



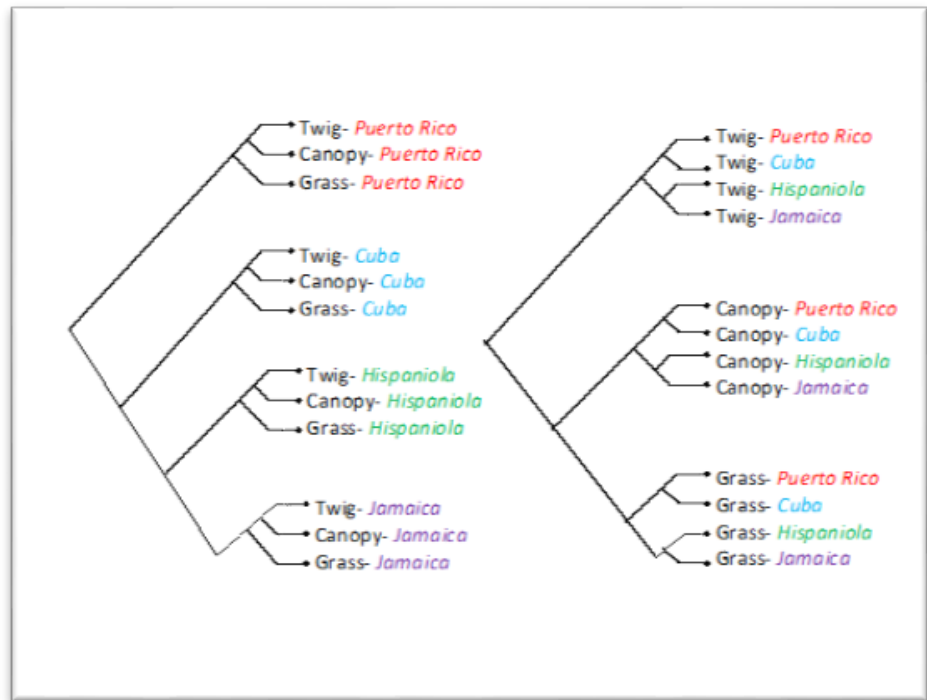
The Origin of Species: Lizards in an Evolutionary Tree

NAME _____

DATE _____

This handout supplements the short film [The Origin of Species: Lizards in an Evolutionary Tree](#).

1. Puerto Rico, Cuba, Jamaica, and Hispaniola have species of anole lizards with distinct body types, including the grass lizards, which have long tails; the canopy lizards, which have large toe pads; and the twig lizards, which have short legs. Anole species with each of these three body types exist on each of the four islands. The phylogenetic trees in the figure below illustrate two hypotheses for how these types of lizards may have evolved.



- a. Select the pair of statements in the table below that accurately describe the phylogenetic trees in the figure above: _____

	Tree on the Left Side of the Figure	Tree on the Right Side of the Figure
A	The twig lizard on Puerto Rico evolved first and is the ancestor of all the other lizards.	The twig lizard evolved first on all of the islands, and then the canopy and grass lizards evolved from the twig lizard.
B	Body types evolved repeatedly and independently on each island.	Different body types evolved once, and then populations of individuals with those body types ended up on different islands.
C	Different body types evolved only once, and then populations of individuals with those body types ended up on different islands.	There are two ancestors to all the lizards, the twig lizard and the canopy lizard.
D	Puerto Rico is the origin of all three lizard body types.	Each body type evolved repeatedly and independently on each island.

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Use the following information and figure to answer Questions 8-9.

In 2003, Jonathan Losos and his research team experimentally introduced curly-tailed lizards (*Leiocephalus carinatus*) to islands populated by trunk-ground anoles that live primarily on the ground and have relatively long legs (Losos, J. B., T. W. Schoener, and D. A. Spiller. 2004. Predator-induced behaviour shifts and natural selection in field-experimental lizard populations. *Nature* 432: 505-508). The scientists wanted to know how the presence of the curly-tailed lizards, which are anole predators, would affect the habitat in which the anoles lived.

In one experiment, Losos and colleagues measured the “perch height” (or how high off the ground a lizard was perched) for 24 individual anoles. They then placed either a curly-tailed lizard (experimental population) or an inanimate object of the same size (control population) in front of individual trunk-ground anoles and measured the perch height 10 minutes later. They then calculated the average change in the anole’s perch height in the experimental and control populations. The results of this experiment are summarized in Figure 1.

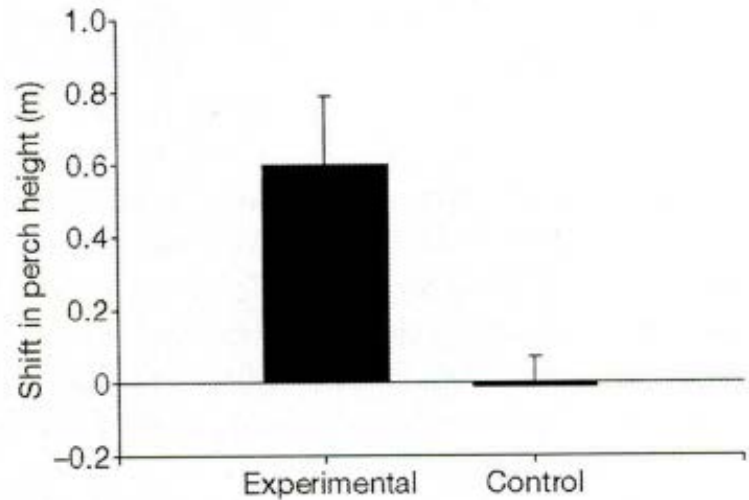


Figure 1. Mean change in perch height (± 1 standard error) 10 minutes after introduction of either a large predatory lizard (experimental) or an inanimate object of the same size (control). (Image reproduced with permission from Losos, J. B., T. W. Schoener, and D. A. Spiller. 2004. *Nature* 432: 505-508.)

- Based on the information above, what research question did the scientists ask that led to this experiment?
- Using the information in Figure 1, describe the results of the experiment.

Use the following information and figure to answer Questions 10-12.

In another experiment, the scientists left the curly-tailed lizards on the islands for several weeks. They counted the number of anoles living on the ground at the beginning of the experiment in May and then again in July and November. The figure below shows the percentage of anoles living on the ground on islands with curly-tailed lizards (experimental population) and without curly-tailed lizards (control population).

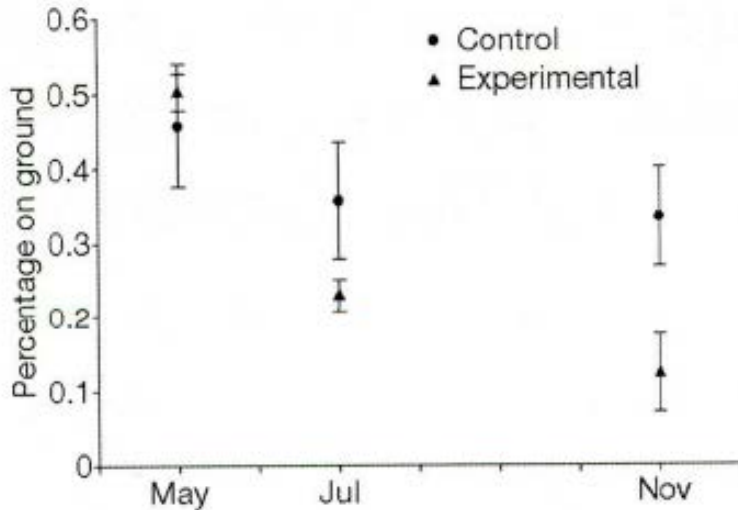


Figure 2. Differences in proportions of anoles observed on the ground in experimental and control populations. Values are mean and ± 1 standard error of the mean for all 12 islands. Only four islands were surveyed in July. (Image reproduced with permission from Losos, J. B., T. W. Schoener, and D. A. Spiller. 2004. *Nature* 432: 505-508.)

10. Based on the information above, what research question did the scientists ask that led to this experiment?

11. Using the information in Figure 2, describe the results of the experiment.

12. Provide a scientific explanation for the results of the two experiments summarized in Figures 1 and 2. (Hint: Imagine that you are one of the anoles in each experiment.)

13. If the curly-tailed lizards were left on the islands for several years, predict how the bodies of the trunk-ground anoles might change after many generations of living in the presence of curly-tailed lizards.