

The Penguin

Standards Addressed

Math

Multiplication and Division

3-4.RA.A

Science

Identify Adaptations

3.LS3.C.1

4.LS1.A.1

Properties of Matter

3.PS1.A.1

ELA

Academic Vocabulary

3.R.1.B.i

4.R.1.B.f

5.R.1.B.g

Fiction vs. Nonfiction

3-5.R.1.C.a

Character Traits and Actions

3-4.R.2.A.b



Q: What do penguins wear on their head?

A: Ice caps

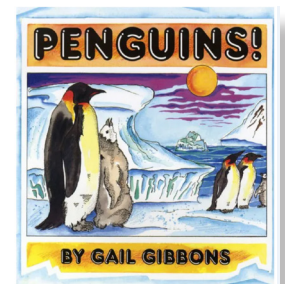
Everyone loves penguins, one of the most easily identifiable bird species. Students may be surprised to learn that there is more than one type of penguin, and that half of those species are found in warm climates. Your students will enjoy solving iceberg math problems and experimenting ways to insulate an ice cube against melting.

The Books

Penguins! by Gail Gibbons

Lexile 470L

Gail Gibbons provides penguin natural history along with amazing illustrations for this stunning book about penguins. This book covers the different species, geography, breeding, penguin adaptations and much more.



Archie the Daredevil Penguin by Andy

Rash

Lexile 460L

Flesch-Kincaid grade level 2.17

Archie designs a series of wild inventions to fly over the water and avoid the strange creatures who lurk in the briny deep. This comical story is written entirely in graphic novel/comic book format, using dialogue, illustrations, and sound effects.

In this unit, students will:

- compare and contrast fiction vs. nonfiction.
- describe the personality traits of a character based on their thoughts, words, and actions.
- solve problems using multiplication.
- predict and investigate how water changes its phase of matter.

Additional Penguin Information



- Penguins live on all four continents in the southern hemisphere, and a large number of surrounding islands.
- There are 18 species of penguins: Emperor, King, Adélie, Gentoo, Chinstrap, Fiordland-crested, Erect-crested, Southern and Northern Rockhoppers, Macaroni, Royal, Snares Island, Yellow-eyed, Little or Little blue fairy, African, Peruvian or Humboldt, Magellanic, and Galapagos. Some scientists include sub-species in their classifications, so different sources will refer to anywhere between 17 and 21 species.
- All but King and Emperor penguins build a nest, though these nests are usually only a simple pile of stones, or burrows under rocks and bushes. These stones are continually stolen and swapped among the members of a colony. Rock nests are slightly higher than the surrounding land so, the nests are not flooded.
- Penguin predators include leopard seals, orcas, and sea lions. Skuas, a type of predatory seabird, are the main predators of penguin eggs and unguarded chicks. Penguins in Antarctica have no land-based predators.
- Penguins can drink sea water, because they have special glands that filter the water, removing the salt.
- Penguins have an oil gland located just above their tail. They will use their bill to spread the oil on their feathers to help make them waterproof.

What challenges does this animal face in the wild?

The biggest challenge facing penguins is overfishing. When commercial fishers catch large amounts of fish, or use unsustainable fishing practices, penguins get caught in the nets trying to get an easy meal or find themselves having to search far and wide for the fish they need to survive.

Be a Planet Protector!

Be a Planet Protector by checking your food items for responsible sources. Share with your household what you have learned about sustainable seafood, and teach them how to look for certified products. By choosing sustainable seafood you can protect our ocean ecosystems!

Vocabulary



ELA- Academic Vocabulary: 3.R.1.B.i, 4.R.1.B.f, 5.R.1.B.g

rookery - the place where a group of birds or social mammals (like penguins or seals) breed, nest or raise their young.

incubation - the period during which a bird keeps an egg warm before it hatches

regurgitate - to bring swallowed food back up again to the mouth

creche - a nursery where babies and young are cared for

fledgling - a bird in its first coat of feathers that is capable of moving about on its own

countershading - when an animal's coloration is darker on the top or upper side and lighter on the underside

molt - to shed old feathers

porpoising - to move through the water like a porpoise; up and down, above and below the surface of the water

insulate - to cover, line or separate with a material that prevents or reduces the passage, transfer or leakage of heat

Meet Paula and Leela



Leela is named after Leela Hazzah (b.1979). Dr. Leela Hazzah has worked in conservation in East Africa for over 20 years. Leela's main focus is studying and protecting lions in Kenya. Her study revealed that the protection of lions relies on the attitudes of the local Maasai people. Together, Leela and the Maasai people founded the Lion Guardians. They monitor lion movements, prevent livestock loss, and intervene to stop lion hunting parties. Leela's efforts show that local people have a huge impact on the success of conservation efforts and the importance of understanding local customs.



Paula is named after Dr. Paula Kahumbu (b. 1966). Dr. Paula Kahumbu fell in love with wildlife as a child growing up near Nairobi, Kenya. She researched elephants for her Ph.D. and has dedicated her life to protecting elephants in not only Kenya, but worldwide. She has moved from a strictly research role to an advocacy role. As the CEO of WildlifeDirect, she helps conservationists receive support and publish their findings online. Dr. Kahumbu also heads the Hands Off Our Elephants Campaign, working closely with the First Lady of the Republic of Kenya. She is the author of several critically acclaimed books, including the children's book *Owen and Mzee: The True Story of a Remarkable Friendship*.

Adaptation Exploration



Science- Adaptations: 3.LS4.C.1, 4.LS1.A

On page 3 of the student guide, students are introduced to penguin adaptations. These adaptations help penguins survive in their natural habitat.

Feathers: Penguins have denser feathers than any other bird, about 80 per square inch. The bottom of each feather is frilly and filled with down to help them stay warm, while the top of each feather is smooth to help them glide through the water. Unlike other birds, penguins go through an annual catastrophic molt, where they lose and replace all their feathers. The color of their feathers gives them a special types of camouflage called countershading. The dark back of the penguin blends in with the dark ocean floor when viewed from above and the light belly blends in with the lighter surface of the sea when viewed from below.

Beak: Since penguins eat very slippery food like fish or squid, their beaks are adapted to help them catch and grip their food. They have a slight hook at the end of their beak and the inside of their mouth is covered with hundreds of tiny spines that work like velcro. These spines are rear directed to aid in swallowing. Because penguins have no teeth, they have to swallow their prey whole. Generally, the bill tends to be long and thin in species that are primarily fish eaters and shorter and more stout in those that mainly eat krill.

Wings/Flippers: Penguin wings have adapted to become flippers that help them swim. Their wing bones are flattened and fused together to make them extra strong. The joint of the elbow and wrist are fused giving a flatter surface for swimming. Each flipper is covered with short, scale like feathers which are better for swimming.

Feet: Penguins are adapted to be good swimmers, not good walkers. Small feet are easy to tuck up against their body to get them out of the way while swimming. They use their webbed feet to help them change direction while swimming, like a rudder on a boat.

Read the Penguin Books



ELA- Fiction vs. Nonfiction: 3-5.R.1.A

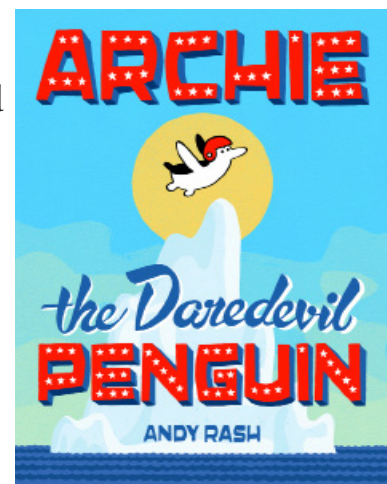
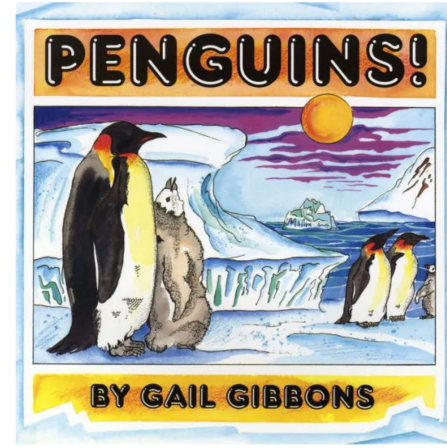
We recommend starting with the nonfiction book; *Penguins!*. This book has beautiful illustrations and covers a variety of penguins, discussing their unique characteristics.

Next, read *Archie the Daredevil Penguin*. This is a fun read-aloud as it uses onomatopoeia, dialogue, and illustrations to tell the story. Have students pay close attention to how these elements work together.

After you've read the book, work together as a class to identify any true information that the author incorporated into the story. Stress that students should look at the illustrations as well as the dialogue.

You might want to re-read or flip through the book again to find examples. Some possible answers include:

- Penguins live somewhere with icebergs and saltwater
- Penguins are black and white
- Many predators of penguins live in the ocean
- Penguins toboggan (though not with a sled!)
- Leopard seals live in the same habitat as penguins



Let's Read About Penguins



LET'S READ ABOUT PENGUINS

Paula says, "You were read two books about penguins. One is fiction and the other is nonfiction. What do you think?"

1. Use this diagram to list the similarities and differences between the two penguin books.

2. Write a sentence that describes one similarity or one difference between the books.

3. Which book do you like better? Why?

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ELA- Fiction vs. Nonfiction: 3-5.R.1.C.a

On page 4 of the student guide, students are asked to fill in a Venn Diagram to compare and contrast the books they have read. This is an excellent opportunity to discuss the purpose of different types of texts. What was the author's purpose in writing *Penguins!*? What about *Archie the Daredevil Penguin*? How does purpose affect the information that is included in a book, the style of writing, the illustrations, etc.? Students will form and support an opinion about which book they preferred.

You may extend this activity by asking students to think about other fiction and nonfiction books they have read. What do they usually have in common? What are the differences? What is similar or different about most books compared to these penguin books?

Archie the Daredevil!



ELA- Character Traits and Actions: 3-4.R.2.A.b

Archie is quite the daredevil, a penguin with a desire to fly. Creating a character can be difficult. The author must think of the characters' personality and how their thoughts and actions might affect the story.

After reading *Archie the Daredevil Penguin*, students will list three character traits and three character actions that describe Archie. Then, they will describe how these traits and actions affected the story.

ARCHIE THE DAREDEVIL!

Leela says, "Archie is unlike other penguins, he has a desire to fly!"

Creating a character can be difficult. The author must think of their character's personality and how their thoughts and actions might affect the story. How would you describe Archie? Fill in the boxes below.

| | |
|--|--------------------------|
| Main Character: | |
| Three Character Traits: | Three Character Actions: |
| How did the character's traits and actions affect the story? | |

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Help Leela Count Penguins



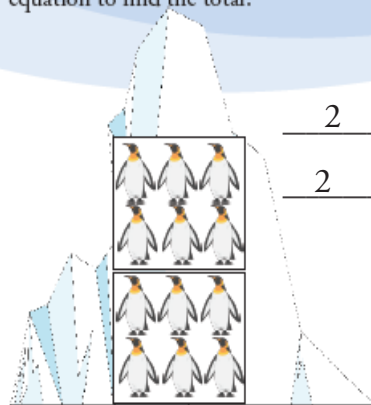
Math - Properties of Multiplication and Division: 3-4.RA.A

In the student guide, students are provided seven icebergs, each with a different number of groups and group size of penguins. For each iceberg, students will need to determine the number of groups on the iceberg and how many penguins are in each group. Then, they will write and solve a mathematical equation to find the total number of penguins on the iceberg.

HELP LEELA COUNT PENGUINS

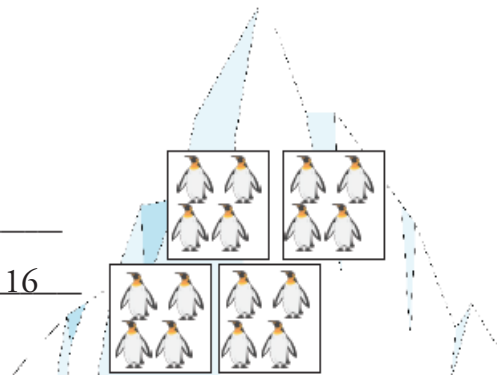
Leela says, "Counting large groups of penguins can be difficult, so sometimes it is easier if you break it up into smaller groups."

For each iceberg, record how many groups of penguins there are on the first line. Then, record how many penguins are in each group on the second line. Finally, create a math equation to find the total.

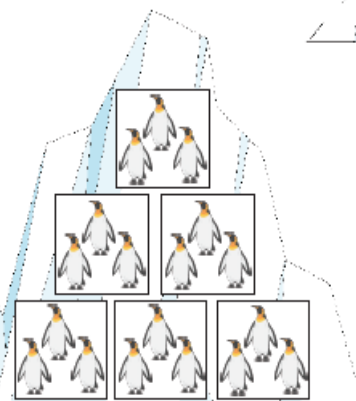


$$\begin{array}{r} \underline{2} \text{ groups of } \underline{6} \\ \underline{2} \times \underline{6} = \underline{12} \end{array}$$

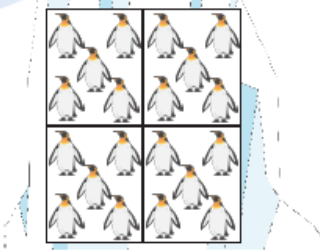
$$\begin{array}{r} \underline{4} \text{ groups of } \underline{4} \\ \underline{4} \times \underline{4} = \underline{16} \end{array}$$




$$\begin{array}{r} \underline{6} \text{ groups of } \underline{3} \\ \underline{6} \times \underline{3} = \underline{18} \end{array}$$



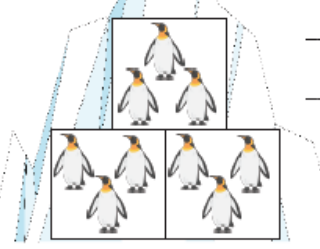





$$\begin{array}{r} 4 \text{ groups of } 5 \\ 4 \times 5 = 20 \end{array}$$




$$\begin{array}{r} 5 \text{ groups of } 2 \\ 5 \times 2 = 10 \end{array}$$



$$\begin{array}{r} 3 \text{ groups of } 3 \\ 3 \times 3 = 9 \end{array}$$



$$\begin{array}{r} 2 \text{ groups of } 4 \\ 2 \times 4 = 8 \end{array}$$

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Don't Melt The Ice



Science- Properties of Matter: 3.PS1.A.1

Overview: Students will work in groups to slow the melting ice cube by using a variety of materials to insulate their ice cube.

At a Glance

Duration: one day, start in the morning

Setting: classroom

Materials (bold provided):

1 paper cup for every 3-4 students

Ice cubes (small enough to fit into the cup, make sure they are all about the same size)

Various materials to help insulate the ice cube (paper towels, tin foil, salt, cotton balls, bubble wrap, foam pieces, etc). Teachers can provide the items that students can select from or you may have the groups brainstorm and bring items from home or outside.

Group size: 3-4 students

Most penguins do not live in cold places, but they all live around colder water. They need adaptations to keep them warm. Their feathers help insulate by repelling the water and trapping air next to their bodies to keep them warm.

Students are challenged to insulate an ice cube to prevent it from melting. You may choose to present this activity several days in advance so that students can brainstorm their designs and collect their own materials, or you can bring in a selection of materials that students can choose from.

To start, have students write a number or group name on their cup and collect the materials they want to use. Students draw or write a list of these items in their student guides. Give each group an ice cube. Students should record the time they received their ice cube in their student guide. Use the materials to insulate the ice cube. As they insulate their ice cube, remind them that they will need to be able to access the ice cube in the future, so it is advisable they do not wrap it too well.

As a control or something to compare to, place an ice cube in a cup with nothing insulating it. Once students are satisfied with their materials and ice cube, place all the cups in the same location so they experience the same environmental factors.

Check the ice cubes every 15 minutes. In their student guide, students make observations about what is happening (for example; little water in cup showing melting, insulated ice cube is bigger than non-insulated ice cube, non-insulated ice cube is 50% melted, etc.) How long did it take for the ice cube to melt? How did this compare to the ice cube that was not insulated? What materials worked better than others?