

Climate Change Science Essentials

Climate Science · Practice Test · 25 Questions

1. Which gas is responsible for the largest portion of the enhanced greenhouse effect caused by human activities?

- A) Methane
- B) Carbon dioxide
- C) Nitrous oxide
- D) Ozone

2. What is the primary process by which oceans mitigate atmospheric warming?

- A) Absorbing excess heat and carbon dioxide
- B) Reflecting sunlight into space
- C) Releasing oxygen into the atmosphere
- D) Neutralizing nitrogen levels

3. Which term describes the long-term trend of increasing average global temperatures?

- A) Climate variability
- B) Global warming
- C) Weather oscillation
- D) Thermal inversion

4. What is the relationship between the burning of fossil fuels and the carbon cycle?

- A) It creates new carbon atoms
- B) It releases sequestered carbon into the atmosphere
- C) It reduces the amount of carbon in the crust
- D) It accelerates the natural carbon sequestration process

5. Which scientific instrument is primarily used to measure current atmospheric CO₂ concentrations at the Mauna Loa Observatory?

- A) Spectrometer
- B) Keeling Curve sensor
- C) Barometer
- D) Anemometer

6. What phenomenon occurs when warming leads to the loss of reflective ice, causing even more heat absorption?

- A) The Greenhouse Effect
- B) The Albedo Effect
- C) The Coriolis Effect
- D) The Greenhouse Feedback

7. What is the primary driver of current sea-level rise?

- A) Increased underwater volcanic activity
- B) Thermal expansion of seawater and glacial melt
- C) Changes in oceanic currents
- D) Increased evaporation from lakes

8. Which atmospheric layer is where the majority of human-induced greenhouse gas trapping occurs?

- A) Stratosphere
- B) Mesosphere
- C) Troposphere
- D) Thermosphere

9. What is the main chemical byproduct of methane oxidation in the atmosphere?

- A) Sulfur dioxide
- B) Carbon dioxide
- C) Nitrogen
- D) Argon

10. How do volcanic eruptions influence short-term global climate?

- A) They increase global temperatures significantly
- B) They release sulfate aerosols that reflect sunlight
- C) They permanently deplete the ozone layer
- D) They have no impact on climate

11. What is the main source of human-produced nitrous oxide emissions?

- A) Transportation
- B) Agricultural soil management
- C) Cement production
- D) Refrigeration

12. What is the approximate percentage of solar radiation that is reflected back into space by clouds and Earth's surface?

- A) 5%
- B) 30%
- C) 50%
- D) 75%

13. Which isotope analysis is often used to differentiate between fossil fuel CO₂ and natural CO₂?

- A) Carbon-14
- B) Carbon-13
- C) Oxygen-18
- D) Deuterium

14. What does the term 'ocean acidification' refer to?

- A) The rise in ocean temperature
- B) The decrease in oceanic pH due to CO₂ absorption
- C) The increase in plastic pollution
- D) The loss of salt concentration in seawater

15. Which human activity is the largest source of global methane emissions?

- A) Waste management
- B) Livestock enteric fermentation
- C) Residential heating
- D) Forest fires

16. What is a 'proxy' in the context of paleoclimatology?

- A) A computer model
- B) Physical evidence like ice cores or tree rings
- C) A satellite observation
- D) A historical weather report

17. What is the role of permafrost in the context of the global carbon cycle?

- A) It acts as a permanent carbon sink
- B) It stores large amounts of organic carbon that can be released as methane when thawed
- C) It increases the rate of forest growth
- D) It has no significant role in carbon storage

18. Which international agreement was designed to phase out substances that deplete the ozone layer, indirectly benefiting climate?

- A) Kyoto Protocol
- B) Paris Agreement
- C) Montreal Protocol
- D) Copenhagen Accord

19. How does deforestation contribute to climate change beyond the loss of carbon sequestration?

- A) It increases the concentration of ozone
- B) It reduces the Earth's surface albedo
- C) It releases stored carbon from biomass and soil
- D) It creates excess sulfur dioxide

20. What does the 'Global Warming Potential' (GWP) of a gas measure?

- A) The total amount of the gas in the atmosphere
- B) Its ability to trap heat relative to CO₂ over a specific time
- C) Its chemical toxicity
- D) The speed at which it degrades in the stratosphere

21. Which of these is a confirmed impact of ocean warming on marine ecosystems?

- A) Increased frequency of coral bleaching
- B) Enhanced growth of all fish species
- C) Increased salinity in deep-sea trenches
- D) Faster ice shelf formation

22. What is the 'Greenhouse Effect' a natural requirement for?

- A) Maintaining temperatures suitable for life on Earth
- B) Preventing the formation of clouds
- C) Filtering ultraviolet radiation
- D) Increasing atmospheric oxygen levels

23. What are Milankovitch cycles known to influence?

- A) The intensity of current human-driven warming
- B) Long-term natural cycles in Earth's climate
- C) The rate of photosynthesis
- D) The concentration of methane in the troposphere

24. Which sector is the largest contributor to global greenhouse gas emissions?

- A) Transportation
- B) Energy production
- C) Waste
- D) Agriculture

25. What is the primary component of 'black carbon' aerosols?

- A) Soot from incomplete combustion
- B) Sulfur particles
- C) Water vapor
- D) Nitrogen oxides