

***Homework No. 2 due Monday April 14, 2014 (at beginning of class).
Write out answers in complete sentences. No computation is necessary.***

1. What is odd oxygen? How does it relate to ozone?
2. What is the primary source for odd oxygen?
3. What is a typical mixing ratio (mole fraction) of ozone in the stratospheric ozone layer?
4. Temperature increases with increasing altitude in the stratosphere. What is the reason for this behavior?
5. What is the significance of increasing temperature with altitude in the stratosphere for the transport of chemicals?
6. What are typical mixing ratios for the oxides of nitrogen and chlorine in the stratosphere? Contrast these with the typical mixing ratio of ozone.
7. Why are the oxides of nitrogen, chlorine, hydrogen and bromine important in the stratosphere?
8. What is the role of reactions that form acid anhydrides such as HCl, HNO₃, HBr and HF?
9. What are CFCs? Give a couple of examples.
10. Why is the F atom from CFCs not important for ozone depletion?
11. What are the important conditions that lead to the formation of the Antarctic ozone hole?
12. What happens to nitrogen oxides in the Antarctic winter?
13. What happens to chlorine oxides in the Antarctic winter and spring?
14. Why is the Arctic different from the Antarctic with respect to ozone in the "normal" stratosphere? In the "chlorine-perturbed" stratosphere?
15. What does the Montreal Protocol do to attempt to return stratospheric ozone to "normal"?