



**Annotated Object List:**  
Raptor Adaptation Discovery Kit

Cooper's hawk (*Accipiter cooperii*)

Range: North America

Size: About the size of a common crow, adults are usually 15 inches in length with a wingspan of 24-35 inches.

The Cooper's hawk is a medium sized woodland predator known for its fleet hunting skills. Because of its size, the Cooper's hawk is able to hunt in thick wooded environments that larger birds of prey would not be able to navigate, switching from a graceful gliding flight pattern to an agile, fast attack when it locks in its prey.

The diet of a Cooper's hawk consists mainly of medium sized birds such as American Robins and pigeons. They have become a more common sight in populated areas and are frequently sighted around urban and suburban bird feeders, waiting for feeding birds to let down their guard.

Sharp-shinned hawk (*Accipiter striatus*)

Range: North America

Size: Slightly smaller than a Cooper's hawk, adult Sharp-shinned hawks are usually 10-13 inches in length with a wingspan of 16-22 inches.

Sharp-shinned hawks are difficult to tell apart from the slightly larger but similarly colored Cooper's hawk. They occupy much of the same habitat across their range and hunt similar prey. Since they have a steady food source in feeder birds, they are able to winter further north than previous migration trends would indicate.

The Sharp-shinned hawk, much like the Cooper's hawk, is known for its agility and speed when attacking prey. Sharp-shinned hawks commonly approach their prey behind the cover of vegetation or man-made structures such as fences to get close before striking.

American kestrel (*Falco sparverius*)

Range: North America, South America

Size: Mature American kestrels are usually 8.5-12 inches in length, with a wingspan of 20-24 inches.

In spite of its small size, the American kestrel is a fierce predator with prey that is sometimes only slightly smaller than the hunter itself. Along with its diminutive stature (the kestrel is the smallest falcon found in North America), the kestrel is notable for its colorful plumage: contrasting bands of slate blue and rusty-red that lends any sighting of the bird an exotic flair.

American kestrels have become well adapted to human environments and are a common sight in suburban and urban areas, especially around parks and open space areas. Although their diet consists mainly of larger insects and invertebrates, they feed on small rodents and birds as well. Given their small size, they also become prey for other raptors that occupy the same types of habitat, such as Sharp-shinned hawk and Cooper's hawk.

*Interesting Fact:* The American kestrel is declining across its range, but it has been found that the species readily utilize artificial bird nests. One way to help this bird population to recover is to build a nest structure for your yard. Plans for nest structures can be found on the Resources page.

**Raptor Parts**

Raptors, also known as birds of prey, have evolved adaptations to their environment that allow them to fulfill their biological niche. Raptors (a group which includes hawks, eagles, owls, and falcons) have developed several characteristics that maximize their hunting skills. They have wings that allow them to soar, to quickly strike and carry their prey, extremely large eyes and a well-developed sense of sight, a curved beak, and strong, sharp talons.

Wings/Tails

Barn owl wing

Red-tailed hawk wing

Gyrfalcon wing

Sharp-shinned hawk wing

## Annotated Object List: Raptor Adaptations

### Great horned owl tail

The shape of a bird's wings varies according to the species' lifestyle. Raptor wings, for example, are designed for maximum lift, allowing them to soar without expending much energy. Raptor wings are long, narrow and tapered, and the image of a hawk circling above a field without so much as flapping a wing is a common one.

Accipiter's, which are a group of hawks adapted for woodland habitats, have slight modifications to the typical raptor wing that allows them to navigate the dense vegetation of forested habitat. Sharp-shinned hawks and Cooper's hawks belong to this group of predatory birds and have shorter, slightly rounded wings that allow them to fly quickly around trees and shrubs without clipping a wing.

Falcons, like the American kestrel, have developed slight modifications to the typical hawk wing that allow them to fly incredibly fast. Falcons are the fastest creatures on Earth, reaching speeds up to 250 miles per hour in a dive. Falcon wings are long, narrow and extremely tapered, sweeping backward like a fighter jet.

### Feathers

Red-tailed hawk wing feathers (2)

Red-tailed hawk tail feather (5)

Andean Condor feather (1)

Barn Owl Wing Feathers (2)

Bird wings themselves are covered with different types of feathers, and the shape, arrangement, and number of these feathers largely determines the sort of flight the bird is capable of. The outermost flight feathers on a wing are referred to as the primary feathers. The primary feathers are the largest and strongest feathers on the bird, and are attached to bone structures in the wing that are similar to hands. The inner flight feathers, located along the inside of the wing, are called secondary feathers. The secondary feathers overlap and provide surface area for keeping the bird aloft while soaring and during flapping of the wings. Covert feathers out the rest of the wing, smaller feathers that give the wing its aerodynamic shape and help insulate against the elements.

### Talons

Short-eared owl talon

Rough-legged hawk talon

## Annotated Object List: Raptor Adaptations

Gyrfalcon talon

Red-tailed hawk talon (2)

Bird claws have evolved in raptors as very sharp, very strong talons. Raptors use their talons to capture and kill their prey. Most raptors have three toes pointing forward and one toe pointing backward, which allows them to grip prey very firmly. The sharp ends will grip and injure prey, and raptors usually firmly hold and repeatedly squeeze while attacking with their beak.

### Skulls

Golden eagle skull (replica)

Barn owl skull (replica)

Red-tailed hawk skull (replica)

Raptors have evolved curved (or hooked) beaks which allow them to tear at flesh and break bones. Their beaks are constantly growing, much like our hair or our fingernails, and shed and flake off a little bit at a time in order to stay as sharp as possible. Most raptors kill their prey using their beaks while holding them firmly with their talons.

Raptors also have a well-developed sense of sight, able to detect prey movement from great distances. This is evidenced in the amount of space the eyes take up in their skulls.

Fun fact: Kestrels can see ultraviolet light, a part of the light spectrum that humans cannot see. This adaptation allows them to see the urine trail of a rodent like a bright swath of neon identification that practically serves as a strip of landing lights for a soaring kestrel looking for dinner.

### **For more information, and for the sources of this document:**

Cooper's hawk species profile:

[http://www.allaboutbirds.org/guide/coopers\\_hawk/id](http://www.allaboutbirds.org/guide/coopers_hawk/id)

Sharp-shinned hawk species profile:

[http://www.allaboutbirds.org/guide/sharp-shinned\\_hawk/id](http://www.allaboutbirds.org/guide/sharp-shinned_hawk/id)

Information on how to distinguish between a Cooper's hawk and a Sharp-shinned hawk:

<http://www.birds.cornell.edu/pfw/AboutBirdsandFeeding/accipiterIDtable.htm>

Annotated Object List: Raptor Adaptations

American kestrel species profile:

[http://www.allaboutbirds.org/guide/american\\_kestrel/id](http://www.allaboutbirds.org/guide/american_kestrel/id)

Information on how to build a nesting box for American kestrels:

<http://www.birds.cornell.edu/nestinginfo/downloads/Am%20Kestrel%20Screech-Owl%20N%20Saw-whet%20Owl.pdf>

Information regarding wing adaptations in raptors, including a page on falcon flight speeds:

<http://www.natureskills.com/birds/bird-wings/>

<http://www.extremescience.com/zoom/index.php/animal-kingdom-records/51-fastest-in-the-world>

Information regarding the different types and functions of wing feathers:

<http://www.birds.cornell.edu/AllAboutBirds/studying/feathers/feathers>

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