

Name: Key Date: \_\_\_\_\_ Core \_\_\_\_\_

LT: I can summarize how the sun's energy is transferred through the processes of radiation, conduction and convection.

## Heating of the Atmosphere

Directions: Read Chapter 1, Section 2 of the Weather and Climate textbook (pages 10-13), and then answer the following questions.

1. The Earth's atmosphere is heated by solar energy. (Circle one)

True False

2. The Earth receives about two-billionths of the radiation released by the sun.

3. Study Figure 8 (page 10). What percentage of the sun's radiation that reaches the Earth is absorbed or reflected in each of the following ways?

25% scattered and reflected by clouds and air

5% reflected by the Earth's surface

50% absorbed by the Earth's surface

20% absorbed by ozone, clouds, and atmospheric gases

4. Energy transferred by heat from the sidewalk to your foot is an example of \_\_\_\_\_ (Circle one)

conduction convection

5. In convection currents, cold air \_\_\_\_\_ (Circle one)

sinks rises

6. How do greenhouse gases act like the layer of glass in a greenhouse? (Hint: Study Figure 10)

Like glass, the gases allow solar energy to pass through, and keep the heat from escaping back out of the atmosphere

Mark each of the following statements as True or False.

7. true Gases in the atmosphere can gain energy from the land and water.

8. true An increase in carbon dioxide might cause global warming because more carbon dioxide would be able to trap more heat.

9. true The balance between incoming radiation and outgoing heat is called radiation balance.

10. false Rising temperatures on Earth would not cause major changes in plant and animal communities.



11. Why would planting millions of trees help reduce the greenhouse effect?

Planting millions of trees would help to reduce the greenhouse effect because plants absorb  $\text{CO}_2$  which is one of the main causes of the greenhouse effect.

Define the following terms:

12. radiation

Radiation is the transfer of energy as waves.

13. conduction

Conduction is the transfer of thermal energy from one material to another by direct contact.

14. convection

Convection is the transfer of thermal energy by the circulation of liquid or a gas.

15. Describe three things that can happen to energy when it reaches the Earth's atmosphere.

Three things that can happen to energy when it reaches the Earth's atmosphere are that it can be absorbed by the Earth's surface, it can be absorbed by the ozone, or it can be reflected by the Earth's surface + clouds.

16. How is energy transferred through the atmosphere?

There are three main ways that energy is transferred through the atmosphere - radiation, convection and conduction.

17. What is the greenhouse effect?

The greenhouse effect is the process in which gases in the Earth's atmosphere trap thermal energy and radiate it back to the Earth.

18. How does the process of convection rely on conduction?

Convection relies on conduction because conduction is responsible for heating the air near the Earth's surface. This air then rises ~~as a result~~ allowing convection to occur.

cools  
warms  
rises  
sinks