

Solar Energy and the Atmosphere

Standard 3 Objective 1 Indicators a, b, and c

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. Which wavelengths are shorter than visible light? Which are longer?

THE ATMOSPHERE AND SOLAR RADIATION (556)

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

ABSORPTION AND INFRARED ENERGY (page 557)

11. Solar radiation that is not reflected is _____.
12. When Earth's surface absorbs solar radiation, what are surface materials heated by?
13. What happens to the infrared rays that are reemitted into the atmosphere?
14. What does the absorption of thermal energy from the ground do to Earth's surface?
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 _____.

17. How does the amount of solar energy that enters Earth's atmosphere generally compare to the amount that escapes into space?
18. What is one human activity that may have caused the average temperature of the atmosphere to increase in recent years?

VARIATIONS IN TEMPERATURE (page 558)

19. Why are the warmest hours of the day usually mid- to late afternoon?
20. What is the primary factor that affects how much solar energy reaches any point on Earth's surface?
21. Near the equator, the rays of the sun strike the ground at an angle of about _____.
22. Why are average temperatures higher at the equator than near the poles?
23. Why do Seasonal variations in temperature occur?

CONVECTION (page 560)

24. What is the primary cause of the heating of the lower atmosphere?
25. 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

26. Explain how radiant energy reaches Earth.
27. Describe how gases and particles in the atmosphere interact with light rays.
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28. Describe how visible light and infrared energy warm Earth.
29. Explain how variations in intensity of sunlight can cause temperature differences on Earth's surface.
30. 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?