

Paleo-Reconstruction Instructor Guide

Goals: Provide students with very basic tools needed to reconstruct the life of a fossil. Provide insight into how difficult paleo-reconstruction is. Highlight the importance of the relationship between anatomy and behavior, the importance of using modern analogues to assess fossils, and how taphonomic processes can impact reconstructions.

Supplies needed: images provided in the Reconstruction Student Activity Handout, Paleo-Reconstruction Activity Guide (one for each student or one for each group), Paleo-Reconstruction Dates & Reveal Information, plain white paper for them to draw, implements for them to draw with, and some lined paper for them to write down their thoughts.

General Progression: First, each group is given a picture of a fossil (**initial evidence**) and is provided only with information about its size and the location the fossil is found. From there, they have to analyze what they can and reconstruct what they can from what they have. Second, I provide them information about the **age** of the fossil. The dates are provided in the Paleo-Reconstruction Dates & Reveal Information document. You will need to cut the dates & time periods out from the table. The numbers correspond to the case study number. The students will research (phone or laptop Google search) what the environment looked like when the creature was alive and refine their reconstruction. Third, I provide **new evidence** that was just uncovered! They have to analyze that evidence and further refine their creature reconstruction. Fourth, I provide some **comparative specimens** to help them consider possible modern analogues (some reasonable, some not so much) and options for their reconstruction. Fifth, they have to draw up a picture of what they think this creature would look like in life and present it to the class. Finally, **reveal** what the creature is and details about it. End with a discussion on how they struggled and why, how taphonomic processes can impact reconstructions, and how modern analogues can be used to assess fossil lifeways.

Basic Set-up: Students will work in groups of 4. Each group is its own contained case study. I have worked up 8 case studies, and all images corresponding to the same case are given the same number. For example, all images for Case Study #1 have “1” at the bottom right corner of each slide. You will need to separate each case study to hand out to student groups. Each slide is also labeled (the **red** words above) to indicate when each slide should be provided to the groups.

Be very clear with students that this is an exercise, and that they are of course at a massive disadvantage because they do not have all the background education in paleontology, and they are working off images & information I chose to give them (due to confines of an in-class activity). However, I think it does provide a nice lesson in how difficult these kinds of reconstructions are and that new information allows for interpretation refinement over time.

Below is the actual activity. The red indicates what information you should provide and when. The black text is for the students – provided in a separate document: Paleo-Reconstruction Activity Guide.

Paleo-Reconstruction Activity

You have just been provided with a “new” fossil specimen. All that you know is the age, time period, location, and rough size of this specimen. It is your job to reconstruction as much of the behavior (diet & locomotion for example) and environment as you can.

PROVIDE INITIAL EVIDENCE – and then have students examine the fossil and answer questions #1-3

1. What are some interesting features about this creature’s anatomy (head, body, limbs, tail, body plan, teeth, odd appendages)?
2. What does this anatomy tell you about diet, behavior (how it got that food for example), and locomotion?
3. Do you think there are parts missing? Why or why not? What taphonomic process may have occurred?

PROVIDE DATE & TIME PERIOD – and then have students answer question #4

4. Research what the environment was like at the fossil site during the time this creature was alive. How does this new information change your assessment of the creature’s diet, locomotion, behavior& taphonomic processes that may have occurred?

PROVIDE NEW EVIDENCE - and then have students examine the fossil + new evidence and answer questions #5&6

5. What new information has this new “discovery” given you?
6. How does all of the information you have now acquired inform your thinking about this creature’s diet, locomotion, behavior, and environment?

PROVIDE COMPARATIVE SPECIMENS – and then have students complete #7-10

7. How does your thinking (diet, locomotion, & behavior) change when provided with comparative specimens?
8. Does looking at the comparative specimens change your mind about what pieces may be missing from the fossil? Why or why not? What taphonomic process may have occurred?
9. Draw a rough sketch of what this creature may have looked like in life.
10. Be prepared to set the scene for the class, telling us the story about what this fossil was like, where it lived, and how it behaved when it was alive.

STUDENT PRESENTATIONS & REVEAL ADDITIONAL INFORMATION

CLASS DISCUSSION