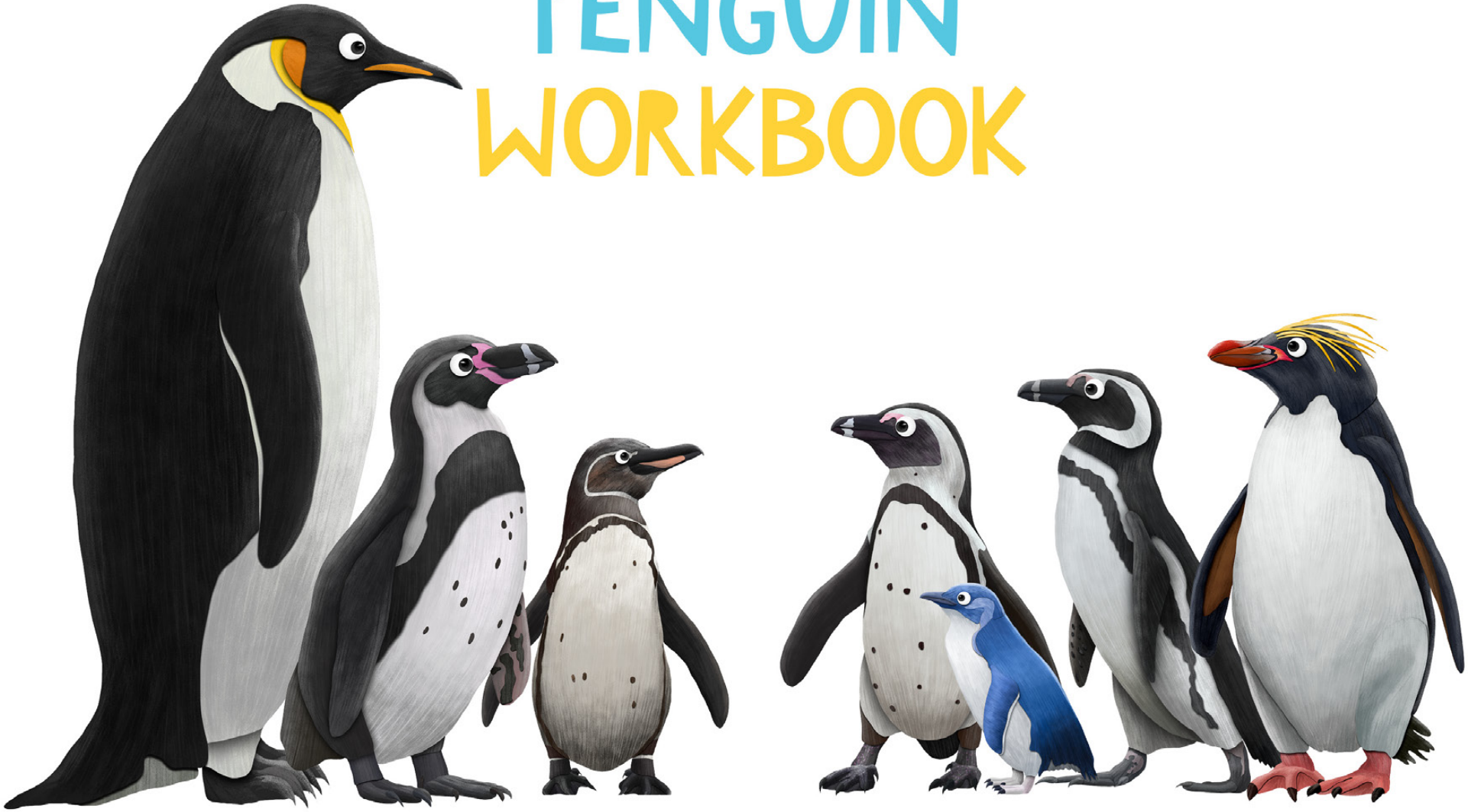
Penguins International

Protecting penguins, protecting the planet

PENGUIN WORKBOOK



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BANDED PENGUINS AROUND THE WORLD

GALAPAGOS PENGUIN

HUMBOLDT PENGUIN

MAGELLANIC PENGUIN

AFRICAN PENGUIN

Banded Penguins belong to the Genus Spheniscus and include penguins that have a stripe or band that runs up the side of the body and across the upper breast. There are 4 types of banded penguins: the Humboldt, African, Magellanic, and Galapagos Penguin.

Humboldt Penguins are found in Peru/Chile. African penguins are found in the South Western coasts of Africa and islands. Magellanic Penguins live in Argentina, Chile and the Falkland Islands. The Galapagos Penguin of course lives on the Galapagos Islands.

MEET THE BAND OF BANDED PENGUINS

GALAPAGOS PENGUIN

Scientific name: Spheniscus mendiculus

Population: 600 breeding pairs

Weight and height: 2.5 kg, 49 cm - 55 cm

Lifespan: 12-15 years

Conservation status: Endangered

Population Trend: Decreasing

Prey/diet: Engraulidae, mullet, Salema, striped herring, and some crustaceans

Distinguishing features: A narrow white line extends from behind the eyes, and joins at the throat. A dark throat band and a second dark band on the upper breast runs down both sides of the body.

HUMBOLDT PENGUIN

Scientific name: Spheniscus humboldti

Population: 16,000 breeding pairs

Weight and height: 4.2 kg- 5.0 kg, 72 cm

Lifespan: 12-15 years

Conservation status: Vulnerable

Population Trend: Decreasing

Prey/diet: Anchovies, silversides, jack mackerel, squid and crustaceans

Distinguishing features: A single wide black band runs in an upside-down U shape across the breast and down to the legs. Pink fleshy parts connect at the base of their bill.

MAGELLANIC PENGUIN

Scientific name: Spheniscus magellanicus

Population: 1.5 million breeding pairs

Weight and height: 3.2 kg- 4.6 kg, 65 cm

Lifespan: 15-20 years

Conservation status: Near Threatened

Population Trend: Decreasing

Prey/diet: Fish, cephalopods and crustaceans

Distinguishing features: A black throat band connects with the black feathers of the back, and a second black inverted U-shaped band on the chest extends down each side.

AFRICAN PENGUIN

Scientific name: Spheniscus demersus

Population: 25,000 breeding pairs

Weight and heights: 3.0 kg - 3.3 kg, 60 cm

Lifespan: 20 years

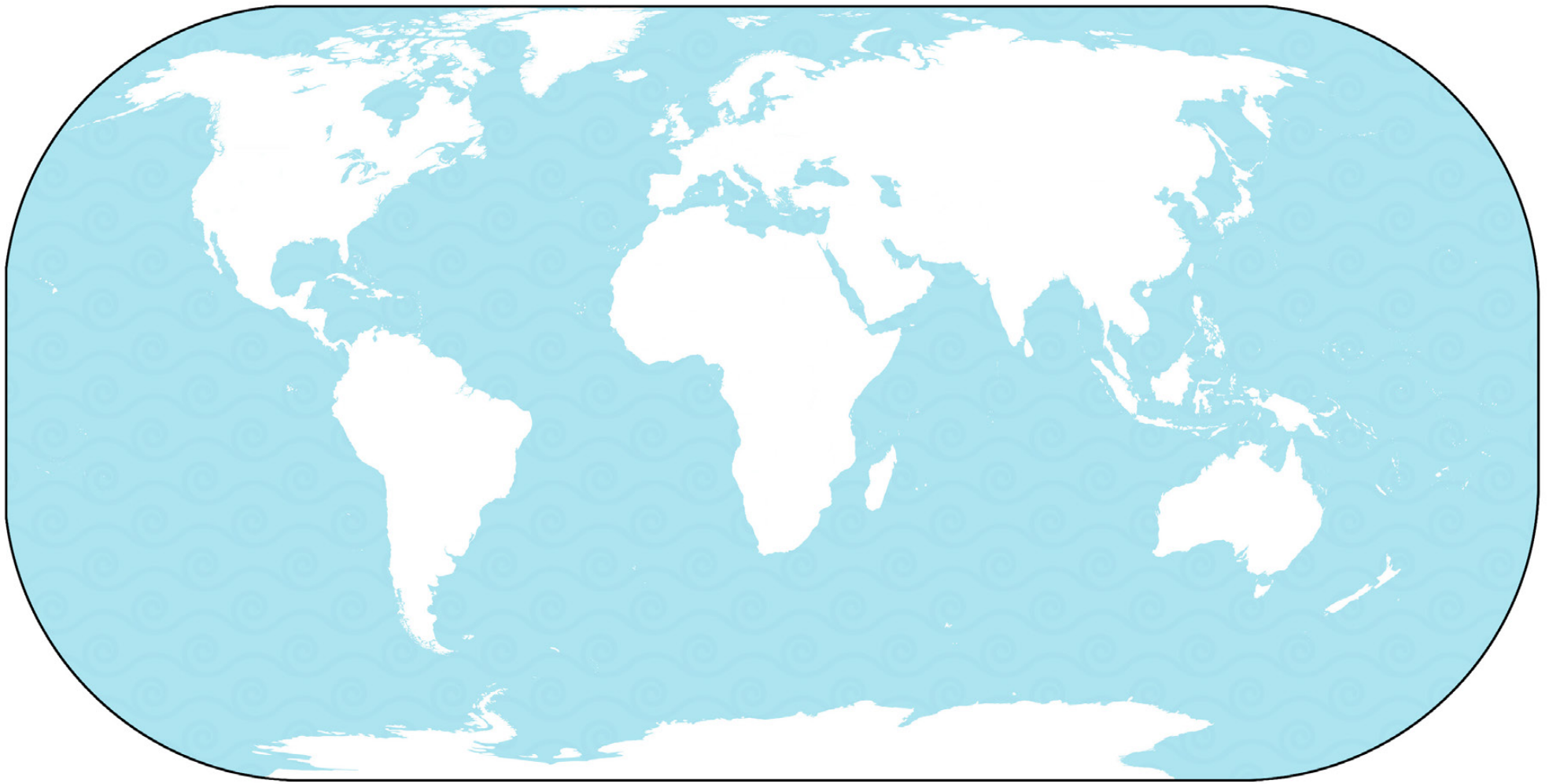
Conservation status: Endangered

Population Trend: Decreasing

Prey/diet: Anchovies, sardines, redeye, horse mackerel, juvenile hake.

Distinguishing features: A single black stripe runs up the sides of the body and across the upper breast.

PENGUINS AROUND THE WORLD

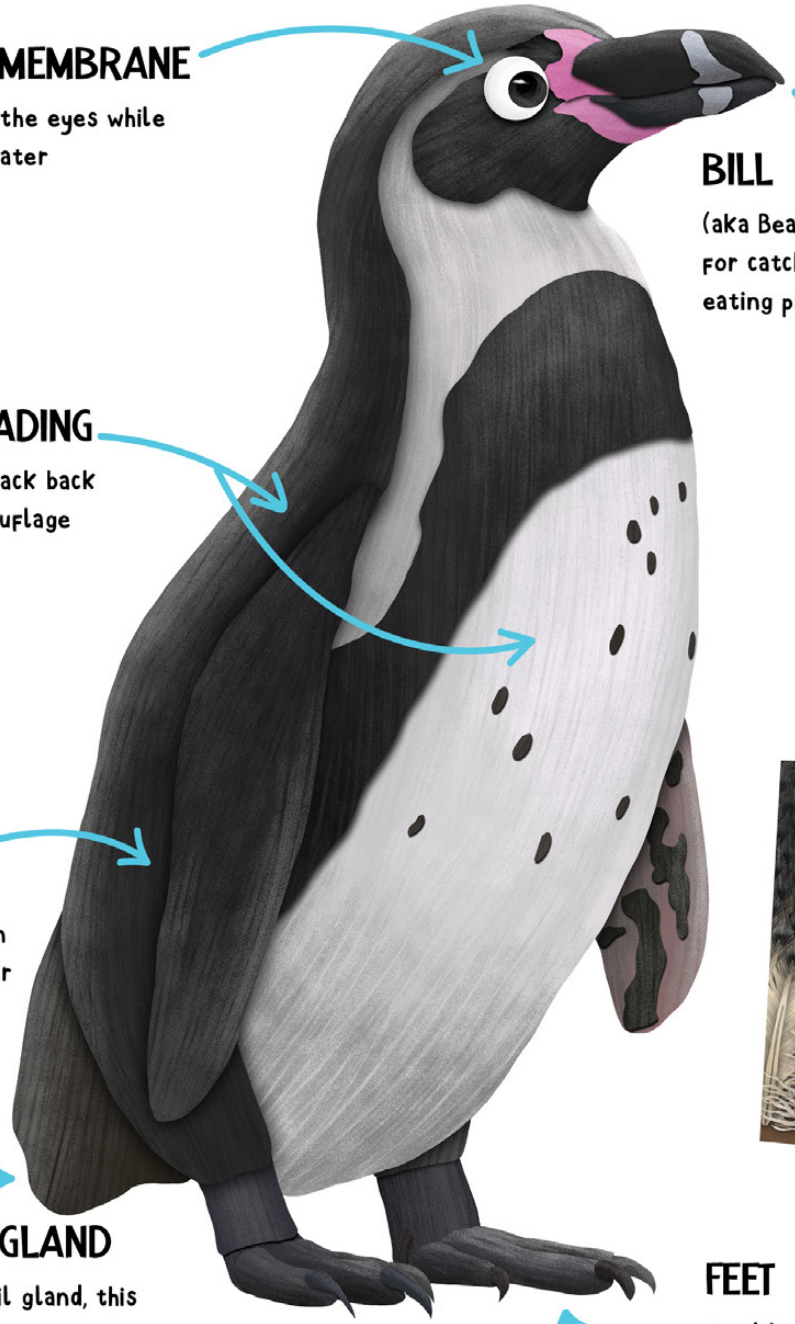


ACTIVITY

Where else might penguins live? Can you draw on the map where an Emperor Penguin, a Macaroni Penguin and a Little Penguin might live?

IF YOU WERE A PENGUIN WHERE WOULD YOU LIVE?

HUMBOLDT PENGUIN ANATOMY



NICTITATING MEMBRANE

like a goggle for the eyes while swimming underwater

BILL

(aka Beak) Mouth for catching and eating prey

COUNTERSHADING

White belly and black back is a form of camouflage

FLIPPERS

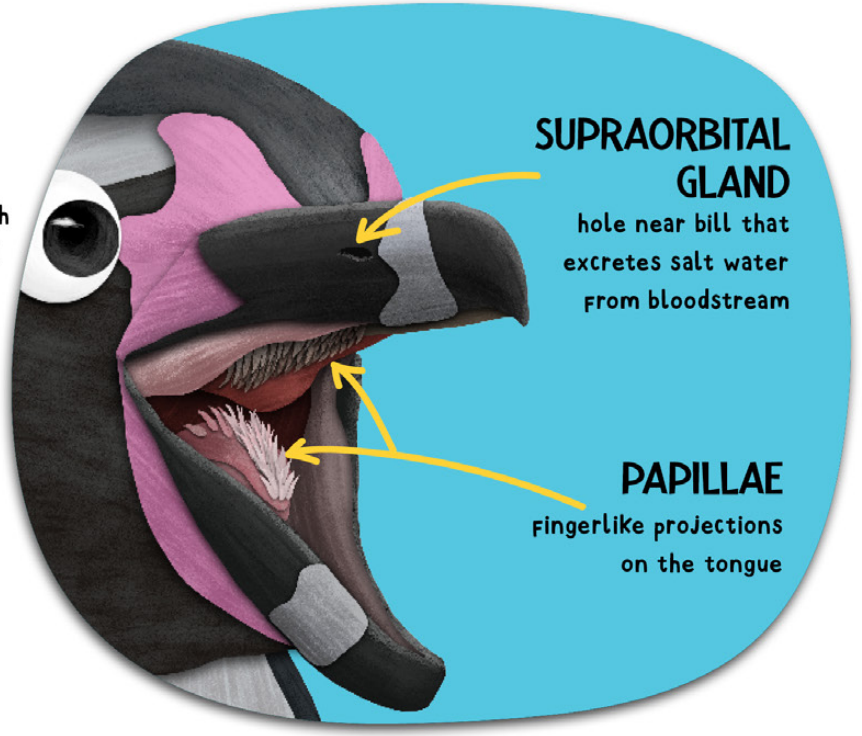
(aka wings) Used to propel penguin through the water

UROPYGIAL GLAND

Also called the oil gland, this special gland allows penguins to coat feathers in oil making them waterproof.

FEET

Act like rudders while swimming to help penguin steer

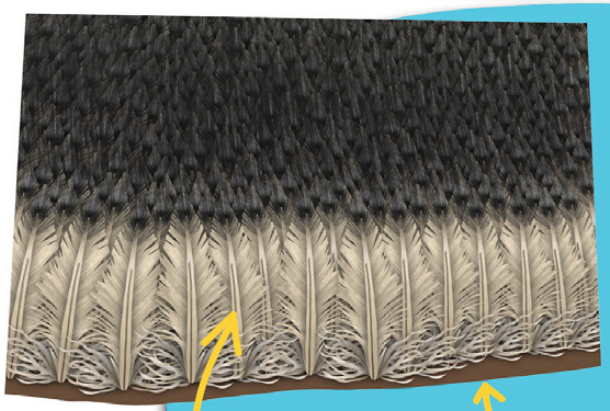


SUPRAORBITAL GLAND

hole near bill that excretes salt water from bloodstream

PAPILLAE

Fingerlike projections on the tongue



FEATHERS

Interlock together to create warmth or can be puffed out to regulate temperature.

HUMBOLDT PENGUINS ADAPTATIONS

WHAT IS AN ADAPTATION?

An adaptation is a modified body part that helps an animal survive in its habitat!

TRY THIS!

Fold your thumb into your palm and try to use your other fingers to do some basic tasks like zipping a zipper, buttoning a button, picking up M&Ms, typing on a computer or holding a pencil! Opposable thumbs are an important adaptation that helps humans survive.

ACTIVITY

How might the following adaptations help penguins survive?

Bill: _____

Papillae: _____

Flippers: _____

Supraorbital gland: _____

Nictitating Membrane: _____

Feathers: _____

Countershading: _____

What are the 4 things all animals need to survive?

1. _____
2. _____
3. _____
4. _____

HUMBOLDT PENGUIN TROPHIC PYRAMID

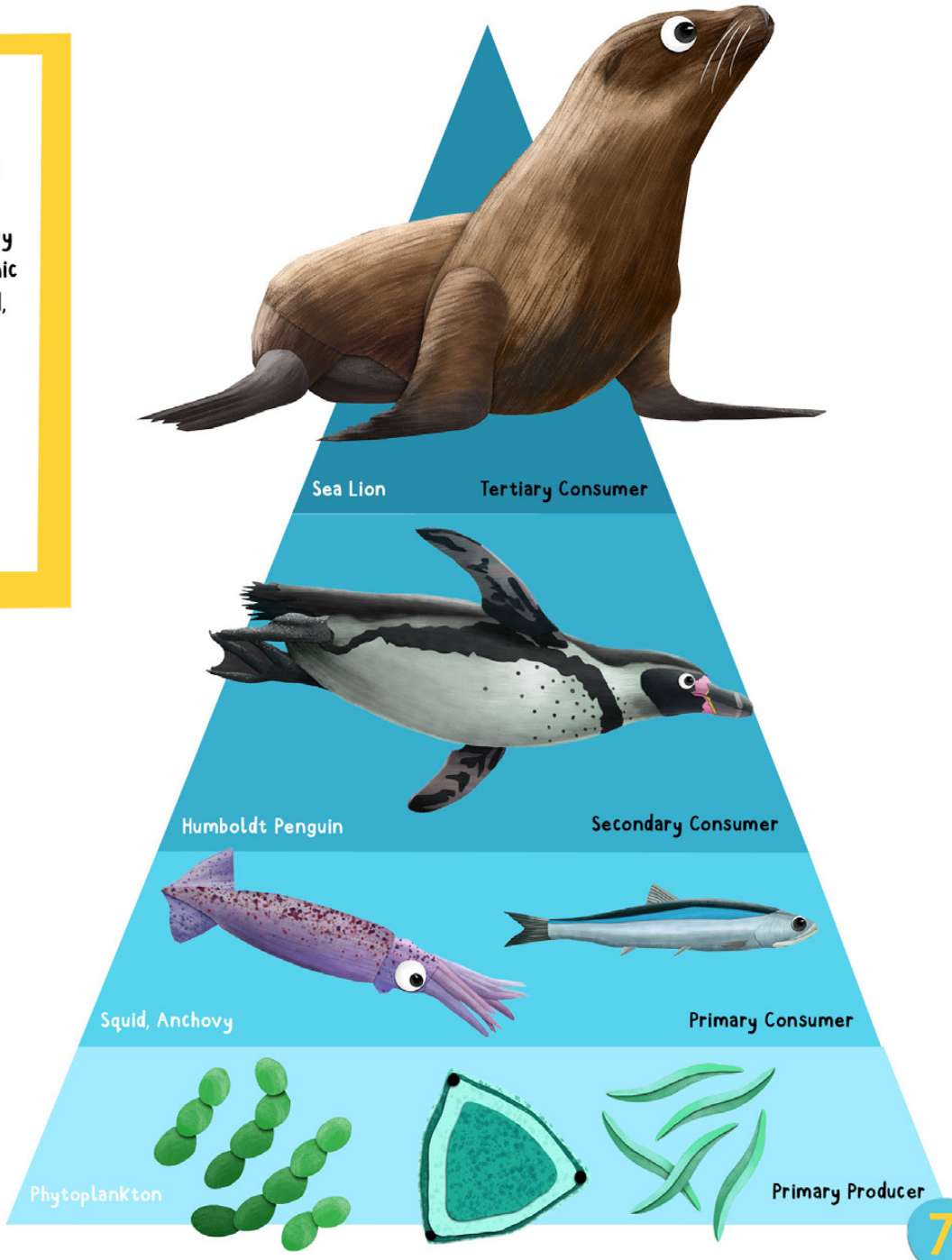
TROPHIC PYRAMID

Trophic pyramid: Stages containing groups of organisms that make up the food chain. Producers: The first trophic level on the bottom of the pyramid. Made up of photosynthesizing organisms that use energy from the sun as food. Consumers: The second, third, and fourth trophic levels. Consumers depend on producers or other consumers for food, nutrition, and energy.

A primary consumer eats producers and a secondary consumer eats the primary consumer. Tertiary consumers eat secondary consumers and apex predators are at the top of the food chain. Penguins are secondary consumers also called mesopredators because they are predators in the middle trophic level.

ACTIVITY

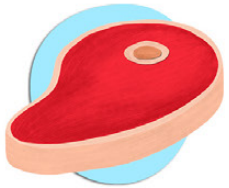
Can you draw an ocean apex predator?



TROPHIC PYRAMID

HERBIVORE

A consumer that eats plants.

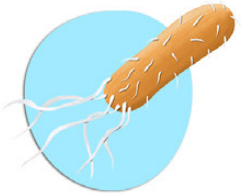


CARNIVORE

A consumer that eats other animals.

OMNIVORE

A consumer that eats both plants and animals.

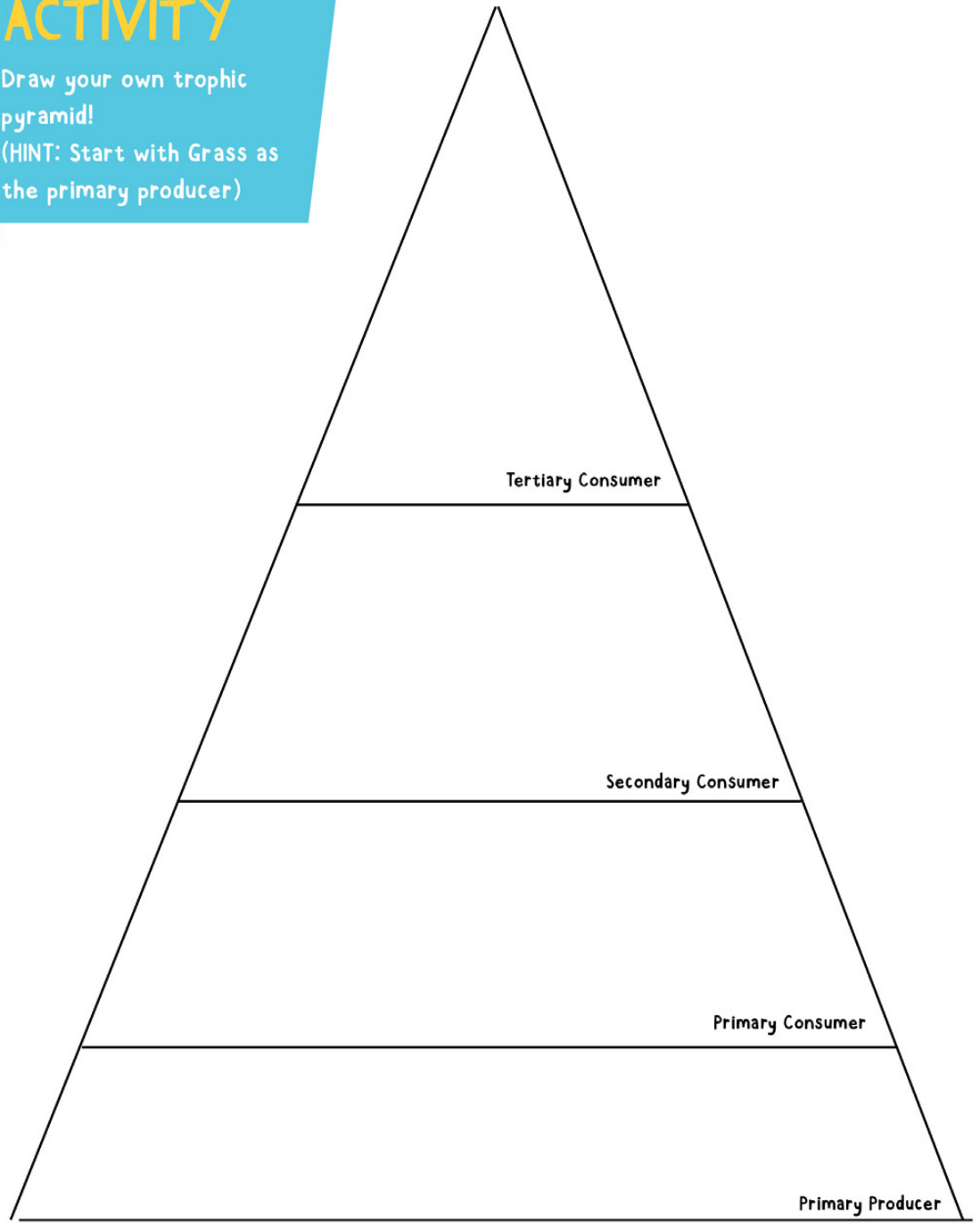


DETRITIVORE

The final part of the food chain, made up of decomposers like fungi and bacteria that eat non- living remains of plants and animals.

ACTIVITY

Draw your own trophic pyramid!
(HINT: Start with Grass as the primary producer)



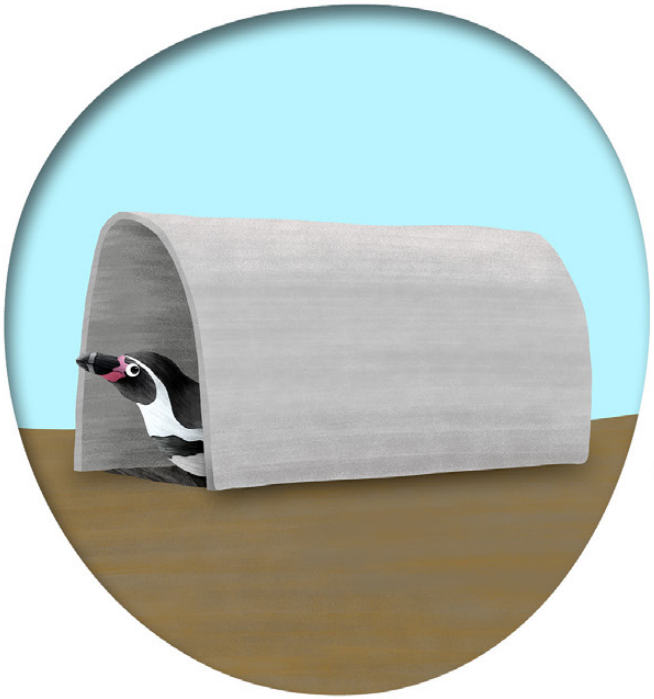
THE GUANO PROBLEM

NESTING

Humboldt Penguins create their nests out of guano (penguin poop!). After many years the guano builds up and penguins burrow into it to create a soft nest for laying their eggs. These burrows have natural insulation keeping the penguins and their chicks cool from the hot temperatures in Peru. Guano nests also serve as protection from extreme weather events and predators such as gulls.

HARVESTING

Humans discovered that guano makes a great fertilizer and began harvesting it from penguin colonies. In Peru, the guano harvest has been happening since the mid 1800s! The guano harvest is important for guano farmers' livelihoods. Scientists and experts began working with the Peruvian government to co-manage guano harvests and protect Humboldt Penguin nesting sites. There are now protected layers of guano and the harvest occurs in different areas every couple of years. The Punta San Juan Program works hard to create a balance of success among guano farmers and minimize impacts on penguins.



NEST BOXES

Many Humboldt Penguins have lost their burrows to the guano harvest and have built exposed nests on rocky ground. Exposed nests have no protection from weather conditions or predators. Nests are key to the breeding success of Humboldt Penguins so artificial nest boxes were created as a solution. These human-made nests have been built with different materials and with different designs to test out how well penguins live in them. Currently, the artificial nest boxes in Peru are made from concrete half pipes.

ARTIFICAL NEST BOXES

What have you seen nests built out of?

_____

_____

_____

_____

List some ideas for items that could be used for a nest:

_____

_____

_____

_____

ACTIVITY

Draw your own artificial nest box design!

HOW CAN YOU HELP?

A BEACH CLEANUP!

have a penguin birthday, and instead of receiving cards ask people to donate the amount of a card ($3) to Penguins International to support the nest box program.

Download your free macaroni penguin party hat by scanning the QR code with your phone. Or go to www.creechakids.com/pages/penguin-hat

SCAN ME

HAVE A PENGUIN PARTY!

Ride your bike!

Say "no!" to plastic straws!

ZOO

Visit a zoo that supports penguins!

Spread penguin conservation awareness!

Compost food scraps!

Eat sustainable seafood!

Turn off the water when you brush your teeth!

Turn off the lights when you leave a room!

Donate to penguins international!

Why do you like penguins?

_____

_____

_____

_____

List some ways you can help penguins:

_____

_____

_____

_____

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Penguins International Extension Activities

Next Generation Science Standards

Banded Penguins Around the World (Pages 2-4):
2-LS4-1 Biological Evolution: Unity and Diversity
4-ESS2-2 Earth's Systems

Humboldt Penguins Anatomy & Humboldt Penguins Adaptations (Pages 5 & 6)
K-ESS3-1 Earth and Human Activity
1-LS1-1 From Molecules to Organisms: Structures and Processes
3-LS4-2 Biological Evolution: Unity and Diversity
4-LS1-1 From Molecules to Organisms: Structures and Processes

Humboldt Penguin Trophic Pyramid (Pages 5 & 6):
5-PS3-1 Energy
5-LS2-1 Ecosystems: Interactions, Energy, and Dynamics

Artificial Nest Boxes (Pages 9 & 10):
K-2-ETS1-1 Engineering Design
K-2-ETS1-2 Engineering Design
3-5 ETS1-1 Engineering Design
3-5 ETS1-2 Engineering Design

How can you help? (Page 11):
K-ESS3-3 Earth and Human Activity
4-ESS3-2 Earth and Human Activity
5-ESS3-1 Earth and Human Activity

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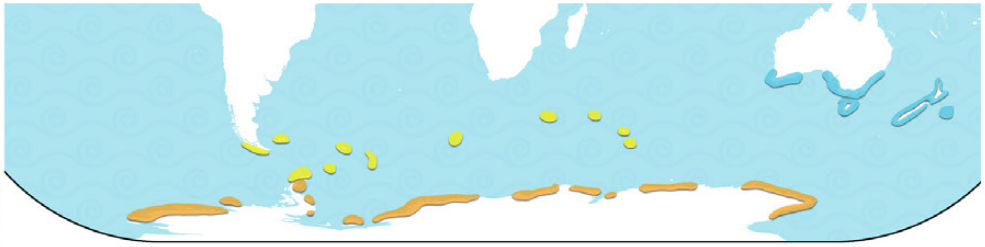
ANSWERS

(Page 4) Question: Where else might these penguins live?

Emperor Penguin: Antarctica Macaroni Penguin: sub-Antarctic Islands & Antarctica

Little Penguin: Southern Australia, Tasmania, & New Zealand



(Page 6) Penguin Adaptations
Question: What are the 4 things all animals need to survive? Food, Water, Shelter, Space

(Page 6) Question: How might the following adaptations help penguins to survive?
Bill: Helps penguins catch and swallow prey
Papillae: Act as hooks to help penguins capture prey
Flippers: Flippers help penguins swim and feet act as rudders to help steer
Supraorbital gland: Filters salt water out of penguin's blood stream. Helps penguins drink water.
Nictitating Membrane: Allows for penguins to see underwater, kind of like goggles
Feathers: Help penguins stay warm in cold temperatures such as the ocean or Antarctic dwelling species. Penguins have a special oil gland at the base of their tail that they use to coat feathers to make them waterproof which helps with swimming.
Countershading: The white belly and black back of a penguin helps camouflage penguins while they are in the ocean. From the sky the black back blends into the dark water and from below looking up the white belly blends into the bright sky. Black also is a color that absorbs heat so penguins that are cold might face their backs to the sun to warm-up and if they are hot they may face their white bellies to the sun to cool off.

Penguins International Extension Activities