

Module 2: Phylogeny

1. In module 1, you identified which species of lizards were most similar to one another based on relative limb length and toe pad size. In this module, you determined which lizards are more similar to one another based on what type of information?
2. Are the species of lizard that are more similar to one another according to body type also more closely related based on the results obtained in this module? Explain your answer.
3. The figures below show two phylogenetic trees similar to the one you constructed in the virtual lab but with more lizards. The trees below show the evolutionary relationships among species from four ecomorphs from the four largest Caribbean islands.

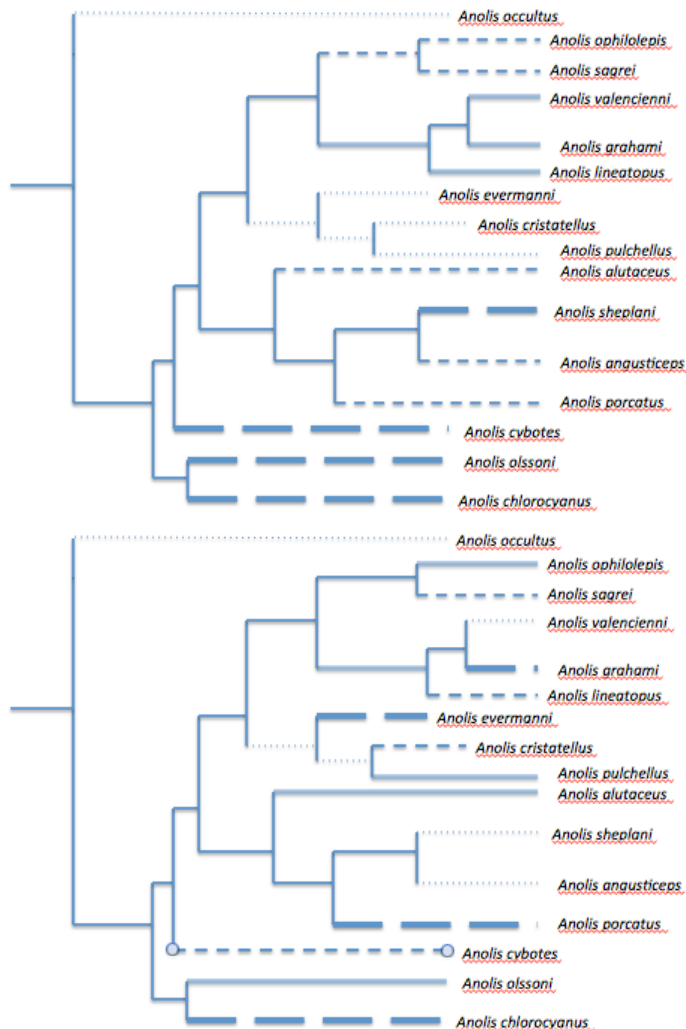
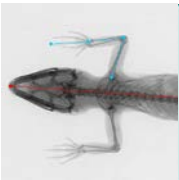


Figure 1. Phylogeny of anole lizards on four of the major Caribbean islands color-coded according to geographical distribution. Light dotted line, Puerto Rico; small dashed line, Cuba; large dashed line, Hispaniola; and solid line, Jamaica.

Figure 2. Phylogeny of anole lizards in the four major Caribbean islands colored in according to ecomorph. Light dotted line, twig; small dashed line, trunk-ground; large dashed line, trunk-crown; solid line, grass-bus.

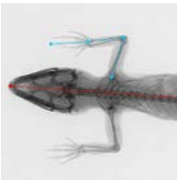


What conclusion can you draw about the evolution of the *Anolis* lizards based on these figures?

4. What is convergent evolution? Use evidence from the trees to explain how the *Anolis* lizards are an example of this concept.

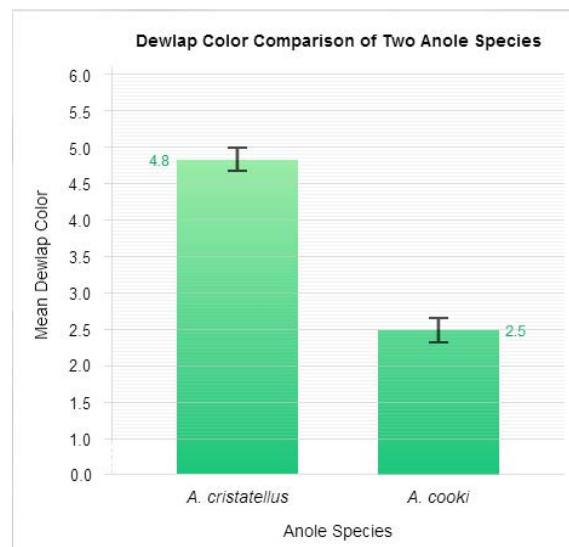
Module 3: Experimental Data

1. In Dr. Losos's experiment, why was it important that the experimental islands lacked lizards?
2. Dr. Losos's data suggest that after only a few generations, the lizards on the experimental islands have shorter legs on average than the lizards on the larger island. Explain how the data you collected either supports or does not support this claim.
3. Based on what you know about the experimental islands and the lizards that were placed on these islands, explain how and why the average leg length of the population might change over time. Include the concept of natural selection in your discussion.
4. If the population from one of the experimental islands were reintroduced on the original island, do you predict that lizards from the two populations would still mate and reproduce? Justify your answer with scientific arguments.



Module 4: Dewlap Colors

1. *Anolis cristatellus* and *A. cooki* are both trunk-ground anoles that live on Puerto Rico. *A. cristatellus* lives in a shady, forest environment, while *A. cooki* lives in an open, sunny environment. What is an adaptive explanation for why the dewlap of one species evolved to be brighter and that of another species darker?
2. From the bar graph generated in the virtual lab (see below), how do the dewlap colors of the two species compare?



3. How would you determine whether the difference between the two populations is statistically significant?
4. If a species of anoles with dark dewlaps colonized a heavily forested island, predict what would happen over time to the color of the dewlap. Using your knowledge of natural selection and genetics, explain your prediction.