

Name: _____ Date: _____

Answer Key: Outsmart the Greenhouse Effect: A 5th Grade Climate Analysis Quiz

Evaluate the relationship between albedo effect, permafrost thaw, and feedback loops to understand how global systems respond to thermal energy shifts.

1. The 'Albedo Effect' describes how different surfaces reflect sunlight. If Arctic sea ice melts and reveals dark ocean water underneath, how does this affect the Earth's temperature?

Answer: B) The dark water absorbs more heat, accelerating global warming.

This is a positive feedback loop: lighter surfaces (ice) reflect energy, while darker surfaces (ocean) absorb it, leading to further warming.

2. When permafrost in the Arctic tundras thaws due to rising temperatures, it releases _____, a potent greenhouse gas that was trapped in the frozen soil.

Answer: C) Methane

Methane is produced by decomposing organic matter in thawing permafrost and is significantly more effective at trapping heat than carbon dioxide.

3. True or False: Planting 'urban forests' in cities is an adaptation strategy designed to reduce the 'Heat Island Effect' caused by concrete and asphalt.

Answer: A) True

Urban forestry provides shade and transpiration, which helps cool cities that otherwise trap heat in building materials.

4. If a coastal community builds 'living shorelines' using oyster reefs and marsh grasses instead of concrete walls, which objective are they primarily meeting?

Answer: B) Creating a natural barrier that adapts to rising sea levels.

Living shorelines are an adaptation strategy that uses nature to absorb storm surges and grow with rising tides.

5. Scientists study ancient climate data by drilling long cylinders of ice out of glaciers. These are known as _____.

Answer: C) Ice Cores

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Ice cores contain trapped air bubbles from thousands of years ago, allowing scientists to measure past CO2 levels.

6. Which of these represents a 'Mitigation' strategy rather than an 'Adaptation' strategy?

Answer: C) Switching a city's bus fleet from diesel to green hydrogen.

Mitigation focuses on reducing the causes of climate change (emissions), whereas the others are ways of living with the effects.

7. True or False: The Greenhouse Effect is a completely man-made phenomenon that did not exist before the Industrial Revolution.

Answer: B) False

The natural greenhouse effect is necessary for life; human activity has simply intensified it to dangerous levels by adding extra gases.

8. Ocean _____ happens when the sea absorbs excess CO2, which lowers the pH of the water and makes it harder for shellfish to grow shells.

Answer: A) Acidification

As CO2 dissolves in seawater, it forms carbonic acid, disrupting the chemical balance needed by calcifying organisms like clams and oysters.

9. How does the loss of mountain glaciers impact human populations living in valleys below?

Answer: B) It leads to a permanent decrease in reliable freshwater for farming.

Glaciers act as 'water towers,' releasing meltwater slowly during dry seasons. Without them, water security for millions is threatened.

10. True or False: Re-introducing apex predators like wolves to an ecosystem can be a form of 'Nature-Based Climate Solution' because it can help restore forests that store carbon.

Answer: A) True

This is known as a trophic cascade; predators control populations of herbivores that would otherwise overeat young trees which are vital for carbon sequestration.