

## BIRD FACT SHEET

Created by the Center for Aquatic Sciences at Adventure Aquarium

### What are birds?

- Birds evolved from ancient reptiles 190 million years ago. The 8700 species alive today range in size a great deal; however, they are all strikingly similar in form and adaptations.
- As a group, birds developed into flighted animals. Some species, such as the ostrich and penguins, have lost their ability to fly. However, all birds share adaptations that reduce their body weight and make flight possible.
- The skeleton of flighted birds is very light because many of the bones are hollow. Non-flighted birds however, have much denser bones.
- Extremely light and deceptively sturdy, feathers provide the needed surface area for the bird's wings to provide lift, and are also an excellent source of insulation.
- Heavy teeth are replaced with lighter, specialized beaks and an internal gizzard to help grind food. A very fast and extremely efficient digestive system reduces the amount of time food remains in the body.
- In addition, birds lack sweat glands and often pant to lose excess heat.
- The reproductive system is also adapted to keep the bird light. Birds lay eggs rather than keeping a heavy developing embryo inside their body.
- A bird's egg is different from a reptile's egg in that it is covered in a hard protective shell rather than the reptile's leathery shell. Like their reptile ancestors, birds rely on internal fertilization.
- All penguins live south of the Equator.

### Why can birds live in cold places?

- Birds, along with mammals, made a significant advancement over all prior forms of life: a warm-blooded metabolism. The development of a four-chambered heart made a warm-blooded metabolism possible by increasing blood flow through the body and increasing the blood pressure.
- All species of vertebrates and invertebrates prior to the arrival of birds, with the possible exception of dinosaur species, relied on an external heat source to keep their bodies warm. This strictly limits their presence in colder habitats.
- On the other hand, a warm-blooded metabolism allows birds and mammals to keep a constant temperature, regardless of the surroundings. This adaptation was instrumental in allowing these groups to expand closer to the earth's poles and more able to survive historical ice ages.
- The drawback to a warm-blooded lifestyle is that it requires an enormous intake of food. A cold-blooded snake does quite well eating once a month. However, most warm-blooded animals would starve with such a limited amount of food.

### Are penguins birds?

- With their upright posture, tuxedoed appearance, and slow waddling gait, penguins often bring images of small clowns to mind, rather than magnificent marine birds.
- The penguin's peculiar shape and habits are actually successful adaptations that enabled these birds to shift from a flighted lifestyle to a swimming one.

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- There are 17 species of penguins, all of which are native to the southern hemisphere. Only two species live entirely on the frozen continent of Antarctica. Most others thrive on the warmer coasts of Africa, Australia, and South America. The Galapagos penguin actually lives just below the tropical Equator.
- Penguins range in size from the 16 inch Little Blue penguin (*Eudyptula minor*) and 18 inch African penguin (*Spheniscus demersus*), to the four-foot Emperor penguin (*Aptenodytes forsteri*).
- Regardless of their size, penguins' wings are relatively short and stiff, which make them excellent paddles. They move underwater by flapping their wings, much like other birds fly through the air.
- Some species can reach swimming speeds of up to 25 mph and dive to depths of 900 feet.
- Penguins have the greatest number of feathers of any bird species, numbering from 70 feathers per square inch in African penguins to 200 feathers per square inch in Antarctic species. Comparatively, most other birds have only 15 feathers per square inch.
- In addition to acting as insulation, a penguin's feathers keep them streamlined and watertight. A special gland located near the tail produces waxy oil that the penguins must continually rub over their feathers to keep them waterproofed.

### How can penguins live at the South Pole?

- Like other birds, penguins' feathers act as insulation to maintain their body heat. However, due to the amount of time they spend in icy waters, their feathers have become shorter and much more densely packed.

### Who is at Adventure Aquarium?

- Standing about 12 inches high, the African black-footed penguins can eat up to 20% of its body weight in just one sitting. They prefer more moderate climates.
- Be sure to visit <http://www.adventureaquarium.com/What-to-do/Aquarium-animals.aspx> for more about the animals you will see when you visit Adventure Aquarium.

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