

Black-Footed Penguin

Objective:

1. Students will identify the basic body structure and behavioral functions of the penguin.
2. Students will describe the habitat of the penguin and determine how the animal has adapted to the environment.
3. Students will examine environmental factors impacting the penguins' habitat.

Performance Objectives:

Grade 3: Strand 4: Concept 3 – PO 3-5
Concept 4 – PO 1-3
NGSS: 3-LS2-1D
Grade 4: Strand: Concept 1 – PO 1-2;
Concept 3 – PO 1; Concept 4 – PO 1-2
NGSS: LS1 -1A
Grade 5: Strand 4: Concept 3 and 4
NGSS: LS2-1A

Grades: 3 – 5

Key Vocabulary:

- Adaptation
- Habitat
- Endangered
- Colony

Related Literature:

The Penguins
Tony D. Williams

My Season with Penguins
Sophie Webb

Growing Up Wild
Sandra Markle

Background Information:

The black-footed penguin is also known by the name ‘Cape Penguin’ because they are found in South Africa. These birds stand 27 inches tall, weigh between 5-8 pounds. They have firm wings that are adapted to be used as flippers to help the penguins swim. **Adaptations** are characteristics or behaviors that animals have to help them survive. They are able to swim up to 12 miles an hour in the water and they seem somewhat “wobbly” on land. Their side-to-side pace appears awkward as they maneuver on dry ground. This penguin makes an odd sound called a bray when it communicates, which is similar to the sound a donkey makes.

Distinctive to these penguins is the color of the body and the horseshoe mark on their chest. The front area of the black-footed penguin has speckles of black on the white areas; each penguin’s pattern of speckles is unique, which allows each

individual to be easily identified. Family members can easily find each other by the different markings on each of the penguins. The Black-Footed Penguin also has a small area of pink skin above the eyes and the beak. This patch of skin is called a heat window and the bare skin allows heat to escape to cool the bird.

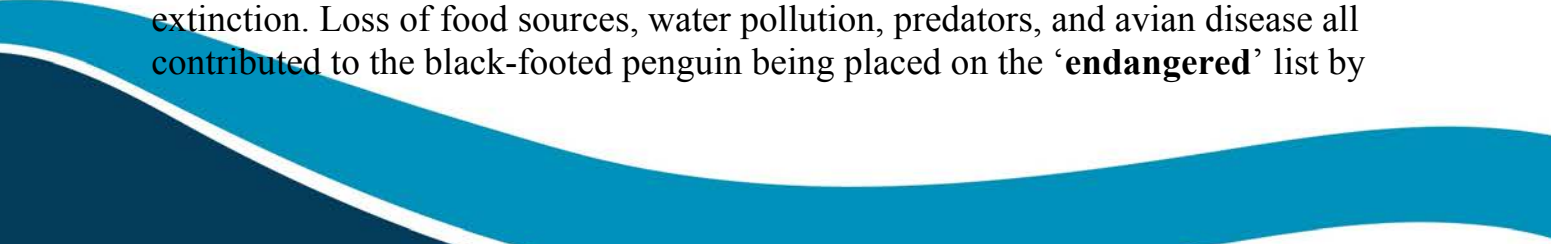
Black-footed penguins have a sturdy, black beak with a band of lighter color near the tip. The pointed beak is used to catch fish and carry the food back to the family. In addition to their flashy dressing, these penguins have hazel colored eyes, and of course, their webbed feet are black. Webbed feet and wing flippers help the penguin swim with great speed and agility.

Black-footed penguins generally lay 2 eggs in a nest made by both parents. It takes 40 days for the eggs to hatch, and both parents care for the babies while they grow. Baby penguins are hatched with a fluffy layer of gray feathers. The feathers help keep the baby protected and warm. As the baby matures, the feathers fall off and are replaced with new black and white feathers through a process called molting. It takes almost 2 to 3 years for each baby to fully mature into an adult.

The black-footed penguin's natural **habitat** is in the ocean and rocky and sandy areas off the coast of South Africa. There are 24 coastal islands between Port Elizabeth and Nambia that the black-footed penguins call home. This species of penguin is the only one found around the southern coast of Africa, and they are not found anywhere else on Earth. While the land temperatures around the area are warm, the water currents are much colder. Black-footed penguins have a triple layer of feathers that overlap to maintain their internal temperature and keep them waterproof. Their natural oil secretion aids in the waterproofing the feathers so they can effectively swim and feed in the cold ocean waters. These flightless birds have adapted to life on land and in the ocean with waterproof feathers, webbed feet, and sturdy wings used as flippers to help them swim. On land, the penguins move about the rocks and sand to nest and raise their young. Comfortable on land and sea, black-footed penguins have survived for many thousands of years in their natural habitat.

Living in small **colonies**, the black-footed penguins make their way up and down the coastal area of southern Africa looking for food. Individuals have been known to travel 25 or more miles in search of food. Penguins enjoy feasting on squid, anchovies, sardines, and other small fish. A daily fish diet of 20% of their body weight must be maintained to provide energy to thrive.

Black-footed penguins can live up to 24 years in human and approximately 11 years in the wild. While appearing to have been on earth for thousands of years, these birds have faced survival challenges in the past century. The population has declined in significant numbers, leaving the black-footed penguin in danger of extinction. Loss of food sources, water pollution, predators, and avian disease all contributed to the black-footed penguin being placed on the '**endangered**' list by



the IUCN (2015). Penguin World reports that as many as 19,000 of these penguins were killed as a result of an oil spill that took place in their area in the year 2000. To assist in protecting the black-footed penguin, conservation organizations have monitored the colonies, placed them on the endangered list, and participated in international breeding programs to ensure their survival. In addition, rescue efforts continue when these penguins are affected by oil spills or other disasters in and around their natural habitat.

Additional Resources

Penguins Braying: <https://www.youtube.com/watch?v=CFjFqlljWHM>

Penguins Swimming: <https://www.youtube.com/watch?v=hkAmMR-HE2Y>

Sources: Wayne/Encyclopedia of Life; Denver Zoo; IUCN Red List 2015; Encyclopedia of Earth; Penguin World.



Indicates 'take along' activity.

Procedures and Activities:

1. State the learning objectives.
2. Read related literature to familiarize students with ocean animals and habitat. Discuss how animals adapt to their environment and the role they play in an ecosystem.
3. Review the vocabulary words as they relate to the topic.
4. Discuss fossil remains to emphasize the lengthy existence of penguins on earth. Draw on students' previously learned information about fossils.
5. Show pictures and discuss the unique physical appearance of penguins, especially black-footed penguins. Discuss the following features and how the penguin's body parts are significant to survival on land and in the ocean. The bill (beak) is used for catching fish; webbed feet are designed to allow the animal to swim fast and effortlessly; wings are rigid and used as flippers to propel the penguin through the water; the white underside of the penguin helps to camouflage it from predators swimming below it in the ocean. The

black on the penguin is less reflective in light so predators may not spot the penguin as it swims near the surface of the water.

6. Discuss the fact that penguins are very fast swimmers yet they are not very agile on land. Explain the body posture of the penguin, position and type of wings and the “wobble” motion penguins use as they walk on land.
7. Discuss adaptation of the “bird” as it has become dependent on both land and ocean. Ask students how the penguin has adapted.
8. Show and read the African black-footed penguin poem. Ask students to write their own original poem about the picture or the life of a penguin.

Activity: “Label the African Penguin” checks for understanding of external anatomy of African Penguins. This activity can be pre or post presenting the background information or the aquarium visit.

Activity: Choose the activities that best fit the grade level of the students. Give handout “Penguin Adaptations!” and ask students describe the significance of the body parts to survival in the natural habitat.

Activity: “Can you spot the African Penguin?” Compares four species of penguins. Through learning their similarities and differences, students identify the four species from one another using deductive reasoning.

Activity: Using a Venn diagram, ask students to compare the penguin with their favorite ocean animal. Discuss the characteristics students listed related to similarities and differences. Next, have students write how the penguin has adapted to the unique environment of land and ocean life.

Activity: Students may want to research the structure of birds of flight and penguins. In a group project, have students research a specific type of bird of flight and present a brief report to the class. The class can then discuss how penguins differ from birds of flight.

Lab: The bone density of penguins assists them in floating on water and diving to depths of 25+ feet. How does the bone density impact penguins? Birds of flight have hollow bones that help them fly.

Students can conduct an experiment to see how the bone structure works. Using empty toilet paper rolls, leave one empty and fill the second with crumbled tissue paper. Now, in a container of water, float them and see what happens. The empty roll represents bones from a bird of flight. The filled tube represents the dense bone of a penguin.



Activity: Students use shoeboxes to create a diorama of the black-footed penguin in its natural habitat. Clay or play dough can be molded into penguins for the project. This is a **STEM** education activity.

Activity: Students create their own story about a penguin. Use prompts “A penguin saved their colony!” “A penguin met an interesting sea creature” or “Penguins at OdySea Aquarium”. Use the story map to write the draft.

Activity: Students create a newspaper article about the black-footed penguin.



Activity: ‘My Special Home’ is a take-along activity that students can complete during their visit to the aquarium.

STEM Information:

Make a poster about the impact manmade disasters (oil spills and contaminated ocean water) have on the survival of the black-footed penguins.

Research what groups have formed to protect the penguin populations.

Research what impact these groups have had over the past ten years.

STEM Resources: www.bioedonline.org

www.livescience.com

www.pbs.org/teachers/stem/

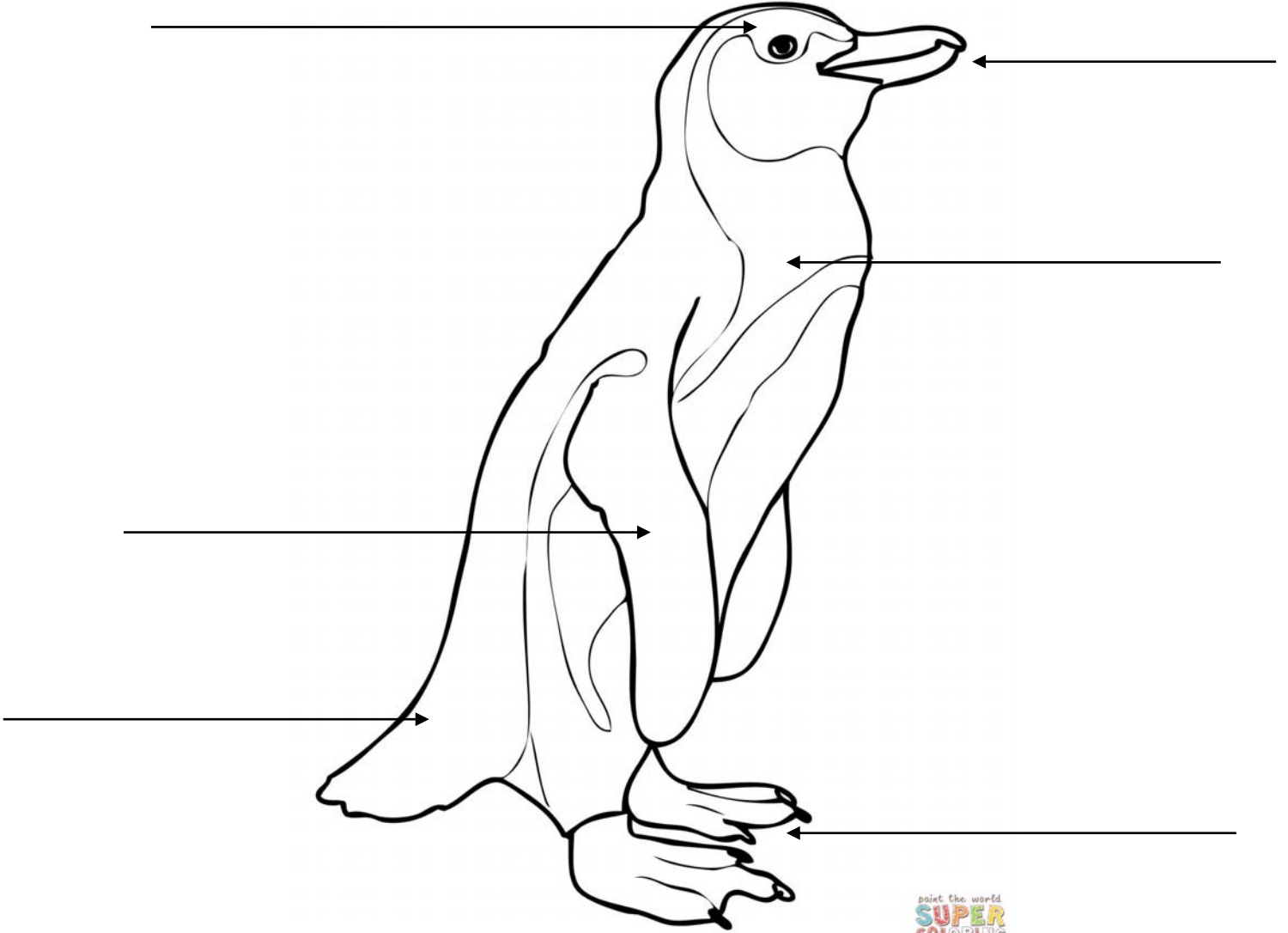
Reflections and Assessments:

Students can be evaluated on the basis of participation. In addition, the teacher may elect to grade projects, posters, and writing assignments.

Post aquarium visit activities may include the STEM activities and writing assignment.



Label the African Penguin



Word Bank:

Heat Windows

Flipper

Beak

Feathers

Feet

Tail

Penguin Adaptations!

Animals have *adaptations*, or things that help them survive. Describe why these body parts, or *anatomy*, help penguins to survive!

Bill

Eyes

Wings

Feathers

Feet



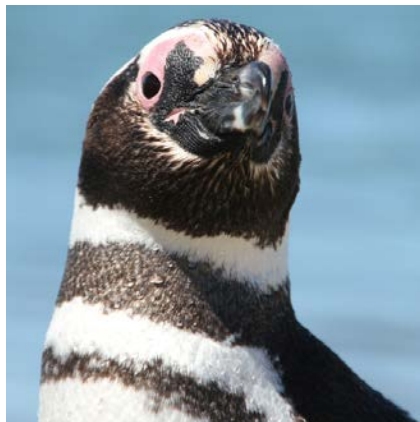
Can you spot the African Penguin?

African Penguins grow to be 2 feet tall and are known for black spots on their chest. Every African Penguin has different spots on their chest. They also have a black upside down “U” across their neck and prominent white crests on the sides of their head. They have pink patches above their eyes called heat windows that can help them release heat by expanding them.



Can you spot the African Penguin?

Four species of penguins look very similar: African Penguins, Humboldt Penguins, Magellanic Penguins and Galapagos Penguins. Write the name of the penguin under the picture you think best fits the description.



African Penguins: Prominent white crests on the side of their head and small heat windows above their eyes.

Magellanic Penguins: Second black band around neck and irregular shaped heat windows above eyes.

Humboldt Penguins: Large heat window around entire beak.

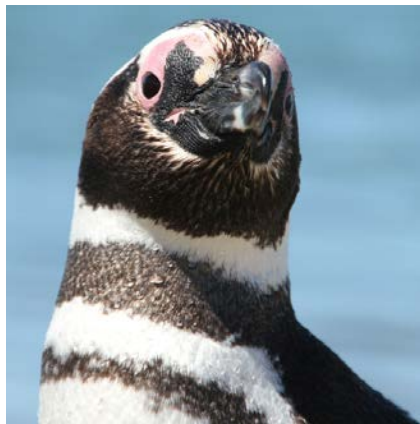
Galapagos Penguins: Small white crests on the side of their head. Heat windows under eyes extending towards lower side of beak.

Can you spot the African Penguin? KEY

Four species of penguins look very similar: African Penguins, Humboldt Penguins, Magellanic Penguins and Galapagos Penguins. Write the name of the penguin under the picture you think best fits the description.



Galapagos



Magellanic



African



Humboldt

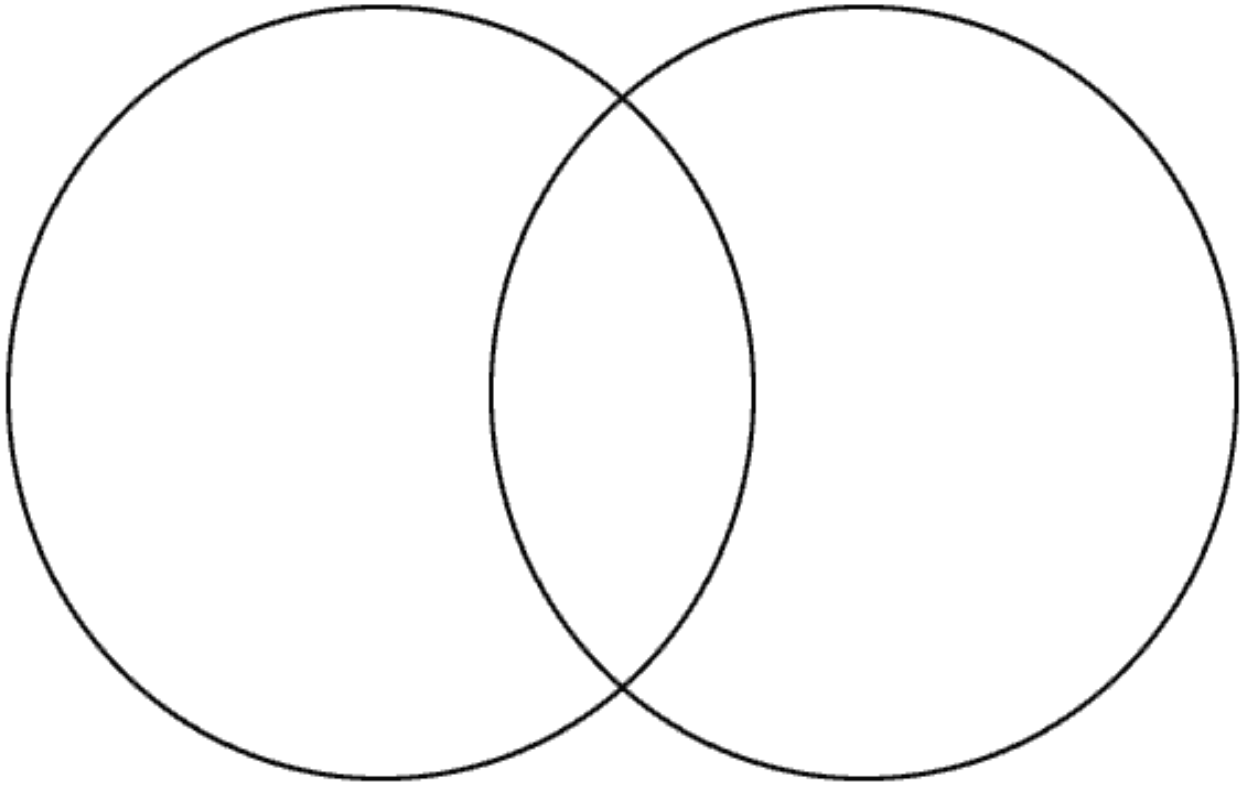
African Penguins: Prominent white crests on the side of their head and small heat windows above their eyes.

Magellanic Penguins: Second black band around neck and irregular shaped heat windows above eyes.

Humboldt Penguins: Large heat window around entire beak.

Galapagos Penguins: Small white crests on the side of their head. Heat windows under eyes extending towards lower side of beak.

Penguins vs. Your favorite ocean animal



How have penguins adapted to live in the ocean and on land?



Create your own story!

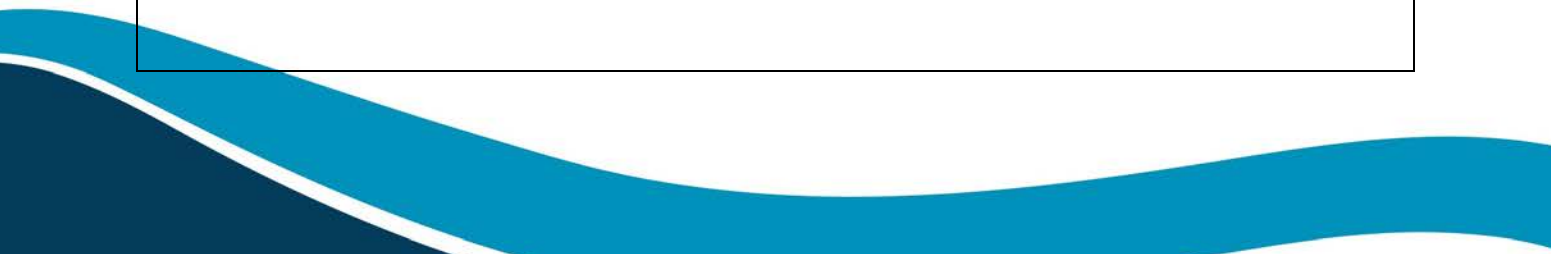
Setting:	Time:	Place:
----------	-------	--------

Characters:

Problem:

Plot/Events:

Resolution:



OUTLINE FOR NEWSPAPER ARTICLE

Name: _____

Date: _____

Title of Article

Introduction (who, what, when, and where)

I first witnessed

Next, _____

Then, _____

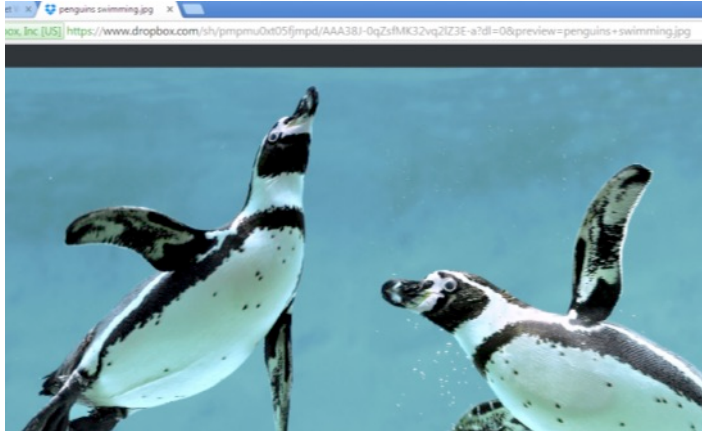
Finally, _____

Conclusion (reflect on total event)



My Special Home

I would like to spend some time with you and show you how I live.



Do you know what kind of bird I am?

What is my name?

Look closely at my feet!
What do you see?

How have I adapted to ocean life? _____

What do penguins eat? _____
How fast can penguins swim? _____
What helps penguins swim so fast? _____
Explain the term, 'flightless bird.' _____

How can penguins be protected from loss of habitat? _____

While watching penguins, what did you observe? _____

