fuels, and limestone rock in relationship to Carbon?
   I have SINKS. These are places that large amounts of Carbon are stored. Forests are reservoirs (sinks) for 86% of above ground Carbon and their roots contain 73% of soil carbon. That means forests are important!!!!!!!!
3. Who has what cellular respiration, decay of material by decomposers, burning fossil fuels and biomass, weatherization of limestone, volcanoes, and warming oceans all have in common?
   I have they RELEASE CARBON. These combined processes are increasing atmospheric CO_2 levels to the highest they've been in over a million years.
4. Who has the process that $6CO_2 + 6H_2O$ + sunlight ---> $C_6H_{12}O_6 + 6O_2$ is a molecular formula for?
   I have PHOTOSYNTHESIS. This is the only place that Carbon enters living systems to first make the organic compounds carbohydrates (glucose, starch, & cellulose) and then proteins, nucleic acids (DNA & RNA), and lipids.
5. Who has the process that $C_6H_{12}O_6 + 6O_2$ ---> $6CO_2 + 6H_2O$ + energy is a molecular formula for?
   I have CELLULAR RESPIRATION. Heterotrophs use aerobic respiration in eukaryotic mitochondria. If Oxygen is not available, anaerobic organisms release methane (marsh gas, flatulence, or belches) that ends up getting into the atmosphere as a potent greenhouse gas.
6. Who has the human centered era that began a period when more CO_2 was released into the atmosphere than was being removed by other sinks?
   I have THE INDUSTRIAL REVOLUTION. Fossil fuel burning and deforestation are the two culprits of this revolution.
7. Who has the process that involves the most abundant gas in the atmosphere?
   I have THE NITROGEN CYCLE. It is 78% of the atmosphere and found in amiNo acids (which make up proteiNs) and Nucleic acids (including dNa and rNa).

8. Who has the process that brings Nitrogen from the atmospher and fixes if into forms usable by organisms?
   I have NITROGEN FIXATION. This occurs through lightning strikes and by bacteria that combine N2 with H2 to for NH3 or NH4. This can further be converted into organic compounds.
9. Who has the process by which bacteria convert nitrates into atmospheric nitrogen gas?
   I have DENITRIFICATION. It's in the name. Now Nitrogen is no longer in the living / organic compounds proteiNs or Nucleic acids.
10. Who has what will occur in an aquatic ecosystem if there is excess nitrogen from fertilizers?
    I have EUTROPHICATION. Elevated nitrogen levels in drinking water interferes with infant blood oxygen levels. Nitrates enter aquifers when overuse of fertilizer happens with agriculture and lawns.
11. Who has what has increased seven fold since we have built internal combustion engines?
    I have ATMOSHPHERIC NOx. These are precursors to tropospheric Ozone, acid rain, and increased inputs of Nitrogen into soils that decrease biodiversity as nitrogen-demanding grasses grow out of control.
12. Who has the only biogeochemical cycle that does not involve the atmosphere?
    I have THE PHOSPHORUS CYCLE. P is needed for cellular DNA & RNA, some fats (phospholipid bilayer in cell membranes), and especially ATP and ADP molecules that organisms use for energy transfer.
13. Who has what 80% of phosphorus used by man is used for?
    I have FERTILIZERS. Excess into water supplies causes algae blooms and eutrophication.
14. Who has the biogeochemical cycle that is so important to making the amino acid cyStein found in proteinS that allow them to kink up and take on complex ShapeS?
    I have THE SULFUR CYCLE. Man releases too much of this by burning coal and SO2 combines with water droplets in clouds to become H2SO4 (sulfuric acid).
15. Who has the biogeochemical cycle that involves evaporation, transpiration, condensation, precipitation, and runoff?
    I have THE WATER CYCLE. It is a sun-powered process!
16. Who has the activity that humans do that have increased groundwater depletion, salt water intrusion, and salinization of the soil?
    I have IRRIGATION. Industrial agriculture is therefore NOT a sustainable practice.

17. Who has what we call man-made pollution of lakes and oceans that increase algae growth?

    I have CULTURAL EUTRIPHICATION. Sewage and fertilizer are the culprits. Biodiversity is the victim.