

Key Concept Builder 

Chapter 19.1

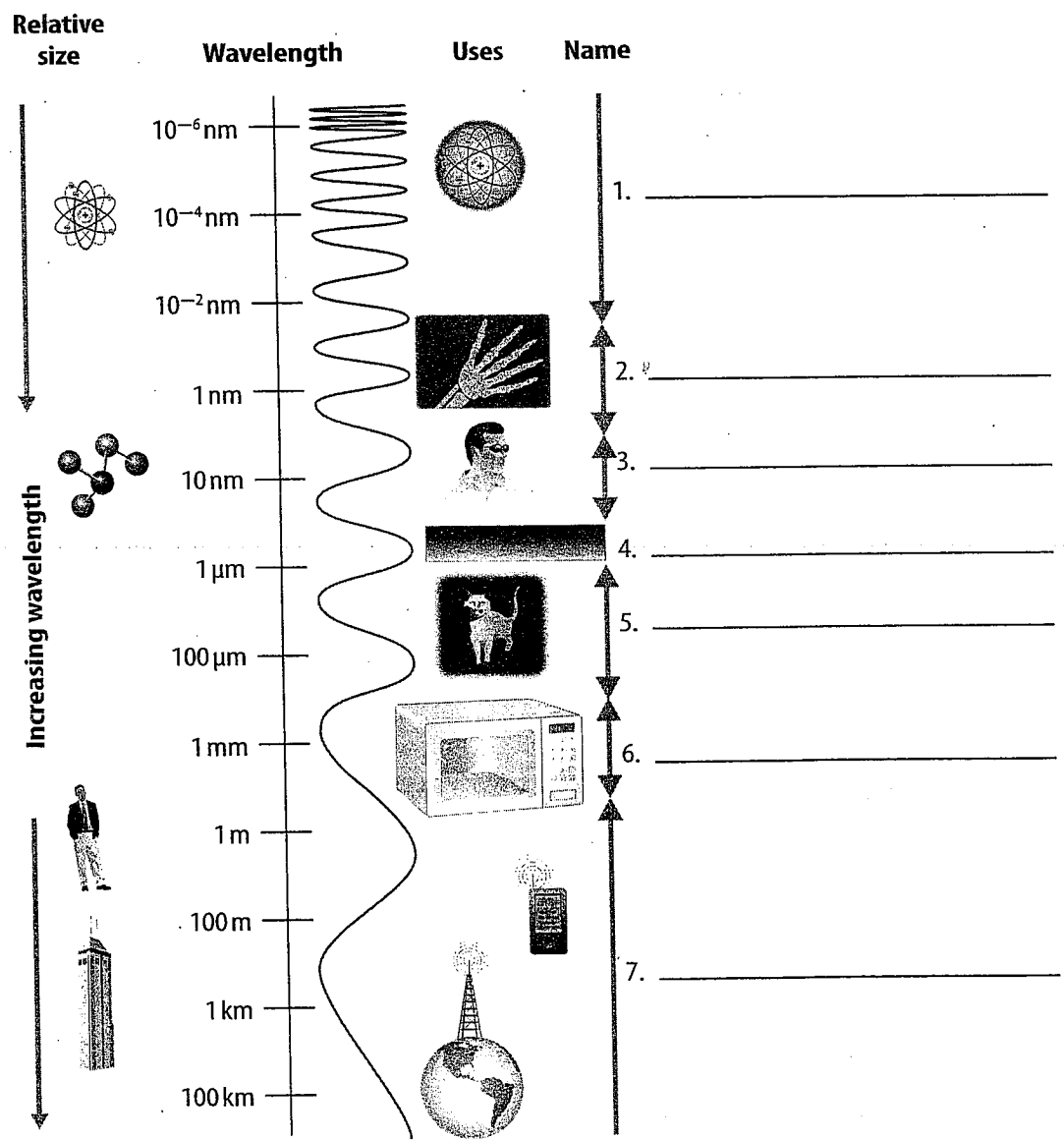
LESSON 1

Observing the Universe

Key Concept How do scientists use the electromagnetic spectrum to study the universe?

Directions: Use the underlined terms in the sentences to label the diagram on the lines provided.

- A TV remote uses infrared waves.
- X-rays help doctors diagnose disease.
- Radio waves have the longest wavelengths, and gamma rays have the shortest.
- When you talk on a cellular phone, you use microwaves.
- Visible light includes all the colors you see.
- Some sunglasses block ultraviolet waves.



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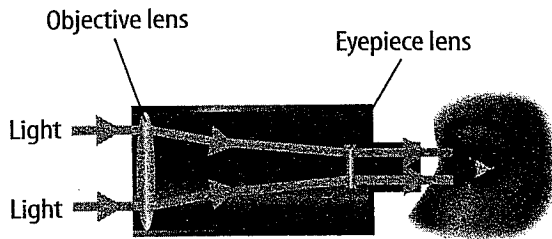
Key Concept Builder 

LESSON 1

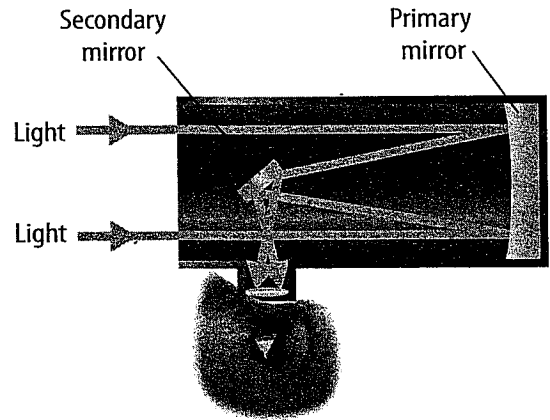
Observing the Universe

Key Concept What types of telescopes and technology are used to explore space?

Refracting telescope



Reflecting telescope



Directions: Use the diagrams to complete the table by writing each phrase in the correct column.

- use curved mirrors
- gather only visible light
- use convex lenses
- bend light to form an image
- reflect light from one mirror to another
- concentrate light from a distant object

Refracting Telescopes	1. _____ 2. _____
Reflecting Telescopes	3. _____ 4. _____
Both Types	5. _____ 6. _____

Key Concept Builder 

LESSON 1

Observing the Universe

Key Concept What types of telescopes and technology are used to explore space?

Three Space Telescopes			
	<i>Hubble</i>	<i>Spitzer</i>	<i>James Webb</i>
Launch Date	1990	2003	2013
Location	orbits Earth	orbits the Sun	will orbit the Sun
Energy Collected	visible light	infrared waves	infrared waves
Used to Study	distant objects	objects hidden by dust and gas that cannot be viewed in visible light	galaxies formed early in the history of the universe

Directions: Use the chart to circle the term in parentheses that correctly completes each description.

- Optical telescopes gather only (visible, infrared) light.
- (Refracting, Reflecting) telescopes use convex lenses to concentrate light.
- Refracting telescopes (reflect, bend) light to form an image.
- Reflecting telescopes use curved (mirrors, waves) to concentrate light.
- Radio telescopes use (an antenna, mirrors) to collect radio waves and some microwaves.
- Most (radio, space) telescopes are located in remote deserts with dry environments.
- Optical telescopes work best (on mountains, in space).
- Telescopes located in space avoid distortion from (the Sun's, Earth's) atmosphere.
- The *Hubble Space Telescope* orbits (Earth, the Sun).
- The (*Hubble*, *James Webb*) *Space Telescope* gathers visible light.
- (Optical, Space) telescopes using infrared light antennas observe old or cold objects that don't emit visible light.
- The (*Hubble*, *Spitzer*) and *James Webb Space Telescopes* orbit or will orbit the Sun.

Lesson Quiz A

LESSON 1

Observing the Universe

Multiple Choice

Directions: On the line before each question or statement, write the letter of the correct answer.

- _____ 1. Telescopes differ in the type of
 - A. Earth orbit they occupy.
 - B. mirrors they use to gather light.
 - C. electromagnetic waves they concentrate.

- _____ 2. What can light from distant stars tell astronomers about the universe?
 - A. the way stars rotate
 - B. the way stars produce energy
 - C. the way stars looked long ago

- _____ 3. In which location would an optical telescope work best for viewing space?
 - A. under the ocean
 - B. on top of a mountain
 - C. in space orbiting Earth

Completion

Directions: On each line, write the term from the word bank that correctly completes each sentence. Each term is used only once.

Hubble **radio** **reflecting**
refracting *Spitzer*

- 4. A _____ telescope uses a curved mirror to gather light.
- 5. The _____ *Space Telescope* detects infrared light from objects in space.
- 6. A telescope that uses a convex lens to concentrate light is a _____ telescope.
- 7. The _____ *Space Telescope* detects visible light from objects in space.
- 8. A huge _____ telescope is often a collection of smaller telescopes that work as one.

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