Study Questions: Climate Change

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The quiz about climate change will involve questions like the ones that follow

Note: Whenever you see reference to *Tarbuck,* in the following questions, that means the eText of the textbook by Tarbuck and others, **Earth**

1. Are most mountain glaciers (a.k.a. alpine glaciers) *growing* or *shrinking*?
2. Given that arctic sea ice expands every winter and contracts every summer, is the *overall* extent of arctic sea ice *growing* or *shrinking* over recent decades?
3. Is Greenland's ice sheet *growing* or *shrinking*? ...*thickening* or *thinning*?
4. How does weather differ from climate, in terms of the time interval associated with each term?
5. Where do we go to extract ice cores for climate studies that extend over tens or hundreds of thousands of years?
6. The fossil record indicates that humans like us (*Homo sapiens*) have existed on Earth for the past ~200,000 to ~300,000 years. Does the climate record preserved in ice cores indicate that the atmospheric concentration of carbon dioxide (CO_2) has varied over the past 800,000 years, both with and without *Homo sapiens*?
   Hint: examine Figure 21.4 in Tarbuck.
7. Roughly what concentration (in parts per million or ppm) was the greatest concentration of carbon dioxide (CO_2) in Earth's atmosphere for the 800,000 years prior to about the year 1700 AD?
   Hint: examine Figure 21.4 in Tarbuck.
8. Does the climate record preserved in ice cores indicate that the atmospheric concentration of carbon dioxide (CO_2) today is *smaller*, *about the same as*, or *greater than* it has been in the past 800,000 years?
9. What is the most abundant gas in clean, dry air in Earth's atmosphere?
10. What is the second-most abundant gas in clean, dry air in Earth's atmosphere?
11. Why is carbon dioxide an important gas in Earth's atmosphere?
12. What do we call a very small solid particle that is suspended in the atmosphere?
13. How do small solid particles suspended in the atmosphere contribute to *cooling* of the atmosphere?
14. How do small solid particles suspended in the atmosphere contribute to *heating* of the atmosphere?
15. How might the injection of volcanic ash and sulfur dioxide into the stratosphere during a major volcanic eruption affect the amount of solar radiation that reaches Earth's surface? Does it *increase*, *decrease*, or *have no effect on* radiation hitting the surface?
16. How might a major volcanic eruption affect the temperature of Earth's surface due to increasing the greenhouse gas concentration in the atmopshere? Would such a volcanically induced increase in greenhouse gases tend to *increase*, *decrease*, or *have no effect on* the average global temperature?
17. If Earth's atmosphere had a larger concentration of greenhouse gases, would its surface temperature likely be *cooler*, *about the same*, or *hotter than* it is now?
18. Has Earth's temperature *decreased*, *stayed about the same*, or *increased* between about 1880 and the present?
19. What is a primary reason for the increased concentration in carbon dioxide (CO_2) in Earth's atmosphere during the past ~200 years?
20. Does raising the temperature of sea water cause sea level to *decrease*, *stay the same*, or *increase*?
    Hint: watch the video available at https://qrgo.page.link/Hd51t
21. Does melting of floating sea ice cause sea level to *decrease*, *stay the same*, or *increase*?
    Hint: watch the video available at https://qrgo.page.link/Mr42z
22. Does melting of glaciers and ice caps on continental crust cause sea level to *decrease*, *stay the same*, or *increase*?
    Hint: watch the video available at https://qrgo.page.link/bhXHa
23. What are the most important greenhouse gases — important either because of their prevalence (this gas forms a larger portion of the atmosphere) or potency (the same volume of this gas has a larger temperature effect than other gases)?
24. Approximately what is the atmospheric concentration of carbon dioxide (CO_2) now?
    Hint: look for an answer at https://www.esrl.noaa.gov/gmd/ccgg/trends/weekly.html
25. How does the atmospheric concentration of carbon dioxide (CO_2) relate (if at all) to the acidity of the world's oceans? Does an increased concentration of CO_2 in the atmosphere result in less, about the same, or greater acidity in the world's oceans?
26. Do humans exert an influence on climate?