



DESERT INDOORS®

Environmental Education Activities for Students at Home

Module: *Adapting to the Changing Desert!*

Topic: Adaptation in the Desert

Objective/Learning Goal: Children will be able to understand how adaptations impact bird populations. Students will investigate the ways natural selection impacts bird populations within the desert ecosystem.

Glossary:

- **Adaptation** - A change or the process of change by which an organism or species becomes better suited to its environment.
- **Habitat** - The natural home or environment of an animal, plant, or other organism.
- **Migratory** - Denoting that an animal migrates (moves seasonally from one region to another).
- **Natural Selection** - The process whereby organisms better adapted to their environment tend to survive and produce more offspring. It is the main process that brings about evolution.
- **Phenology** - The study of plant and animal life cycle events and how the cycles are influenced by seasonal and annual variations in climate, as well as habitat factors like elevation.

Materials: *coin, pencil or pen.*

Indoor and/or Outdoor Activity:

Build Background Knowledge – What do you already know about climate change? What do you know about the connection between **adaptation** and **natural selection**? How do you think birds have adapted to living in the harsh desert climate?

In the last century the Mojave Desert has warmed by 3 degrees Fahrenheit, putting additional stress on plants and animals already adapted to living in the desert's hot and dry climate. It is estimated that climate change will bring about even more extreme

weather patterns in the upcoming decades. This leaves many animals in peril if they cannot adapt quickly enough to the changing climate.

Due to climate change, bird diversity has decreased 42% in the Mojave in a little over a century (Waters 2021). With the extreme weather conditions some birds are **migrating** out of the area and finding new **habitats** in which to live.

Birds are being pushed to adapt, but can they keep up with climate change? General consensus from scientists that study avian **phenology** is that they cannot. Scientists that study avian phenology agree that birds cannot adapt faster than the climate is changing (Riddell et. al. 2021). This causes what is known as *bird community collapse*, when populations can no longer thrive in their home habitat.

Birds like the phainopepla have adapted to environmental changes by nesting in two different places - both along the coastal areas and in the desert (Baldassarre et.al. 2019). Why do you think this would be a good adaptation for the phainopepla?

Some birds like the LeConte's thrasher have long curved beaks, specially designed to hunt insects on the ground, rather than in the air. Another common desert bird is the black-throated sparrow; they have stout conical beaks and round heads perfect for eating seeds. They fly low, between shrubs to forage for seeds and to hide from predators, such as the Cooper's hawk. The Cooper's hawk has a short, sharply curved beak, perfect for catching small birds. Their sharp talons and excellent eyesight make them a great desert predator.

Activity - Complete the activity on the following page. Flip a coin to create a new desert species! Feel free to draw and color the bird as you imagine the bird would look.

Follow-up/ Discussion - *What did you learn? Do you think your bird would adapt to living in the desert? Why or why not?*

Once you're done with the activity, head outside. Go to your backyard or local public lands and bird watch. What kinds of adaptations do those birds have for living in their environment? What do you notice about their behavior? For example, are they flying, running on the ground, or hiding in trees? This can give you an idea of what the bird eats.

References Cited-

Baldassarre, Daniel T., Leonardo Campagna, Henri A. Thomassen, Jonathan W. Atwell, Miyoko Chu, Lisa H. Crampton, Robert C. Fleischer, and Christiana Riehl. 2019. GPS Tracking and population genomics suggest itinerant breeding across drastically different habitats in the Phainopepla. The Auk Ornithological Advances, American Ornithology Vol 136, 2019, pg 1-12.

Riddell, E.A., K.J. Iknayanm L. Hargroove, S. Trimmer, J.L. Patton, R. Rameirez, B.O. Wolf. and S.R. Beissinger. 2021. Exposure to climate change drives stability or collapse

of desert mammal and bird communities. Science. Feb 2021, vol 371, issue 6529, pg 633-636.

Waters, Hannah, senior editor. 2021. How climate change pushes even the hardest desert birds past their limit. Audubon magazine. February 4, 2021.

<https://www.audubon.org/news/how-climate-change-pushes-even-hardest-desert-birds-past-their-limit>

Bird Adaptations

You are going to create a drawing of a bird's adaptations by flipping a coin to determine what types of traits it will possess. Then you can determine whether this bird would survive and thrive in the desert's ecosystem.

Part 1:

Flip a coin to determine the sex. Remember, this will determine whether the bird is more brightly colored (male) or more muted in color (female).

Heads: Female Tails: Male

Part 2:

Adaptations and traits:

Flip a coin for each trait to see how well your bird would adapt to the Mojave Desert's environment.

Coloring/Pattern:

Heads: Brightly colored

Tails: Blends in

Head Shape:

Heads: Pointed

Tails: Rounded

Beak Shape:

Heads: Short and pointed

Tails: Long and curved

Feet:

Heads: Large talons

Tails: Small talons

Behaviors:

Heads: Flighted

Tails: Flightless

Part 3:

On the back of this sheet draw what your bird would look like and explain why some of the traits would lead to adaptations that would do well in the desert environment.