Atmospheric Sciences 101 **Name_____**
Homework #3 **Section_____**

Autumn 2009
Due: Tuesday, November 5, 2009

1. If the mixing ratio of a parcel of air is 3.5 g/kg and the temperature is 0°C, what is the relative humidity of the parcel? (You can assume the pressure is 1000 mb, the saturation mixing ratio at 0°C was given in class).

2. During a cold, clear night the temperature falls and dewpoint remains steady until fog begins to form. After fog formation the dewpoint drops. Explain why.

3. Why do farmers spray water on crops in danger of freezing? Explain.

4. A parcel of air at mean sea level is 10°C. If the parcel is forced to rise dry adiabatically to 1000 meters, what will its temperature be there? If the temperature of the environment is 5°C at the new level, will the parcel rise, sink or remain in place?

5. The environmental lapse rate is 8°C/km. If an air parcel which is unsaturated is displaced upwards, will it keep on going or return to its original height? Does this change if the parcel is saturated? (Assume saturated adiabatic lapse rate = 6.2°C/km)

6. Explain why fog tends to form on clear autumn nights when wind speed is light, rather than when the wind is calm or strong.