

**Chapter 22: Section 2: Directed Reading Pages 555-560****Section: Solar Energy and the Atmosphere (page 555)**

1. How is Earth's atmosphere heated?
2. Name the two primary sources of heat in the atmosphere.

**RADIATION (page 555)**

3. Define *radiation*:
4. Define *electromagnetic spectrum*:
5. What form of radiation can humans see?
6. What are three forms of radiation that humans cannot see?
7. Which wavelengths are shorter than visible light? Which are longer?

**THE ATMOSPHERE AND SOLAR RADIATION (556)**

8. How much of the radiation from visible light waves is absorbed as they pass through the atmosphere?
9. What happens to solar energy that reaches Earth's surface?
10. What is the fraction of solar radiation that is reflected off a particular surface called?

**ABSORPTION AND INFRARED ENERGY (page 557)**

- \_\_\_\_\_ 11. Solar radiation that is not reflected is  
**a.** absorbed.   **b.** scattered.   **c.** radiated.   **d.** dissipated.
- \_\_\_\_\_ 12. When Earth's surface absorbs solar radiation, the surface materials are heated by  
**a.** longer-wavelength infrared rays and ultraviolet light.  
**b.** short-wavelength infrared rays and visible light.  
**c.** short-wavelength microwaves and infrared light.  
**d.** longer-wavelength microwaves and ultraviolet light.
- \_\_\_\_\_ 13. Heated materials on Earth's surface convert energy into infrared rays of longer wavelengths and  
**a.** reabsorb energy as infrared waves.      **b.** reabsorb energy as radio waves.  
**c.** reemit energy as infrared rays.      **d.** reemit energy as radio waves.
14. What happens to the infrared rays that are reemitted into the atmosphere?
15. One process that helps heat Earth's atmosphere that is similar to the process that heats a greenhouse is called the \_\_\_\_\_.
16. The warming of the surface and lower atmosphere of Earth that occurs when carbon dioxide, water vapor, and other gases in the air absorb and reradiate infrared radiation is called the \_\_\_\_\_.

## VARIATIONS IN TEMPERATURE (page 558)

17. Why are the warmest hours of the day usually mid- to late afternoon?

18. Why are average temperatures higher at the equator than near the poles?

\_\_\_\_\_ 19. The transfer of energy as heat from one substance to another by direct contact is called  
a. conduction.            b. collision.            c. firing.            d. baking.

\_\_\_\_\_ 20. Conduction heats only the lowest few centimeters of the atmosphere because  
a. air does not come into direct contact with Earth.    b. air comes into direct contact with Earth.  
c. molecules of air in the lower atmosphere are closer together.  
d. molecules in the upper atmosphere do not collide.

## CONVECTION (page 560)

21. What is the primary cause of the heating of the lower atmosphere?

22. The movement of matter due to differences in density caused by temperature variations resulting in the transfer of heat is called \_\_\_\_\_.

## Chapter 22 Section 2 Review Page's 555 - 560

1. Explain how radiant energy reaches Earth.

2. List and describe the types of electromagnetic waves.

*Long wavelength:*

*Short wavelength:*

3. Describe how gases and particles in the atmosphere interact with light rays.

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4. Describe how visible light and infrared energy warm Earth.

5. Explain how variations in intensity of sunlight can cause temperature differences on Earth's surface.

6. You decide not to be outside during the hottest hours of a summer day. When will the hottest hours probably be? How do you know?