

**Chapter 24 Studying the Sun**

**Section 24.1 The Study of Light**

*This section describes the electromagnetic spectrum and how scientists use spectroscopy to study it. It also explains the Doppler effect and how it is used in astronomy.*

**Reading Strategy**

Before you read, predict the meaning of the term *electromagnetic spectrum* and write your definition in the table. After you read, revise your definition if it was incorrect. For more information on this Reading Strategy, see the **Reading and Study Skills** in the **Skills and Reference Handbook** at the end of your textbook.

Vocabulary Term	Before You Read	After You Read
electromagnetic spectrum	a.	b.

1. Why is an understanding of light important to astronomers? \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Electromagnetic Radiation**

2. The arrangement of electromagnetic waves according to their wavelengths and frequencies is called the \_\_\_\_\_.
3. 🗑️ List the types of energy that make up the electromagnetic spectrum.  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_
4. Is the following sentence true or false? Different electromagnetic waves travel through vacuum at different speeds.  
 \_\_\_\_\_
5. Circle the letter of the best description of the nature of light.
- a. Light always behaves like waves.
  - b. Light always behaves like particles.
  - c. Light sometimes behaves like waves and at other times like particles.
  - d. Light never behaves like either waves or particles.

### Chapter 24 Studying the Sun

6. How can you show that visible light is made up of many different wavelengths?

\_\_\_\_\_

\_\_\_\_\_

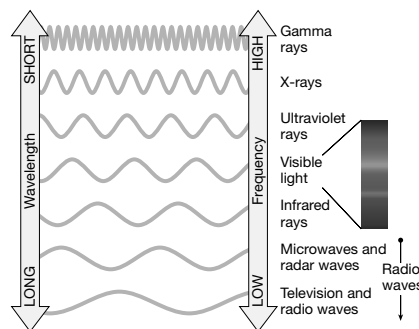
7. Particles of light are called \_\_\_\_\_.

8. According to the figure, how are frequency and wavelength related?

\_\_\_\_\_

9. Circle the letter of the waves in the figure that have the highest frequency.

- a. gamma rays
- b. ultraviolet rays
- c. infrared rays
- d. radio waves



### Spectroscopy

Match each description with its spectrum.

Description	Spectrum
_____ 10. band of color with a series of dark lines running through it	a. absorption spectrum
_____ 11. uninterrupted band of color	b. emission spectrum
_____ 12. series of bright lines of particular wavelengths	c. continuous spectrum

13. Spectroscopy is the study of the properties of light that depend on \_\_\_\_\_.

14. 🌀 What can a star's spectrum tell astronomers about the star? \_\_\_\_\_

\_\_\_\_\_

### The Doppler Effect

15. When a wave source is moving toward or away from an object, the wavelength changes, a phenomenon known as the \_\_\_\_\_.

\_\_\_\_\_

Match each situation with its type of change in a wave.

Situation	Change in Wave
_____ 16. sound source approaches an observer	a. pitch becomes lower
_____ 17. light source moves away from an observer	b. pitch becomes higher
_____ 18. sound source moves away from an observer	c. light becomes bluer
_____ 19. light source approaches an observer	d. light becomes redder

20. 🌀 How is the Doppler effect used in astronomy? \_\_\_\_\_

\_\_\_\_\_