Mass Extinction Lab for FossilPlot

**Goal:** Students use various graphing functions in FP to study the diversity trends across one of the Big Five mass extinction events. The assignment focuses on hypothesis testing and quantitative analysis skills.

Ordovician-Silurian (O-S): 443 Ma
Late Devonian (Frasnian-Famennian): 374 Ma
Permian-Triassic (P-Tr): 250 Ma
Triassic-Jurassic (End Triassic): 205 Ma
Cretaceous-Tertiary (K-T): 65 Ma

1. Choose a major Mass Extinction interval: __________________________________________

2. Use FossilPlot to determine the high-resolution extinction curves for a variety of animals during your mass extinction time interval.
   
a. How many varieties of animals did you use?

b. What animals did you use? What is the range for each group of animals?

c. What time period split on your DOX graphs (i.e. Relative Time: Period vs. Stage) did you find most useful for each group of animals? Why?

d. Did any group(s) of animals have a radiation event during your Mass Extinction Event? If so, which ones? Show the appropriate graphs that display this increase in diversity.

**How you combine them is entirely up to you, but you will want to make sure that you have enough useful data to make interpretations.**

- **Attach a copy of the high-resolution extinction graphs for each animal group you choose, be sure that each graph is clearly labeled.**

3. Take 4 varieties of animals that had the largest decrease in diversity across your mass extinction interval and create diversity graphs.
   
a. What animals did you choose?
b. What was the change in diversity for each group of animals?

c. When did each group of animals originate?

4. Potential Causes:
Refer to *peer-reviewed primary (journal) literature* (i.e. no websites, no Wikipedia!) to generate a listing of hypothesized causes for your mass extinction event. *You must cite any source you use.* Be sure that your list includes specifics for the time period of your mass extinction, e.g., if a meteor impact is thought to be a cause of your extinction, what specific meteor impact is it?, where is it?, and who discovered/proposed it originally? Or if glaciation has been proposed, where are the glacial deposits located?, who described them first? etc.

- **Submit a listing of specific potential causes of your mass extinction with references in your report.**

5. Observing Your Data:
   a. What ecological significance is shared by these animals, or how are they different?

b. Do all animals respond equally to the mass extinction in terms of magnitude (% change) or absolute (number) change across the boundary?
**Be creative and quantitative!**

• **Submit your observations on the changes in diversity and ecology across your mass extinction in your report.**

  6. **Argue A Cause:**
  
  Take a position! Pick one (or a couple) of your listed potential causes of mass extinction and argue how this cause(s) of extinction is supported by your diversity data. You must only use your data in this argument: after all you are using the primary diversity data that all paleontologists use!

  • Submit a persuasive argument supporting a cause for your mass extinction that is based on your primary graphing data in your report.

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**TO HAND-IN**

- A brief introductory paragraph
  
  (i.e. The Ordovician–Silurian mass extinction occurred roughly 443 million years ago and …)

- A description of specific potential causes for the extinctions
- A description of your observations generated from your graphs
- An argument for the likely cause(s) of your mass extinction based on your observations
- A reference section listing all sources of data used in your report, using the GSA format
- An appendix of hardcopy print-outs of your graphs