

# Hall of Paleontology Knowledge Hunt: High School Biology

As you explore the Morian Hall of Paleontology, you'll find the exhibits arranged chronologically, starting with the oldest life forms and progressing to modern prehistoric creatures. This layout allows you to trace the evolution of life on Earth. By following this timeline, you can better understand significant evolutionary milestones and how ancient life connects to our current diversity.

*Note:* If you need more background details to answer a question, you can use your phone to research additional information, which is not available on the exhibit text panels or through direct observation.

### **Trilobites: Punctuated Equilibrium**

**Locate the Trilobite display.** Trilobites are a classic example of punctuated equilibrium. They existed for approximately 300 million years, exhibiting long periods of morphological stability in their extensive fossil record. Observe how these specimens demonstrate extended periods of stasis interrupted by episodes of rapid diversification, aligning with the pattern of punctuated equilibrium.

#### Consider the following as you examine the fossils:

- Differences in body shapes, sizes, and features across specimens from different periods.
- Information about the marine environments these trilobites inhabited.
- Text panels describing trilobite predators, competitors, and other contemporaneous organisms.
- Evidence of major geological or climatic events during trilobite existence.

**Hypothesize two environmental or biological factors** that could have triggered rapid changes in trilobite populations. Explain how each might have led to significant morphological shifts within short geological timescales.

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# Gradualism vs. Punctuated Equilibrium

#### Explore the contrasting models of evolution:

- Gradualism: Slow, steady accumulation of changes over vast timescales.
- **Punctuated Equilibrium:** Long periods of stability ("stasis") interrupted by rapid evolutionary shifts.

#### Your task:

- Identify one fossil that visually demonstrates gradual, incremental changes over time (gradualism).
- **Identify one fossil** that shows prolonged stability followed by abrupt morphological shifts (punctuated equilibrium).

#### For each specimen:

- State the name of the organism.
- Describe the features that exemplify either gradualism or punctuated equilibrium.
- Explain why each specimen was selected as an example of its respective evolutionary model.

*Hint:* Focus on fossils near the extinction events on the "timeline."

#### **Adaptations**

**Observe the specimens closely.** Notice the action-oriented poses of the larger specimens that highlight how these creatures moved and interacted with their environments. Pay attention to detailed structures that reveal adaptations.

# Select three specimens from different time periods and environments (aquatic, terrestrial, aerial). For each:

- Name of the organism
- Time period it lived
- Environment inhabited
- Specific anatomical adaptation observed
- Explanation of how this adaptation provided a survival advantage

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#### **After Your Visit**

After completing your exploration of the hall, reflect on the following:

- What was the most interesting or surprising thing you discovered while answering the knowledge hunt questions or exploring the exhibit?
  Describe what made it stand out to you and how it changed or deepened your understanding of evolution or prehistoric life.
- When you examined the trilobite display, what did you learn about how environmental or biological factors can lead to rapid evolutionary change? Share one hypothesis you made during the activity and how the exhibit supported or challenged your thinking.
- 3. How did the chronological arrangement of the exhibit help you make sense of the progression and major transitions in the history of life on Earth? Give an example of a major evolutionary milestone you noticed and how the timeline display contributed to your understanding.