

Model for Unity and Diversity (UD2) – Learning Segment Table

(approximately 2 to 3 class days)

We frame the "model-building" in this unit as a summary and extension of previous ideas we've already figured out, rather than development of a novel model. Please read the notes embedded in the introductory slides before deciding how to proceed with modeling with your students.

1. There are many different species on Earth. They all have a great deal in common, because they all **evolved by Natural Selection from a common ancestor**.
2. But they are also very different because they were **each shaped by their own particular environment** – and there are an almost infinite variety of environments on Earth. Darwin called the process by which Earth was populated by new species, each adapted to its own environment, "**Descent with Modification**".

Seg	Model Move	Time (min)	Overview	What did we figure out?
1	Q→M	15	We once again return to the Big Driving Question (from Unity and Diversity Part 1), now convinced we are ready to tackle it. We leverage our recent Model for Speciation as a means to explain HOW diversity arose, but we also find we need to explore WHY: Why are there so many different kinds of species?	We recognized that we understand how new species arise, and yet we still have a questions about the diversity piece of our Big Question: why so many species?
2	Q→M	30-55	We dive into the "why" question through an exploration of the distribution and ecology of the six species of ground finches from the Galapagos islands. In looking over the data, we recognize that each species has changed over time to fit its particular environment and habits.	We generated our first model idea. Diversity arises through natural selection and speciation, but it is truly the diversity of our planet's environments that allows for so much diversity. Each species has been shaped by natural selection to its particular environment or "niche".
3	Q→M	30	We return to our Big Driving Question to explore our question about unity. With all of the diversity we've now explained, why do we think all life has certain traits in common?	We recognized that all life has a common ancestor, and that common ancestry explains our observation that all life has certain characteristics.
4	M	20-30	We explore Darwin's concept of "descent with modification" as a means to understand the two patterns—unity and diversity—together. We review key pieces of evidence for the concept, and use the idea to add to or revise our model.	We've elaborated on our understanding of how unity and diversity are related through descent with modification and we've revised and finalized our model.
5	M→P	10	<i>Optional Learning Segment.</i> We return to a handful of slides from Unity and Diversity Part 1 to recognize and celebrate the understanding we have built together over the year. You can decide how you would like to have a moment of recognition. For many classes, the last moment of the previous segment will be enough.	We've realized that we made real progress in developing an understanding of the big patterns in biology, the big patterns of life on this planet.
6	M	55	<i>Optional Activity: Model Integration</i> We explore the connections between our central ideas from Natural Selection and many of the other models we've built during the year. In "mapping models to models", we highlight and reinforce connections among the ideas and review what we've learned.	We reinforced our understanding of the connections between models and perhaps managed to do some preparation for end-of-year exams.

