Assignment sheet: Week 4 (Feb 3)

After the third week of class you should be able to answer each of the following questions thoroughly, and with confidence. You should have this sheet completed by: **Tuesday, Feb 10**

1. What is a *photon*? What is its primary characteristic? That is, what makes one photon different from another?

2. What are the primary characteristics of a light wave? That is, what makes one light wave different from another?

3. According to the *photon description of light*, how is blue light different than red light? How is radio light different than X-ray light?

4. According to the *wave description of light*, how is orange light different than violet light? How is gamma ray light different than infrared light?

5. Draw a diagram illustrating the basic design of a *reflecting telescope*.

6. Name at least one major telescope dedicated to each of the following types of light: visible light; radio light; X-ray light; gamma ray light.

7. Discuss briefly how X-ray astronomy and gamma ray astronomy differ from visible light astronomy.

8. Describe one method for measuring distances to each of the following types of objects: a nearby star (less than 50 light-years away); distant star within our own galaxy (beyond 100 light-years away); a relatively nearby galaxy; a distant quasar.

9. What is *thermal emission*? Give an example of an astronomical object that would emit purely thermal emission.

10. What is an *emission spectrum*? Give an example of an astronomical object from which an emission spectrum might be observed.

11. What is an *absorption spectrum*? Give an example of an astronomical object from which an absorption spectrum might be observed.

12. Describe how the composition of a cloud of gas can be determined using spectroscopy.

13. Describe how the *motion* of a star or galaxy, relative to us, can be determined using spectroscopy.

14. Describe *two* ways in which the *temperature* of a source can be estimated using spectroscopy.