

This addendum was released on 1/28/2021

What is the issue this addendum corrects? There was a peripheral connection to structure/function thinking made on **slide J**. But this distracts from the more immediate line of inquiry that students will be anticipating they should be investigating next. The proposed correction is to skip **slide J** and to provide a slightly different framing at the end of **slide I** before going straight to **slide K**. The slides notes have been updated to include this revision.

Here is the old teacher framing at the end of slide I:

Motivate the need for a different set of characters. Say, *We compared external traits in modern penguins to Pedro. We also compared those traits between different types of modern penguins. But comparing only these traits doesn't provide us enough data to make evidence-based claims about all ancient penguins. We'd need to look at heritable traits within ancient penguins too, right? The problem is we don't have the same kind of data available that we were just looking at in modern penguins when we start looking at fossils. We know from what Dr. Clarke said that if we look for fossils, it's very rare to find evidence of any sort of characters that have to do with external features like feathers because those structures are rarely preserved. Her team was lucky with Pedro. Most of the time the only thing that is preserved in a fossil is just the shape of some of the bones that made up the skeleton of the organism.*

Establish a connection among muscles, bones, and movement. Say, *In addition to heritable traits that are external, we've previously studied some internal traits that we know are largely heritable too. In [material:ge.n] you figured out that some aspects of musculature are heritable. Some aspects of bone structures are heritable too. When we are looking at variation in bone structures or muscle structures, it's useful to think about how the structures work together because muscles have to attach to bones in order to make them move. * So before we look at specific trait variation data for muscles or bones for modern penguins and Pedro, let's make some predictions about the type of trait variation we expect we might find.*

There is the revised teacher framing to use at the end of slide 1:

Motivate the need for a different set of characters. Say, *We compared external traits in modern penguins to Pedro. We also compared those traits between different types of modern penguins. But comparing only these traits doesn't provide us enough data to make evidence-based claims about all ancient penguins. We'd need to look at heritable traits within ancient penguins too, right? The problem is we don't have the same kind of data available that we were just looking at in modern penguins when we start looking at fossils. We know from what Dr. Clarke said that if we look for fossils, it's very rare to find evidence of any sort of characters that have to do with external features like feathers because those structures are rarely preserved. Her team was lucky with Pedro. Most of the time the only thing that is preserved in a fossil is just the shape of some of the bones that made up the skeleton of the organism.*

Connect to prior work with internal heritable traits work in [material:ge]. Say, *In addition to heritable traits that are external, we've previously studied some internal traits that we know are largely heritable too. In our Muscles Unit you figured out that some aspects of musculature are heritable. Some aspects of bone structures are heritable too. When we are looking at variation in bone structures or muscle structures, it's useful to think about how the structures work together because muscles have to attach to bones in order to make them move. While muscles structure doesn't preserve well in fossils, bone structures do. Let's orient to some of the bone structures that Dr. Bertelli and other researchers have determined are largely heritable in penguins and other animals.*

