Carbon Virtual Lab

# Carbon Cycle Lesson 1

|  |  |  |  |
| --- | --- | --- | --- |
| **Sink Types** | **Carbon Level in 2010**  **in GT of Carbon** | **Carbon Level in 2050 in GT of Carbon** | **Carbon Level in 2100 in GT of Carbon** |
| Terrestrial Plants | 700 | 743 | 862 |
| Soil | 1800 + 200 | 1800 + 226 | 1800 + 313 |
| Coal500 | 3500 | 3264 | 1433 |
| Oil and Gas | 500 | 190 | 0 |
| Surface Ocean | 1000 + 0 | 1000 + 85 | 1000 + 275 |
| Deep Ocean | 38000 + 0 | 38000 + 170 | 38000 + 845 |

1. At the default rate of deforestation, the atmospheric carbon level is 1042 ppm of CO2 or 1888 GT carbon. Although I cannot predict the ppm of the atmosphere, I predict that if the fauna in 2100 were halved, the carbon that would have been stored would go to the atmosphere. This would mean that in 2100, with half the fauna, the terrestrial plants would have 432 GT carbon, and the atmosphere would have 2320 GT carbon. The closest I can get to reflect this is to increase the value for “Net deforestation rate per year” to 4 GT.
2. This was one of the most interesting things I found in this experiment. Increased carbon in the soil leads to increased carbon in the atmosphere, leading to an increase in carbon in the ocean. I would assume that this is the result of the carbon in the soil being burned up to the atmosphere, and then the carbon comes down to the ocean in the form of rain. Carbon may also be transferred to the soil through rain or mining.
3. The increase in atmospheric carbon is proportional to the percentage increase in fossil fuel consumption. They increase together, but it is not a linear relationship. As the percentage change in fossil fuel increases, the atmospheric carbon exponentially increases.

# Carbon Cycle Lesson 2

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sink Types | Carbon Level in 2010  in GT of Carbon | Carbon Level in 2020 in GT of Carbon | Carbon Level in 2030 in GT of Carbon | Carbon Level in 2040  in GT of Carbon | Carbon Level in 2050 in GT of Carbon | Carbon Level in 2600 in GT of Carbon | Carbon Level in 2070  in GT of Carbon | Carbon Level in 2080 in GT of Carbon | Carbon Level in 2900 in GT of Carbon | **Carbon Level in 2100 in GT of Carbon** |
| Sky | 720 | 753 | 806 | 868 | 941 | 1031 | 1171 | 1364 | 1598 | 1888 |
| T. Plants | 700 | 708 | 718 | 730 | 743 | 758 | 776 | 801 | 830 | 862 |
| Soil | 1800 + 200 | 1800 + 202 | 1800 + 208 | 1800 + 216 | 1800 + 226 | 1800 + 238 | 1800 + 251 | 1800 + 268 | 1800 + 289 | 1800 + 313 |
| Surface Ocean | 1000 | 1000 + 35 | 1000 + 50 | 1000 + 66 | 1000 + 85 | 1000 + 107 | 1000 + 137 | 1000 + 178 | 1000 + 224 | 1000 + 275 |
| Deep Ocean | 38000 | 38000 + 21 | 38000 + 57 | 38000 + 107 | 38000 + 170 | 38000 + 250 | 38000 + 349 | 38000 + 478 | 38000 + 642 | 38000 + 845 |

1. Fossil fuel consumption and carbon in terrestrial plants increase proportionally and exponentially. This might affect the flora population by decreasing biodiversity due to only plants that can tolerate large amounts of carbon being able to survive. One thing to mention is that increased carbon in the atmosphere may give plants more energy to grow. Over twenty years, I'd expect the number of green flora to increase as a result of more carbon dioxide in the atmosphere and more carbon to build their bodies.
2. As the total carbon concentration increase, so does the carbon in the ocean surface. This would change marine life populations because marine creatures are hypersensitive to their environments and migrate at even the slightest changes in temperature or water composition. Increased carbon in the water would decrease biodiversity at the surface because not all creatures would be suited to handle the new water composition. Fifty years could be long enough for individual species, both predator and prey, to go extinct. There would also be mass migrations to the least carbon-filled areas of the ocean. The flora depends heavily on the sun's rays' ability to penetrate the water to whatever depth the plant is at. Increased carbon in the atmosphere and the water could make this more difficult and make it so that marine flora that depends on a high level of light would decrease their population.
3. Fossils are a significant source of carbon. Their biomass is often extracted and used as fuel by humans. In fifty years, we are likely to see excess carbon mainly in the ocean at deep levels and in the atmosphere, as indicated by the simulation.
4. The atmosphere and the terrestrial plants are the fastest to be affected by an increase in carbon emissions. The rise of carbon in the atmosphere has proven to lead to climate change, which has a myriad of adverse effects, including the melting of the icecaps. Increased carbon in the atmosphere also makes breathing harder due to smog. The increase of carbon in terrestrial plants may lead to an increase in green plants.