Name: _____ **Date:** _____

Answer Key: When the Atmosphere Gets Feverish: 6th Grade Climate Analysis

Interpret data on albedo effects and permafrost feedback loops to prepare for a classroom debate on global sustainability strategies.

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1. The 'Albedo Effect' refers to how much sunlight a surface reflects. If Arctic sea ice continues to melt and is replaced by dark ocean water, what is the most likely result?

Answer: C) More solar energy will be absorbed, accelerating global warming.

Dark surfaces like open ocean water have a lower albedo than ice, meaning they absorb more heat energy rather than reflecting it back into space.

2. Scientists analyze bubbles trapped in _____ to study the composition of the Earth's atmosphere from hundreds of thousands of years ago.

Answer: C) Ice cores

Ice cores from Greenland and Antarctica contain air bubbles that act as 'time capsules,' allowing scientists to measure past CO2 levels.

3. True or False: The 'Enhanced Greenhouse Effect' is a natural process that has kept Earth warm enough for life for millions of years.

Answer: B) False

The 'Greenhouse Effect' is natural and necessary; however, the 'Enhanced' Greenhouse Effect refers to the extra warming caused by human-led emissions.

4. Which of these represents a 'Positive Feedback Loop' in the context of climate change?

Answer: B) Thawing permafrost releasing methane, which leads to more warming.

A positive feedback loop occurs when a change triggers a response that intensifies the original change, such as warming causing the release of more greenhouse gases.

5. While CO2 is the most discussed gas, _____ is a greenhouse gas that is 25 times more potent at trapping heat and is often released by landfills and rice paddies.

Answer: B) Methane

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Methane (CH_4) is a powerful greenhouse gas that, while less abundant than CO_2, has a much higher heat-trapping capability over a 100-year period.

6. True or False: Thermal expansion—the tendency of water to increase in volume as it gets warmer—is a major contributor to rising sea levels.

Answer: A) True

Sea level rise isn't just from melting ice; as ocean water warms, the molecules move more and take up more space, causing the water level to rise.

7. What is the primary difference between 'Weather' and 'Climate'?

Answer: C) Weather is short-term conditions; climate is long-term averages.

Weather is what you see outside today; climate is the pattern of weather recorded over a long period, usually 30 years or more.

8. The process of 'Ocean _____' occurs when the sea absorbs excess CO_2, which lowers the pH of the water and harms shell-building organisms.

Answer: C) Acidification

When CO_2 dissolves in seawater, it forms carbonic acid, making the water more acidic and dissolving the calcium carbonate shells of many marine species.

9. True or False: Volcanic eruptions can actually cause short-term global cooling by releasing ash and particles that block sunlight.

Answer: A) True

Large eruptions release sulfate aerosols into the stratosphere, which reflect sunlight away from Earth, causing a temporary 'volcanic winter' effect.

10. Which of the following is considered a 'Mitigation' strategy rather than an 'Adaptation' strategy?

Answer: B) Switching a city's bus fleet from diesel to electric power.

Mitigation focuses on fixing the root cause (reducing emissions), whereas adaptation focuses on living with the changes that are already happening.