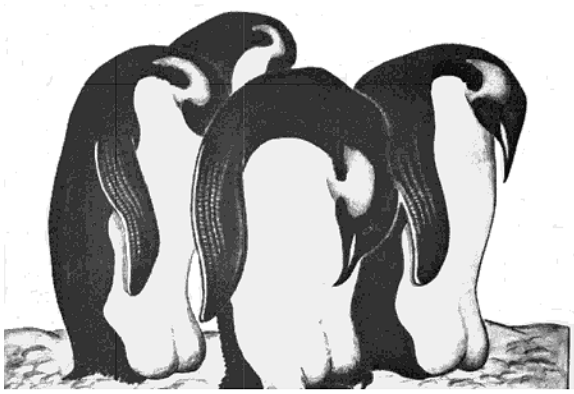
EXERCISE 14
Marine Birds
at Sea World

Name_____

Section_____



Polar and Equatorial Penguins

Penguins

Penguins are flightless birds that are mainly concentrated in the Southern Hemisphere. They were first discovered in the mid 1800's in New Zealand. Mistaken for a kind of auk, these birds were named "penguins" which is derived from the generic name of the flightless auk.

There are six groups of penguins, the giant penguins, the brush-tailed penguins, the crested penguins, temperate penguins, the fairy penguin and the yellow-eyed penguins. They are found throughout the Southern Hemisphere from the Antarctic pole to the equator. Penguins are usually found in areas free of terrestrial predators.

Penguins have a number of interesting aspects in their adaptation to an oceanic life. One aspect deals with their body weight and density. Their ancestors, the albatrosses, had light hollow bones for better flight. Penguins on the other hand, have solid bones and dense bodies.

How would this added body density help the penguins in swimming?

_____

Another adaption is in the area of reproduction. In general, flying birds have retained their reptilian ancestral habit of laying eggs.

What positive effect could laying eggs outside of their body have on the flight ability of birds?

_____

Penguins lay and hatch their eggs on land where they are relatively helpless against land based predators.

In what way would this helplessness to land based predators limit their habitat selection of nesting areas?

_____

Penguin skin is covered with shiny stiff feathers. They have more feathers than most other birds; 70 feathers per square inch. These feather overlap and help provide waterproofing and insulation.

Describe the nature of a penguins feather covering, structure and orientation to one another.

1) Feather Shape _____

2) Feather Tracts_____

3) Feather Orientation _____

How does the penguin fully waterproof its feathers?

_____

Penguins molt their feathers once a year and during this transition, the feathers are not waterproof. This transition period last about thirty days.

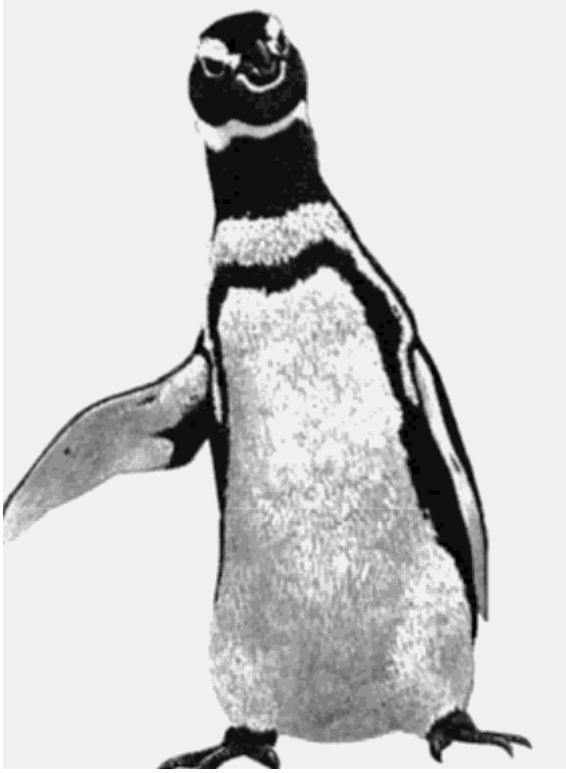
How does this molting process effect the birds habits during transition ?

_____

The oceanic region around the Antarctic continent represents one of largest areas of biomass in the world. The reasons for this are due to the Antarctic convergence, a layer of deep cold water which up wells bringing with it nutrients needed to support the large masses of krill or euphausiid shrimp. The dense aggregations of shrimp support not only the penguins, but also seals and giant whales.

TEMPERATE PENGUINS: Magellanic, Humboldt

Magellanic Penguins



This abundant species (pictured at right) occurs in Argentina, Southern Chile and the Falkland Islands. The Magellanic penguins are very shy and will bolt when approached. They nest in burrows dug into soft ground.

Humboldt (Peruvian) Penguins

These birds are restricted to Peru and Chile. They weigh in at about ten pounds and stand about twenty-four inches high. Similar in size to the Magellanics, these penguins are also shy birds.

Humboldt Penguins were endangered. They nest by burrowing in areas covered by bird guano. The farmers of Chile's coastal plains use the guano for a cheap fertilizer. Why would this nesting choice be responsible for its past endangered status?

_____

Compare the differences between the polar penguins and the temperate penguins in the following table.

Species	Fully Feathered	Exposed Skin Areas
Polar Penguins		
Equatorial Penguins		

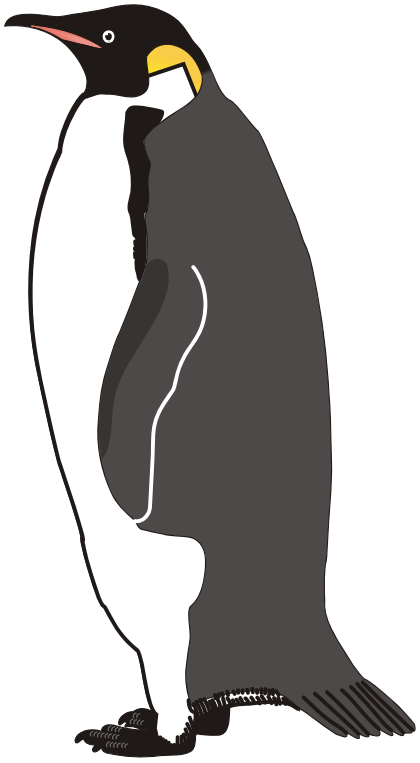
What techniques can a temperate penguin use to keep their body cool in temperate to tropical latitudes ?

_____

_____

ROYAL PENGUINS; Emperor, King

Emperor Penguins.



This penguin is the largest of the species, standing over three and half feet tall and weighing ninety or more pounds. This bird is restricted to the Antarctic continent. This is a strange bird in many ways. The Emperor is a winter nester. During the Antarctic winter the temperatures dip down 80^0F below zero. They breed right on the sea ice in April and May. Then the Emperors begin their difficult trek to coastal nesting rookeries, sometimes one hundred miles or more away. The Emperor Penguins is known to dive down to 900 feet and stay under water for twenty minutes.

Which sex does most of the incubation of the egg?_____

The Emperor penguin does not build a nest. How does it protect the egg during incubation period?

_____

How does the shape of the Emperor Penguin's egg adapt it to its habitat?

_____

How do the Emperors keep warm during the long Antarctic winter?

_____

At what point during the incubation process do the female Emperor Penguins return from their feeding at sea?

_____

How long does it take to raise an Emperor chick?_____

King Penguin

The King Penguin is shorter than the Emperor Penguin and not as heavy, weighing less than forty pounds. They do not breed on the sea ice as the Emperors do. Instead the King Penguins breed on shore rookeries located on sub antarctic islands. These birds share in the chores of incubation because the ocean is nearby.

How does the King Penguin incubate its egg?_____

How long does it take for the King Penguin to rear its chick?

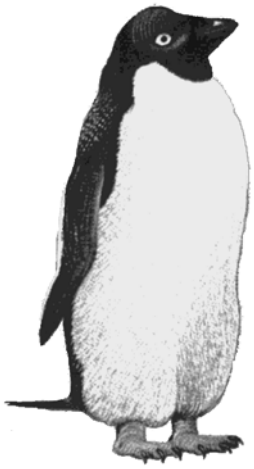
_____

Besides their difference in size, what is another good way to identify a King Penguin from an Emperor Penguin?

_____
_____

BRUSH-TAILED PENGUINS: Adelie, Chinstrap, Gentoo

Adelie Penguins



These medium sized penguins fit the stereotype image for the order. They are active animals abundant in the Antarctic, and one of the most polar penguin species, except for the Emperor penguin. These species breed during the Antarctic summer in shore rookeries located on the Antarctic continent. Unlike the continual darkness of the Antarctic winter, the summer is filled with 24 hours of sunlight. Once the males have established their territories, they seek out a mate.

How do the Adelie Penguins create their nest?

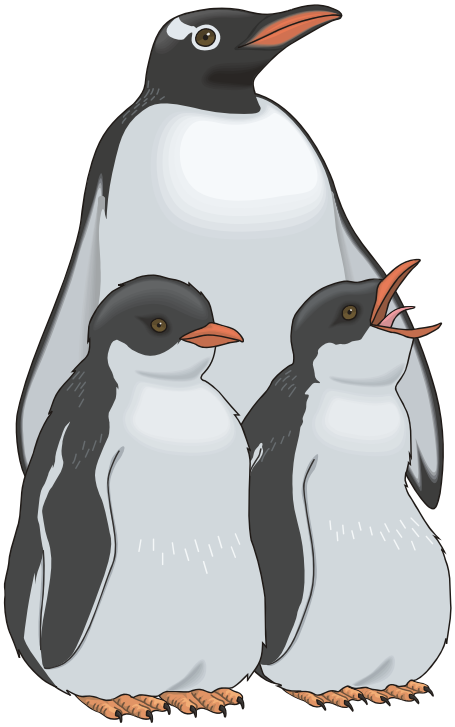
_____

How many eggs are usually laid?_____

What is the Adelie penguin's biggest enemy to the eggs and chicks?

_____

Gentoo Penguins



These are the largest amongst the brush-tailed penguins standing some thirty-two inches in height and weighing up to fourteen pounds. Fortunately these birds are also known for their timid and docile behavior. The Gentoo are found in a variety of habitats and often forms rookeries some distance inland by traveling through ravines and valleys.

Chinstrap Penguins

These penguins stand twenty-seven inches tall and can weigh about ten pounds. The Chinstrap Penguins are the most aggressive of the three brushed-tailed species. Their rookeries are usually located on steep rocky terrain. Breeding often in the same areas as the Adelie, the Chinstraps have been known to chase the Adelie Penguins off their nests and take over the sites.

Distinguish between the three brush-tailed species in the table below.

Penguin	Size	Head Coloration	Bill Color	Behavior
Adelie				
Chinstrap				
Gentoo				

CRESTED PENGUINS: Macaroni

Rockhopper Penguins

These crested penguins are smallest of the crested penguins, standing some fifteen to twenty-two inches tall and weighing five and one half pounds. They are known as the most aggressive of the penguin species. They will attack anything, including humans, who wander into their rookery.

In what area(s) of the world are the Crested Penguins found?

ALCID FAMILY

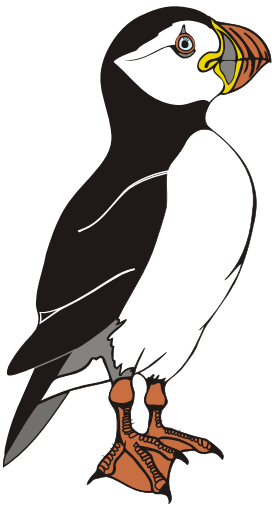
This group of birds represents a parallel evolution of sea birds similar to the Antarctic Penguins. The alcids have no representatives in the Southern Hemisphere. These birds dive and swim after fish using their wings in much the same manner as the penguins. Unlike the penguins, the Alcids retained their ability to fly. Although a bit awkward and labored in the air, they have mastered the underwater environment. As sea worthy as these birds are, they are usually not found too far from the continental shelf. This family can be divided into the Razorbills, guillemots, puffins and murrelets.

PUFFINS

These beautiful birds with their brightly colored bills are very comical to watch. The often quarrel with their neighbors and their mates. The puffins are found in the North Pacific. Puffins dig burrows and raise their young in safety below the surface. The young are not taken out until they are fully grown and feathered. The large bills are used to bite at their neighbor's wing or leg. The puffin's bill can open as a parallel rectangle instead of a pie shaped angle like most other birds. This allows these birds to catch and hold several fish in their bill at one time.

Common (Atlantic) Puffin

The Common Puffin acts very tame in their large colonies. This species spends more time on the water than the other puffin species. The Common Puffin is confined to the North Atlantic and is sometimes mistaken for the Razorbill.



Common Puffin

Tufted Puffin

Tufted Puffins

The Tufted Puffin has a range that overlaps with the Horned Puffin. The Tufted Puffins are described as being the most abundant seabirds of Alaska. The Tufted Puffin is stockier than the Horn Puffin. This puffin requires a long surface run before becoming airborne.

Compare the three puffins in the table below.

Species	Breast Color	Feather Plumes on Head	Bill Pattern
Common Puffin			
Tufted Puffin			

Common Murre

The Common Murre or Common Guillemot is unusual in that on land, they do not stand upright like many other alcids, but sit duck-like. The nest sites are usually in crevices or among boulders on rocky islands and coastlines. These birds do not attempt to construct a nest, but instead lay their eggs on the rocky surface. Usually two or three eggs are laid and the chicks remain in the nest until five weeks of age.

Compare the Common Puffin with the Murre in the following table.

Species	Bill Shape	Bill Coloration	Body Size
Murre			
Puffin			