Carbon Cycle Internet Investigation

**Directions: Follow the directions below to navigate through a few Science based interactive web sites and answer the questions using complete sentences. Each answer should be well thought out and contain multiple sentences.**

1. Open Google Chrome and type the following address into the address bar:

* mare.lawrencehallofscience.org
* Type “carbon cycle” into search box
* Click “Unit 2 resources”
* Scroll down to Session 2.8 “Crunching the numbers for the carbon cycle”
* Click on “Simulation: Interactive Carbon Cycle Diagram (PC)”
* Click on the link for “Reservoirs” at the top of the page.
* On your paper list the 9 reservoirs where carbon can be stored, how much carbon is stored in each, and what each reservoirs residence time is. (You will have to click on each one to get this info)

1. Click on the “Natural flows” link at the top. What pattern can you identify involving the carbon flow between the atmosphere and the ocean? Open a separate window in Google and research and explain one way carbon is exchanged between the atmosphere and ocean.
2. Using the “Natural flows” link again, describe the roles of photosynthesis and respiration in the carbon cycle. (click on the links for info)
3. Using the links under “Fossil Fuels” at the bottom of the diagram, compose a explanation of how each of the 3 fossil fuels are formed.
4. In a separate search window, type this address:
   * <https://www.youtube.com/watch?v=zaXBVYr9Ij0>
   * Watch this video (using your headphones) and answer the following questions:
     + What does it mean that Fossil Fuels are Non-Renewable?
     + How are companies dealing with the gradual depletion of fossil fuel reserves?
5. From the “Natural Flows” link again, identify and explain the 2 geological factors that contribute carbon into the atmosphere (hint: they are on the right side of the page).
6. Much of the exposed rock in the mountains around Helena is from the Madisen Limestone Formation. Using the link under “Natural Flows”, explain why limestone contains so much carbon.
7. In a separate window, go to the web address below and explain how carbon is released from Limestone into the atmosphere:
   * <http://www.ces.fau.edu/nasa/module-4/causes/sources-carbon-dioxide.php>
8. Just outside of Helena there is a massive cement plant called Ash Grove. They mine many mineral resources (including Limestone) to manufacture cement. Research cement manufacturing and explain how this type of industry contributes to atmospheric carbon dioxide levels.
9. Go back to the internet and type the following web address:
   * https:coast.noaa.gov/psc/dataviewer/#view=tracker
   * This is an animation of the daily distribution of CO2. After studying this model, describe where the major sources of CO2 are on Earth. Next explain how CO2 distribution changes with seasons.
10. Staying on the NOAA site, click the climate icon in the upper right corner and scroll down to the “Business as usual” climate model. Watch this animated prediction of global temperature change and answer the following questions:
    * Which areas does the model predict will warm the most?
    * How much warming does the model predict where you live?
11. The oceans that cover Earth’s surface filter out a lot of CO2 from the atmosphere. Currently the oceans are almost completely saturated for absorbing so much CO2. This is called Ocean Acidification. Staying on the NOAA site, and from the same climate icon, scroll to “Coral Reefs & Ocean Acidification”. This animation shows ocean acidification over our global oceans. Read the info and study the animation and explain which areas are predicted to have the least favorable conditions for coral & shellfish (Hint: grey & orange).
12. In a different window type this web address:
    * <https://www.youtube.com/watch?v=6SMWGV-DBnk>
    * Watch the video clip and answer the following questions:
      + What problems is Ocean Acidification Causing?
      + How could this affect us?
13. Navigate back to the NOAA site, and from the climate icon, scroll to “Aerosols in the atmosphere” and watch the animation. Which areas on Earth have the most black carbon in the air, and which are affected the most by sulfate aerosols?
14. Trees are a major reservoir where 600 gigaton of carbon is stored. In addition, trees also act as “the lungs of the planet” as they filter CO2 out of the air. Watch the video at the link below and describe how deforestation will contribute to atmospheric carbon levels as well as global warming.
    * <https://www.youtube.com/watch?v=Nc7f5563azs>
15. This last video clip I will let speak for itself. Please watch it and write a 2-3 sentence reflection on how it makes you feel and what you think of it.
    * <https://www.youtube.com/watch?v=eRLJscAlk1M>