

SECTION

1 REVIEW

Summary

Atmospheric Structure

- The stratosphere and the troposphere are two lower layers of Earth's atmosphere. Most weather takes place in the troposphere.

Atmospheric Heating

- Most solar radiation first heats Earth's surface, which then heats the atmosphere.
- Characteristics of the land surface greatly influence atmospheric heating.

Water in the Atmosphere

- Cloud formation generally requires moist air, rising and cooling, and condensation nuclei.
- Water is cycled through Earth's system by precipitation, runoff, storage, and evaporation.

Self Check

1. Describe how temperature of the atmosphere changes with height and explain why.
2. Explain the greenhouse effect.
3. Explain why small changes in the amount of trace gases are so important in heating Earth's atmosphere.
4. Identify what must happen before rain can occur.
5. Compare and contrast cumulus and stratus clouds.
6. **Think Critically** How might changes on Earth's surface such as deforestation, have an effect on weather?

Applying Math

7. **Use Percentages** If the southern hemisphere contains 10 percent land and the northern hemisphere contains roughly 40 percent land, what percent of Earth is land?

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1. In the stratosphere, temperature increases with height; in the troposphere it decreases with height.
2. Water vapor, carbon dioxide, and trace gases transmit solar radiation to the surface, but absorb the Earth's infrared radiation, preventing it from escaping into space.
3. Trace gases are stronger absorbers than nitrogen and oxygen and heat the atmosphere more.
4. First, the air must be completely saturated. Then the water vapor must condense into droplets, usually around condensation nuclei.
5. Both types of clouds form as water vapor condenses. Stratus clouds are layered, form slowly, and produce drizzle or slow rain. Cumulus clouds are large and puffy, form rapidly, and usually produce showers.
6. Changes on Earth's surface, such as deforestation, alter the absorption of solar radiation. This leads to uneven heating of Earth's atmosphere that causes differences in air pressure, wind, and other weather conditions. Also, deforestation alters concentrations of atmospheric CO₂ and water vapor, which are trace gases.
7. 25 percent