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**Book I Chapter 1 Lesson 2 Review**

**ANSWERS**

On a separate piece of paper, answer the following questions. Use complete sentences!

1. What is the name of the energy that travels through space?

Radiation energy travels through space. You can find radiation energy in sunlight, radar waves, microwaves, nuclear sources, and x-rays.

2. True or False: The Earth receives 2 % of the total energy output from the sun.

(If you decide the statement is false, correct the statement to make it true)

False! The Earth receives only about two billionths of the total output of the Sun.

3. Explain the difference between **conduction** and **convection**.

Conduction and convection are both terms that explain how heat is transferred through materials.

**Conduction** is the transfer of heat through material with DIRECT CONTACT. Heat is transferred from objects with high heat energy to objects with lower heat energy. For example, in the atmosphere, molecules of gas absorb heat energy from the Sun. When these molecules collide with other molecules or with another object, the heat is transferred. If the molecules collide with YOU, the heat will be transferred and you will ‘feel’ the heat.

**Convection** is the transfer of heat through a moving liquid or a moving gas. Convection is created when liquids or gases are heated. Hot liquids and gases will rise higher than cooler liquids and gases – pushing cooler liquids or gases out of the way and forcing them to move ‘downward’. This causes an overall circular pattern called a convection current/

4. Account for the energy output from the Sun: (as a percentage)

-How much of this energy is reflected or scattered back into space? 30%

-How much of this energy is absorbed by the atmosphere? 20%

-How much of this energy is absorbed by the Earth? 50%

\*your numbers should add back to 100%

5. Explain the term **radiation balance**.

Radiation balance is a term used to explain what happens to the energy that reaches Earth from the Sun. All the energy from the Sun is eventually ‘returned’ back into outer space. About 30% of the energy from the sun is immediately reflected back into outer space – it never even reaches the surface of Earth. The remaining 70% of the energy from the Sun eventually gets re-radiated back into space as heat (or thermal) energy. Even the energy that is absorbed by the ozone layer or the Earth itself eventually is re-radiated back into space. If this did not occur, the Earth would continually heat up and become so hot that it would eventually burn itself up. If too much of the Sun’s energy was radiated back into space too quickly, it would result in an ice-planet.

6. What is the greenhouse effect?

The greenhouse effect is a term used to describe the action of atmospheric gases temporarily trapping heat in order to keep Earth warm and habitable. The atmosphere acts like a blanket to temporarily trap heat in order to keep global temperatures warm enough to sustain life. Without the greenhouse effect, the planet would be too cold to support life as we know it. The atmospheric gases slow down the loss of heat back into outer space.

7. List two greenhouse gases and the source of these gases. Explain what could happen if the amounts of these gases increase within our atmosphere.

Some greenhouse gases include carbon dioxide, water vapor, methane and nitrous oxide. These gases naturally occur in our atmosphere and create the atmospheric ‘blanket’ that keeps our planet at temperature that can support life.

Over the history of our planet, the amounts of these gases have fluctuated, but eventually returned to the optimal balance to keep global temperatures steady. Over the past two centuries, scientists have noticed a trend that includes consistant increases in the total amounts of two specific greenhouse gases – carbon dioxide and methane.

The increase in these gases – specifically carbon dioxide and methane – is directly connected to human activities. Burning fossil fuels like coal and gasoline creates carbon dioxide, and these emissions increase the amounts of carbon dioxide in the atmosphere.

Deforestation also contributes to an increase in carbon dioxide. Plants help to remove carbon dioxide from the atmosphere because plants use carbon dioxide in cellular activities. When large amounts of plants are removed, this can cause a build up of carbon dioxide.

Humans also rely on livestock (cows, pigs, etc) as a major food source. The waste products from these animals produce methane, a greenhouse gas. The populations of these animals has skyrocketed over the past hundred years and so has the amounts of methane released into the atmosphere.

With increases in these greenhouse gases, the atmospheric conditions have changed. The atmosphere is becoming thicker, increasing the ability of the atmosphere to retain heat. With more heat being held in the atmosphere and less heat being radiated back into space, global temperatures are rising. This can cause catastrophic climate changes that can endanger many species on Earth, including humans.