1. What are three separate variables that show substantial climate change over the past 30 years?

2. Use the Kaya Identity to explain how fossil fuel emissions have changed in the past decade, then speculate on how they might change over the next 50 years.

3. What's the difference between an empirical model and a deterministic model?

4. Name three main components of a climate model

5. What are "representative concentration pathways?" What do their numbers (2.6, 4.5, etc) mean? Where do the RCPs come from?

6. Changes in precipitation under a changing climate:
    a. What *must* happen to global average precipitation as global temperatures increase?
    b. Which latitudes will likely be wetter or drier and **why**?
    c. Why might extreme storms increase as the Earth warms?

7. Watch the video titled "**Antarctic Ice Sheet**s" on the class website.
    a. Explain in a few sentences why these two glaciers are particularly vulnerable to melting, and how scientists know this.
    b. If Pine Island Glacier in West Antarctica and Totten Glacier in East Antarctica melt or calve into the Ocean, by how much would global sea level rise?

8. Use the "CO2 and climate effects of emissions reductions" calculator on the class website to figure out how much rich countries and poor countries would have to reduce emissions (and by when) to hold global mean temperatures within 2 °Celsius of their preindustrial values.

9. Use the "Temperature Statistics for Fort Collins" calculator on the class website to estimate the frequency of winter days with subzero (F) temperatures and the frequency of summer days hotter than 100 F:
    a. From 1893 to 1923
    b. From 2000 to 2015
    c. From 2090 to 2100 under RCP 8.5

10. Use the "Earth[carbon]" calculator on the class website to estimate the atmospheric CO2 and global mean temperature (compared to preindustrial temperatures) in the year 3000 under "Business as Usual" (RCP8.5) and "Big Reductions" (RCP4.5) emissions scenarios.