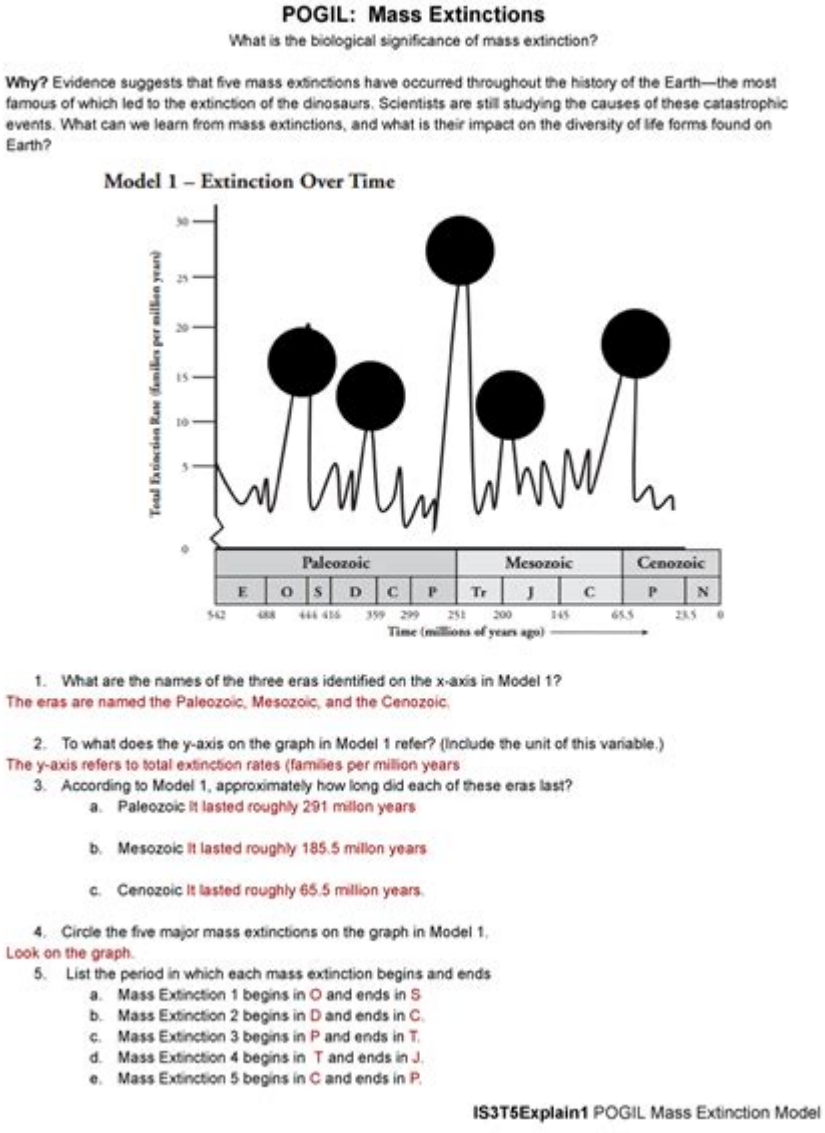
Mass Extinction Pogil Answer Key



POGIL: Mass Extinctions

What is the biological significance of mass extinction?

Why? Evidence suggests that five mass extinctions have occurred throughout the history of the Earth—the most famous of which led to the extinction of the dinosaurs. Scientists are still studying the causes of these catastrophic events. What can we learn from mass extinctions, and what is their impact on the diversity of life forms found on Earth?

Model 1 – Extinction Over Time

1. What are the names of the three eras identified on the x-axis in Model 1?

The eras are named the Paleozoic, Mesozoic, and the Cenozoic.

2. To what does the y-axis on the graph in Model 1 refer? (Include the unit of this variable.)

The y-axis refers to total extinction rates (families per million years

3. According to Model 1, approximately how long did each of these eras last?
   a. Paleozoic It lasted roughly 291 millon years
   b. Mesozoic It lasted roughly 185.5 millon years
   c. Cenozoic It lasted roughly 65.5 million years.

4. Circle the five major mass extinctions on the graph in Model 1.

Look on the graph.

5. List the period in which each mass extinction begins and ends
   a. Mass Extinction 1 begins in O and ends in S
   b. Mass Extinction 2 begins in D and ends in C.
   c. Mass Extinction 3 begins in P and ends in T.
   d. Mass Extinction 4 begins in T and ends in J.
   e. Mass Extinction 5 begins in C and ends in P.

IS3T5Explain1 POGIL Mass Extinction Model

Mass extinction pogil answer key is a term that refers to the instructional materials used in Process Oriented Guided Inquiry Learning (POGIL) related to the topic of mass extinction events. Mass extinctions are significant episodes in Earth's history where a substantial percentage of species disappear in a relatively short period of geological time. Understanding these events is crucial for students of biology, ecology, and environmental science as they shed light on the dynamics of life on Earth, the impact of environmental changes, and the resilience of ecosystems. This article aims to provide a comprehensive overview of mass extinctions, the POGIL approach to teaching this topic, and a general answer key for typical questions that may arise in such educational contexts.

What is Mass Extinction?

Mass extinction is defined as a widespread and rapid decrease in the biodiversity on Earth. This phenomenon can be attributed to various factors, including:

- Catastrophic Events: Such as asteroid impacts, volcanic eruptions, and climate change.
- Environmental Changes: Long-term shifts in climate, sea levels, and ocean chemistry.
- Biological Factors: Invasive species, disease, and competition for resources.

Historical Context of Mass Extinction Events

There have been five major mass extinction events recorded in the geological history of the planet:

1. Ordovician-Silurian Extinction (around 440 million years ago)
2. Late Devonian Extinction (around 375 million years ago)
3. Permian-Triassic Extinction (around 252 million years ago)
4. Triassic-Jurassic Extinction (around 201 million years ago)
5. Cretaceous-Paleogene Extinction (around 66 million years ago)

Each of these events was characterized by the loss of a significant percentage of species, ranging from 50% to as high as 96% in the Permian-Triassic Extinction.

Causes of Mass Extinction

Understanding the causes of mass extinction is vital for comprehending how life on Earth has evolved over time. The causes can be broadly categorized as follows:

Natural Causes

- Volcanic Activity: Large-scale eruptions can lead to climate change and habitat destruction.
- Asteroid Impacts: Such impacts can lead to immediate and drastic changes in the environment.
- Sea Level Changes: Fluctuations can eliminate coastal habitats and disrupt ecosystems.

Anthropogenic Causes

In recent years, the focus has shifted toward human-induced factors contributing to extinction rates. These include:

- Habitat Destruction: Urbanization, deforestation, and agriculture lead to the loss of natural habitats.
- Pollution: Contaminants can affect species health and reproductive success.
- Climate Change: Global warming caused by human activity is altering habitats and food sources.

The POGIL Approach in Teaching about Mass Extinction

POGIL is a student-centered instructional strategy that emphasizes active learning. It involves students working in small groups to construct their understanding of concepts through guided inquiry. The POGIL approach typically includes:

1. Modeling: Students analyze data or models related to mass extinctions, such as fossil records or climate data.
2. Guided Inquiry: Instructors provide guiding questions that lead students to discover principles related to mass extinction.
3. Collaboration: Students work together, sharing insights and discussing their findings.

Structure of a POGIL Activity on Mass Extinction

A typical POGIL activity on mass extinction might include:

- Introduction: Brief overview of mass extinction events.
- Data Analysis: Students examine graphs showing species diversity over time.
- Guiding Questions: Questions to prompt discussion such as:
- What patterns do you observe in the data?
- How do the extinction rates correlate with geological events?
- Conclusion: Students summarize their findings and reflect on the implications for current biodiversity.

Sample Questions and Answer Key for Mass Extinction POGIL Activities

Below is a sample of questions that might be included in a POGIL activity on mass extinction, along with a general answer key.

Sample Questions

1. What evidence supports the idea that a mass extinction occurred at the end of the Cretaceous period?
2. Describe how volcanic eruptions could lead to a mass extinction.
3. What role do humans play in the current rates of extinction?
4. How does the fossil record provide insight into past mass extinctions?
5. What can be inferred about ecosystem resilience based on previous extinction events?

Answer Key

1. Evidence of mass extinction at the end of the Cretaceous includes high levels of iridium found in sediment layers, indicating an asteroid impact, and the presence of shocked quartz, along with a significant drop in biodiversity seen in the fossil record.
2. Volcanic eruptions can release large amounts of ash and gases into the atmosphere, leading to climate cooling and acid rain, which can devastate ecosystems and reduce habitability for many species.
3. Humans contribute to extinction through habitat destruction, pollution, overexploitation of resources, and introducing invasive species that outcompete native species.
4. The fossil record shows a pattern of species disappearance followed by periods of recovery, helping scientists understand the timeline and impact of mass extinction events.
5. Ecosystem resilience can be inferred from the recovery patterns after mass extinctions, showing that while biodiversity decreases, life often rebounds, albeit with different species dominating the ecosystems.

Conclusion

Mass extinction events have played a crucial role in shaping the biodiversity we see today. By employing the POGIL approach in teaching about mass extinction, educators can foster a deeper understanding of these significant biological events. Students learn not only the historical and ecological implications but also the relevance of these events in the context of current biodiversity crises. As we face ongoing threats to species globally, understanding the past can inform our actions to protect the future of life on Earth.

Frequently Asked Questions

What is mass extinction?

Mass extinction refers to a widespread and rapid decrease in the biodiversity on Earth, characterized by the loss of a significant number of species in a relatively short period.

What are the main causes of mass extinction events?

The main causes of mass extinction events include catastrophic events like asteroid impacts, volcanic eruptions, climate change, habitat destruction, and human activities such as pollution and overexploitation of resources.

How many major mass extinction events have occurred in Earth's history?

There have been five major mass extinction events recognized in Earth's history, known as the 'Big Five,' with the most recent being the Cretaceous-Paleogene extinction about 66 million years ago.

What is the significance of the current biodiversity crisis?

The current biodiversity crisis is significant as it is considered the sixth mass extinction, primarily driven by human activities, and poses a threat to ecosystems, food security, and human health.

What role do scientists play in studying mass extinction?

Scientists study mass extinction to understand the causes and consequences of biodiversity loss, develop conservation strategies, and predict future trends to mitigate the impact on ecosystems and species.

How can understanding past mass extinctions help us today?

Understanding past mass extinctions helps us identify patterns and triggers of biodiversity loss, informing current conservation efforts and guiding policies to prevent further extinctions.

What measures can be taken to prevent a mass extinction?

Measures to prevent a mass extinction include habitat conservation, sustainable resource management, pollution reduction, climate change mitigation, and the protection of endangered species.

What educational resources are available for studying mass extinction?

Educational resources for studying mass extinction include textbooks, online courses, documentaries, scientific journals, and interactive activities like POGIL (Process Oriented Guided Inquiry Learning) that promote group learning and critical thinking.

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濃度のことで質問です。『*wt%*』と『*atm%*』の違いはなんです …

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