

Geology Summer Independent Learning: Introduction to Evolution and Mass Extinction
Events

First Life Episode 1 – “Arrival” (David Attenborough)

Watch the video in the link <https://www.youtube.com/watch?v=o7-SqWqlG8I> and answer the questions below.

- 1) According to the video, how old are Stromatolites? Which process do they use to obtain energy? How do they provide evidence for early life?
- 2) In Attenborough’s video, what environment is claimed to have created the first cell? Outside of the video, there many other environments that are claimed to have created the first cell, what environments are these?
- 3) David Attenborough stated Charnia was clearly alive; how do we know that they were a living organism? What type of organism were they?
- 4) For what timeframe were microscopic single-celled organisms the only organisms on Earth?
- 5) What is “Snowball Earth” and how is it significant in the evolution of life? Which organisms thrived and still exist today?
- 6) How did oxygen increase on Earth to facilitate the evolution of complex life?
- 7) What was the Cambrian Explosion?
- 8) Which organism does Attenborough describe as being one of the first multicellular organisms? Why was it advantageous for the cells to work together as a colony rather than as single celled organisms?
- 9) What is the significance of collagen in sponges? What happens when you break down a sponge into its constituent cells?
- 10) How were the fossils of Mistaken Point dated?
- 11) How did the Ediacaran fauna differ in body plan compared to modern organisms?

- 12) What was the significance of animals being able to move?
- 13) Why are the nose and the eyes near the mouth?
- 14) A lagerstätte is (refer back to your Fossils notes from December!). Where is described as one of the world's most important fossil bearing sites? Why is it so significant?
- 15) Describe the morphology (shape and features) and mode of life of:
- Dickensonia
 - Kimberella
 - Hallucigenia
 - Anomyiacaris
 - Opabinia
 - Wiwaxia

First Life Episode 2 – “Conquest” (David Attenborough)

- 1) Watch the video in the link <https://www.youtube.com/watch?v=FxRGttdKV5Y> and use the video to describe how different trilobites were morphologically adapted to their environment and mode of life. see the Trilobites PowerPoint on Moodle to help you. You should identify whether your trilobite is:
- Benthic, Nektonic or Pelagic
 - Predator or Prey (or both!)
 - Key morphological features
 - Adaptations for mode of life (e.g. Deiphon has an enlarged glabella; what might this suggest about how it lived? Hint: what is the function of the glabella?).

Describe, sketch and annotate:

Deiphon



Agnostus



Paradoxides



Neosaphus



Erbenochile



Walliserops

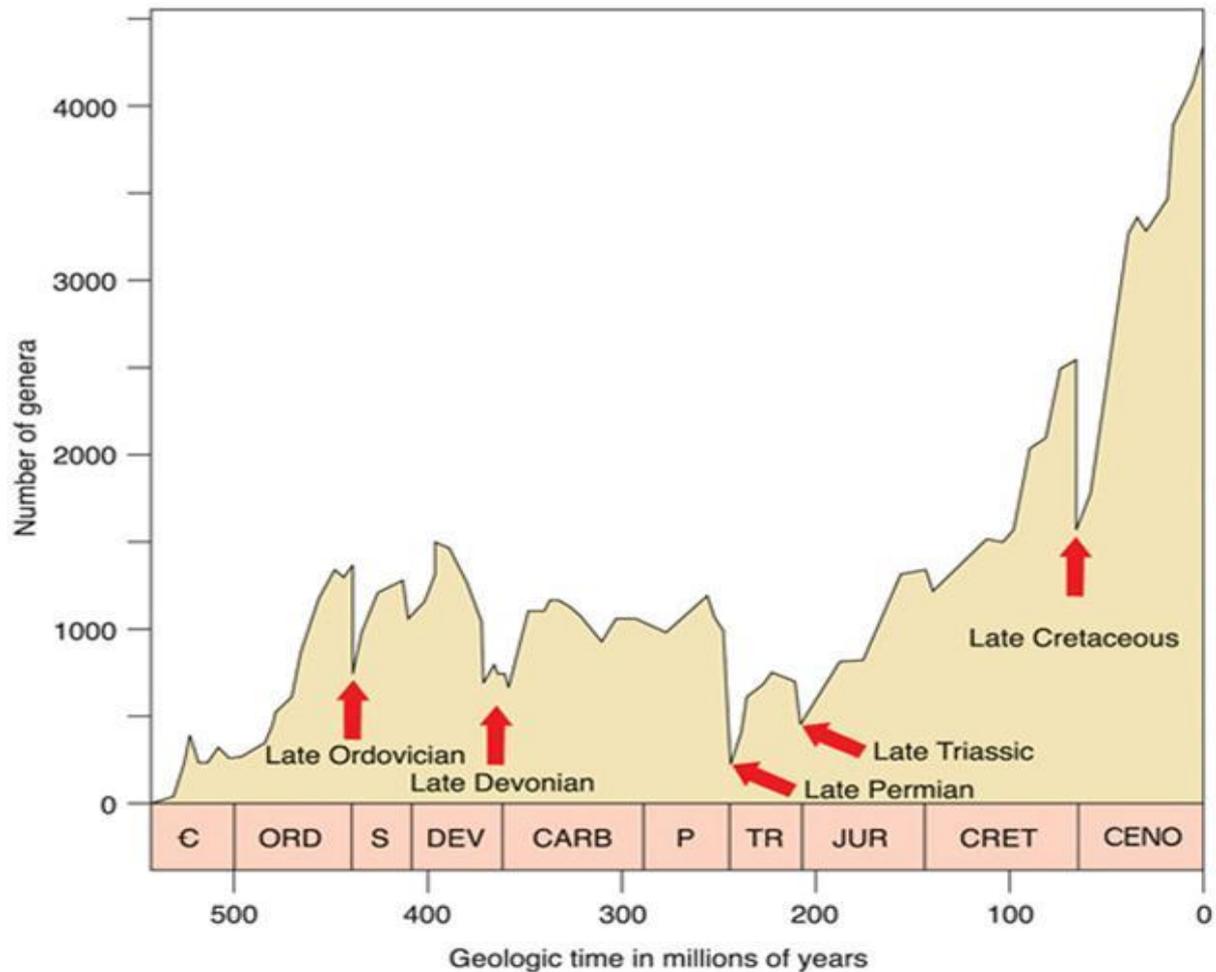


For your exam, you will not need to be able to name each of these trilobites, but will need to be able to **identify key morphological features** and how they provide **evidence** for the trilobites **living environment** and **mode of life**.

- 2) During which geological period were large arthropods particularly prevalent? Why did they grow so large?
- 3) What resulted in the end of the “Age of the Arthropods”? What happened to result in them being less successful?
- 4) What is Pikaia and why is it particularly significant in the evolution of life?

Mass Extinctions

- 1) Using the “Mass Extinctions” Textbook Notes on Moodle, create a geological timeline to include the 5 main mass extinction events, and when key species identified in the video were prevalent. You need to include approximately how many species became extinct (as a percentage of total species), and the probable cause of the mass extinction event.



- 2) Describe how each of the following factors could cause mass extinctions:
 - a) **Supercontinent Formation**
 - b) **Extra-Terrestrial Impacts**
 - c) **Flood Basalt Eruptions**
 - d) **Methane Hydrates and Global Warming**
 - e) **Rapid and Major Glaciation Events**
- 3) What is the K-T Mass Extinction? What do Geologists believe is the most probable cause of this Mass Extinction Event and what is the evidence to support this conclusion?