



## ***Teacher's Guide***

### **Hummingbird Adaptations in Dazzling Motion** **NATURE Science Education Series**

**Grade Levels:**

7-12

**Subject Areas:**

Sciences

Life Sciences

Biology

Ecology

**Synopsis:**

Slow and stop motion images, taken in the wild and in controlled scientific experiments, reveal remarkable hummingbird adaptations that account for the evolutionary success of this tiny bird. The photographs reveal that hummingbirds have the unique ability to hover while they suck nectar from flowers, and that bill sizes and shapes mimic the shape of the flowers that have co-evolved along with the hummingbirds. Further adaptations are revealed by infrared photography that captures hummingbird metabolism and changes in body temperature as a state of torpor is achieved each night. The predatory birds have also adapted a supplement for their nectar diet – insect protein helps them maintain their runaway metabolism. A segment highlights the birds' migration patterns, mating rituals, females foraging for their young, and the colorful varieties of this fascinating bird. The program closes with a focus on a Peruvian hummingbird, the endangered marvelous spatuletail, whose numbers are being restored by conservation efforts financed by ecotourism.

**Learning Objectives:** Students will:

- Describe the unique adaptations that have made hummingbirds an evolutionary success.
- Explain how hummingbirds and flowers depend on one another for species survival.
- Describe hummingbird migration routes and adaptations to extreme environments.
- Describe the scientific experiments biologists have devised to study hummingbird adaptations.

- Explain why ecotourism may save the endangered spatuletail.

**Vocabulary:**

diversity, warm-blooded, aerial agility, repertoire, choreography, avian, nectar, evolutionary bond, datura, reproduction, aggressive hunters, lethal predator, metabolism, infrared, torpor, foraging, extreme environments, iridescent feathers, pigments, emit, regurgitate, fledged, banding data, genetic variation, ecotourism

**Pre-Viewing Discussion:**

Why do hummingbirds fascinate most people?

How many varieties of hummingbirds are there? What are some of their distinguishing features?

Considering their size and lack of defenses, how are hummingbirds able to survive as successfully as they do?

Do hummingbirds migrate? Are they found all over the world or only in certain locations?

**Post-Viewing Discussion:**

What adaptation allows hummingbirds to feed on the nectar of flowers? How do hummingbirds help flowers survive and propagate?

What adaptations allow hummingbirds to survive in extreme environments, for example, at altitudes of 12,000 feet? How are they able to travel thousands of miles in their yearly migrations?

Why do hummingbirds have to eat so much each day? How do they supplement their nectar diet? How do they survive overnight when they can't eat?

What species of hummingbird, found only in Peru, is endangered? How do wildlife biologists plan to save this bird from extinction?

**Further Activities:**

Further investigate ecotourism programs that are saving endangered species.

Find out what species of hummingbirds thrive where you live, or closest to where you live. Investigate their habits and discover their migration routes.

Investigate flowers and feeders that attract hummingbirds.

Further investigate the varieties of nests hummingbirds build, and how they care for their fledglings.

**Related New Dimension Media Titles:**

Biological Classification in the Animal Kingdom