

Mass Extinctions & The Biodiversity Crisis

Use this guide to help you test your knowledge by quizzing yourself on the terms with the definitions hidden and answering the concept questions.

New Vocabulary or Terminology

biodiversity

- The variety of life on Earth including the number of species on Earth or within an area, genetic variation within a species, and different habitats available.

Before Present (BP)

- Refers to years before present. Because the present year changes, present is defined as 1950 A.D. This convention comes from the development of radiocarbon dating.

ecosystem processes

- Key interactions among living and non-living parts of an ecosystem. These are common to all ecosystems, but may be performed by different species in different ecosystems. They include energy transfer, primary production, decomposition, nutrient cycling, and water cycling.

ecosystem services

- Benefits humans receive from ecosystems such as pollination, soil formation, and water regulation.

evolution

- Theory first proposed by Charles Darwin that all species on Earth are descended from ancestral species due to changes in the genetic composition of a population over successive generations.

exotic species

- Species introduced by humans to a geographical area where it is not native.

extinction

- The dying out of a species. Local extinction happens when a species becomes extinct in one geographic area, but persists in another. In global extinction, the species disappears from everywhere on the planet.

fossil

- Remains or evidence of a once-living organism. A fossil may be an entire organism or parts of it, impressions the organism made such as trails or footprints, or artifacts such as dung, burrows, or nests.

invasive species

- An exotic species that becomes so well adapted to its new environment that it tends to spread rapidly and cause harm to the environment, economy, or human health.

mass extinction

- A major episode of extinction involving many taxa over a relatively short period of geologic time.

megafauna

- Large (>45 kg or 100 pound) land animals.

microclimate

- Localized climate that differs from the surrounding regional climate. Microclimates may be only a few square meters to several square miles in area.

positive feedback cycle

- Amplification of an initial change in a system as a result of interactions among the components of the Earth system.

Conceptual Questions

1. How are mass extinctions different from normal extinctions in the fossil record?
 - Mass extinctions are periods when extinction rates rise much higher than normal and large numbers of species die out within a relatively brief time, resulting in a rapid decrease in biodiversity on Earth.
2. What factors are thought to have caused past mass extinctions?
 - Various factors thought to have caused past mass extinctions include asteroid impacts, volcanism, changing climate, sea level fluctuations, and shifts in atmospheric and oceanic chemistry. These factors are often interrelated, so multiple components of Earth's systems may interact to cause mass extinctions.

3. What factors are causing current extinctions?

- Like past mass extinctions, there can be more than one factor threatening species with extinction and negatively impacting ecosystems. Unlike past mass extinctions, however, current extinctions are being caused by human actions including overhunting and overfishing, habitat loss and fragmentation, climate change, the introduction of invasive species.

4. What is the difference between an exotic species and an invasive species?

- An exotic species is a species that is introduced, either intentionally or accidentally, by humans to a locations where it does not naturally occur. Many exotic species fail to survive or thrive in their new environment. Others that do survive may not be harmful. When an exotic species spreads rapidly and causes harm to the environment, economy, or human health, it is considered an invasive species.

5. Are we currently in the midst of a sixth mass extinction?

- Although we are limited by incomplete fossil and modern data, there is wide agreement among scientists that extinction rates and magnitudes are higher than usual, with a recent estimate suggesting that the current extinction rate is 1000 times higher than the normal background rate. Although recent species losses may not yet qualify as a mass extinction, if the extinction rate increases to the point at which all threatened species disappear within a century, we would reach a sixth mass extinction comparable to the five most severe past mass extinction events within ~240 to 540 years.