

## Reading Guide for November 5

from Gribbin and Gribbin, *From Here to Infinity*

### Introduction. A Brief History of Astronomy

p. 10. *Beyond the Solar System* (continued) After triangulation, the text describes another method to find the distances to stars. In this method, called **spectroscopic parallax**, the distance to a star can be determined from its color and its brightness. We will explore this in class as well, but try to get an understanding of it here (p. 10) first.

Then there is yet another technique that can be used to determine distances to stars, using a class of stars known as **Cepheids**.

- What is distinctive about the way Cepheids behave?
- How can a Cepheid's behavior be used to determine how far away it is?

pp. 10–13. *Secrets of Spectroscopy*. There is a lot of background given in this section. The key idea is identified as “the key discovery” in the text.

- What do lines in a spectrum have to do with the chemical elements?
- What is the form of a spectrum produced by a hot element?
- What is the form of the a spectrum produced by shining white light through a cool element?

*Figure 9* on p. 11 takes a little work to interpret. The horizontal axis shows the wavelength of electromagnetic radiation, from long to very short. The vertical axis shows how far down through the Earth's atmosphere the radiation penetrates. In other words, the dotted white line shows how high above the surface of the Earth you would need to rise to detect incoming radiation from outer space. Only radio and visible radiation can make it all the way through the atmosphere.

- What advantages does photography give over simply looking through a telescope?

Read the explanation of the **Doppler effect** (pp. 12–13).

- What does it mean if the light from a star is bluer when we receive it than it was when the star radiated it?
- What does it mean if the light from a star is *redder* when we receive it than when the star radiated it?