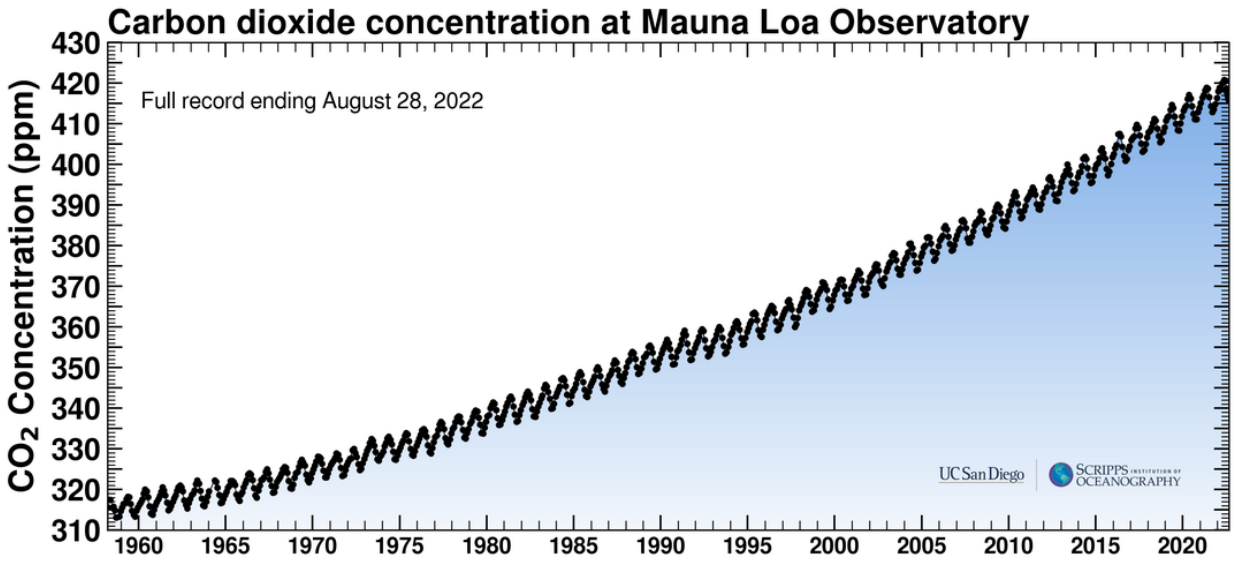
Name _____	Grade = ___/24
Section _____	____% correct

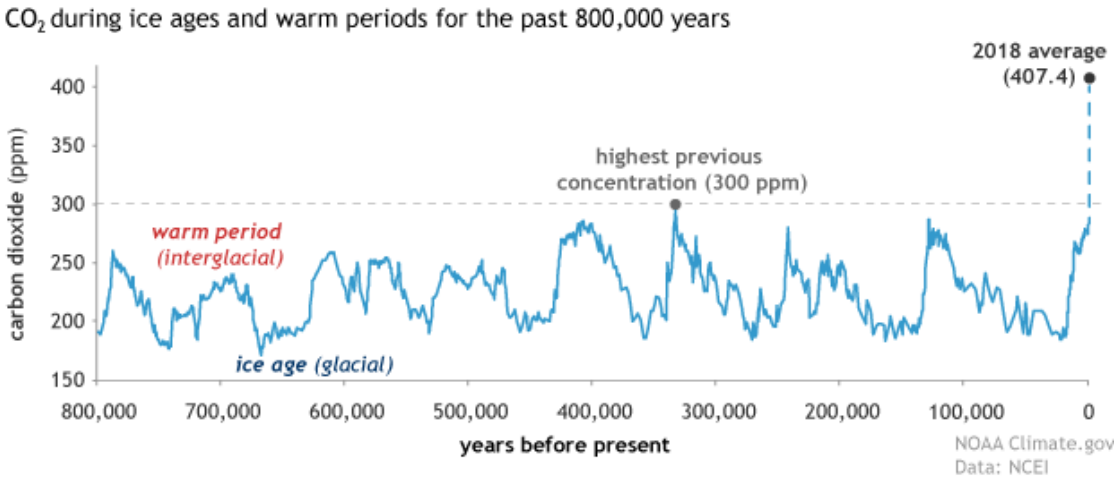
RECITATION 10: CLIMATE SCIENCE AND GLOBAL WARMING

1. 

The diagram above is called the Keeling curve. The Keeling curve shows that atmospheric CO_2 concentrations today are at approximately what concentration (include units). [1 point]

2. Preindustrial atmospheric CO_2 concentrations during the 19th Century (i.e., the 1800s) were approximately what concentration? [1 point]

3. Refer to the figure below. How much higher are current atmospheric CO_2 concentrations compared to the maximum atmospheric carbon dioxide concentrations measured from ice cores from the preceding 800,000 years? [1 point]

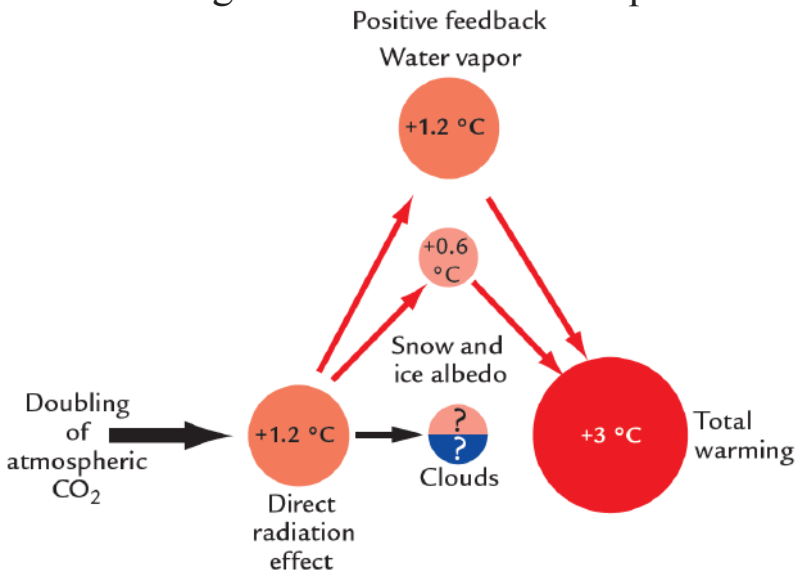


4. Approximately how much has the planet warmed over the last 125 years? [1 point]

5. What anthropogenic emissions are most directly tied to creation of the "ozone hole" in the stratosphere? [1 point]

6. What anthropogenic emissions are likely to lead to a cooling effect similar to large volcanic eruptions by reflecting and scattering some incoming solar radiation back to space? [1 point]

Consider the figure below and answer questions 7-9.

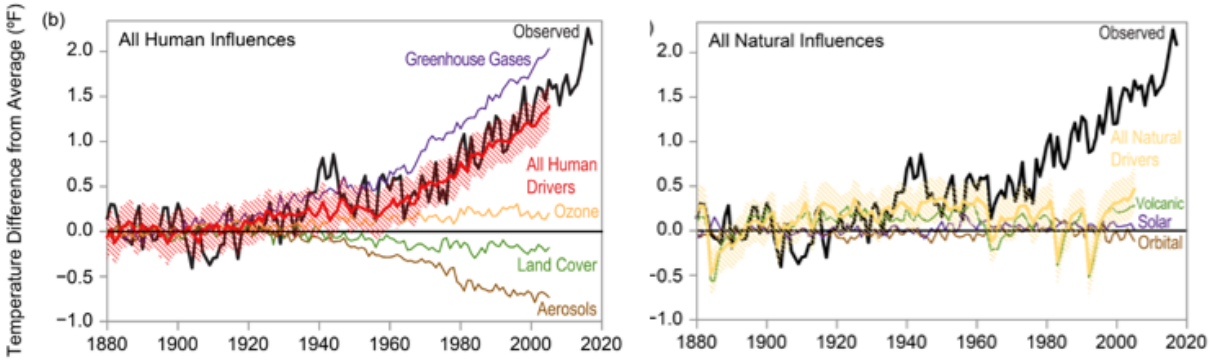


7. How much warming could be expected from a doubling of CO_2 due solely to the radiative effect (i.e., without considering possible feedbacks)? [1 point]

8. After feedbacks are added, what is the total warming expected? [1 point]

9. According to the figure, what is a major source of uncertainty in this estimates? [1 point]

10. Examine the two figures below, where the **black line shows observed warming trends** from 1880 to 2020, and the different colors show the temperature change from various forcings based on their radiative properties. The left shows temperatures associated with human forcing and the right shows natural forcing. What is the primary takeaway point of these graphs? Explain your answer. [4 points]



11. True or False? There is a strong consensus in the scientific community that Earth's climate is warming and that this warming is due to human activities. [1 point]

12. As a consequence of increased temperatures, scientists have observed a "greening of the Arctic" over the last several decades. Biomass is a sink of carbon, and thus this is often used as an example of a way in which CO_2 may be removed from the atmosphere. What are two limitations of carbon uptake by Arctic greening? [2 points]

13. What are three ***human factors*** that scientists must take into account when predicting future carbon emissions? [3 points]

14. Compare and contrast carbon sequestration and geoengineering as solutions to climate change [4 points]

15. What type of response to climate change is demonstrated in this photo? (mitigation or adaptation)? [1 point]