# Climate Change Impacts on Earth's Biosphere

Climate Change · Answer Key · 10 Questions

**1. What is the primary mechanism by which ocean acidification, caused by increased atmospheric CO2, affects calcifying organisms like pteropods?**

A) Increased water temperature kills the organisms

**B) Increased hydrogen ion concentration reduces carbonate ion availability**

C) Decreased salinity inhibits shell formation

D) Enhanced photosynthesis causes toxic algal blooms

**2. Which phenomenon is identified as the primary driver of 'phenological mismatch' in migratory bird species due to climate change?**

A) Shifts in magnetic pole orientation

**B) Changes in the timing of peak insect abundance**

C) Increased predation by invasive species

D) Reduced availability of nesting materials

**3. In the context of coral bleaching, which biological process is disrupted between the coral polyp and its symbiotic zooxanthellae?**

A) The synthesis of calcium carbonate

**B) The process of photosynthesis providing glucose to the host**

C) The nitrogen fixation process in the coral gut

D) The mechanical filtration of zooplankton

**4. Which specific Arctic marine mammal is listed as a 'vulnerable' species under the IUCN Red List primarily due to sea ice loss impacting its foraging and mating habitats?**

A) Pusa hispida (Ringed seal)

**B) Ursus maritimus (Polar bear)**

C) Monodon monoceros (Narwhal)

D) Odobenus rosmarus (Walrus)

**5. The 'treeline shift' observed in high-latitude mountain ecosystems is a documented response to rising temperatures. Which factor most limits this upward migration?**

A) Increased atmospheric pressure

**B) Soil nutrient availability and depth**

C) Decreased solar radiation

D) The presence of predatory insects

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**6. Which chemical feedback loop is currently accelerating permafrost degradation in the Siberian tundra?**

A) Nitrogen sequestration by mosses
**B) Release of sequestered methane and carbon dioxide**
C) Increased absorption of solar radiation by volcanic ash
D) Decreased transpiration from coniferous trees

**7. What is the main physiological impact of warming oceans on the metabolic rate of ectothermic fish species?**

A) Decreased metabolic rate leading to lethargy
**B) Increased metabolic demand exceeding oxygen supply**
C) Total cessation of reproductive activity
D) Enhanced growth rates regardless of oxygen availability

**8. The migration of the 'huckleberry' (Vaccinium membranaceum) is restricted in alpine regions due to the disappearance of which specific environmental factor?**

A) High soil humidity
**B) Reliable winter snowpack for insulation**
C) Extended periods of darkness
D) Specific pollinator species of moths

**9. How does climate change specifically impact the sex ratio of sea turtle populations, such as Chelonia mydas?**

A) By altering the salinity of nesting beaches
**B) By temperature-dependent sex determination (TSD) in eggs**
C) By increasing the frequency of hurricanes
D) By reducing the viability of hatchling movement

**10. Which specific carbon sink in the Southern Ocean has shown decreased efficiency in absorbing anthropogenic CO2 due to intensified wind patterns?**

A) The deep-sea coral reefs
**B) The Southern Ocean 'biological pump' and surface mixing**
C) The Antarctic ice shelf edge
D) The benthic sediment layers

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