6 Adapting To The Antarctic Climate

Antarctica, the home of the Adélie penguins, is considered one of the harshest environments on earth, with temperatures dropping to as low as -112 °F (-80 °C) and strong winds creating blizzard-like conditions. Not only must Adélie penguins adapt to the weather, but they must constantly be aware of natural predators such as leopard seals, killer whales and south polar skuas who will prey not only on eggs and chicks but themselves as well. Despite these tremendous obstacles, Adélie penguins not only survive in Antarctica, but thrive, as scientists recently discovered colonies reaching sizes of 1.5 million individuals from satellite imagery.

Adélie penguins are able to successfully inhabit Antarctica due to physical adaptations that provide them with the necessary tools for survival. In order to combat the low temperatures of Antarctica, Adélie penguins have overlapping feathers that create a surface nearly impenetrable to wind and water. These feathers, along with a thick layer of body fat, provide Adélie penguins with thermal insulation to keep their body temperature regulated. Despite these physical characteristics, Adélie penguins must conserve heat by tucking their flippers close to their bodies while shivering to generate additional heat.

To avoid their natural predators, Adélie penguins also have additional adaptations to aid in their survival. The coloring of Adélie penguins allows them to hide from predators while swimming, with their dark backs blending into the ocean bottom, and their white undersides becoming nearly invisible against the light from the surface. Entering into the water, Adélie penguins work together by diving in pairs or trios to increase their odds of survival.

Grades **2-3** | Content Areas **ELA, Science & Math**

Adélie Penguin Surveys

ESSENTIAL QUESTIONS

What information about Adélie penguin survival is important to capture in graphs and infographics? What are things people can do to protect Adélie penguin habitats?

Materials
- *Activity Sheet: Adélie Penguin Surveys*
- *Activity Sheet: Infographic Example*
- butcher paper
- clipboards
- glue
- markers
- pencils
- poster board
- scissors

Vocabulary
- bar graph
- layout
- infographic
- pie chart
- survey
- tally marks

WARM UP

Encourage students to take the point of view of an Adélie penguin as they ask and answer survey questions about how they would survive in Antarctica. Tell students to combine the survey information into a class infographic. Explain that one of the goals of the infographic will be to highlight things people can do to protect Adélie penguin habitats.

CREATING GRAPHS

Provide each student with *Activity Sheet: Adélie Penguin Surveys*. Students in small groups conduct survey 1, 2, 3 or 4 with classmates or other classrooms. Students will transfer data into a table, discuss and then represent the answers in a graph (pictogram, **bar graph** or pie chart) on poster board. To help students understand how the graphs will be used, display and discuss features of an infographic. Use butcher paper for the background of the infographic, follow the example on *Activity Sheet: Infographic Example* and glue graphs in place. Students should add pictures for each graph or insight.

WRAP UP

Display infographics in the room and discuss how the information invites viewers to care about Adélie penguins. Students decide and add to the infographic which way to conserve Adélie habitats they will support. Students who wish to continue gathering data may conduct their own surveys.

Key Infographic features include:
- Visually organized information.
- Focused on main points.
- Contains at least 4 sets of facts, data or information, that are clear, and in order of importance.
- Includes color, shape, size and symbols that lead viewers through the information in a logical way.

How to Conduct Your Own Adélie Penguin Survey

1) Write questions on your topic of interest.
2) Ask the questions.
3) Organize and record tally marks.
4) Show the answers on a graph.
5) Discuss what you learned from the graphs.
6) What are implications or insights?
7) What additional questions do you want to ask?

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Activity
GRADES
2-3

ADÉLIE PENGUIN SURVEYS
SURVEYS 1 AND 2

NAME _____   DATE _____

Directions:

1. In small groups, select a survey, read over the question and take turns conducting the survey with classmates and recording answers with tally marks under each question below.

2. Convert tally marks into a table that records the number of responses for each question.

3. On a piece of scratch paper, turn information from the table into a graph of your choice (pictogram, bar graph, pie chart).

4. Follow guidelines to organize graphs into an infographic.

Survey 1: If you were an Adélie penguin what adaptation would you use to get away from a predator in the ocean?

SURVEYOR NAMES:

_____
_____
_____
_____
_____
_____
_____

A Use a burst of swimming speed (22 mph)

B Leap quickly onto an ice floe

C Be still and rely on my camouflage

D Start swimming in a zig zag pattern

Survey 2: If you were an Adélie penguin what adaptation would you use to get away from a predator on land?

SURVEYOR NAMES:

_____
_____
_____
_____
_____
_____

A Plop onto my belly and toboggan into the water

B Waddle quickly to mix in with a larger group of Adélie penguins.

C Move into the middle of the colony

Organize your data into a table:

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Activity
GRADES
2-3

ADÉLIE PENGUIN SURVEYS
SURVEYS 3 AND 4

NAME _____   DATE _____

Directions:

1. In small groups, select a survey, read over the question and take turns conducting the survey with classmates and recording answers with tally marks under each question below.

2. Convert tally marks into a table that records the number of responses for each question.

3. On a piece of scratch paper, turn information from the table into a graph of your choice (pictogram, bar graph, pie chart).

4. Follow guidelines to organize graphs into an infographic.

Survey 3: If you were an Adélie penguin what is the most important thing you would do to protect your chicks?

SURVEYOR NAMES:

A Build the nest in the middle of the rookery	**B** Stand guard while my mate forages for food	**C** Let my chicks huddle in a creche of other chicks	**D** Fight skua gulls with my sharp beak

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Survey 4: If you were an Adélie penguin what is the most important thing you want people to do to save your habitat?

SURVEYOR NAMES:

| **A** Plant more trees	**B** Use less energy	**C** Raise funds at school to adopt a penguin	**D** Recycle plastics

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Organize your data into a table:


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INFOGRAPHIC EXAMPLE

If we were Adélie Penguins...

SURVEY 1 How we would escape a predator in the ocean:

(Insights and observations)

50%
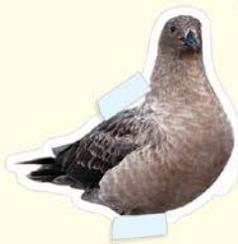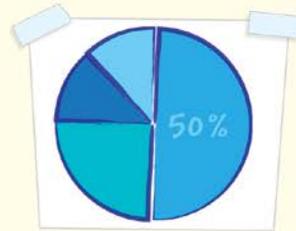
SURVEY 2 How we would escape a predator on land:

(Insights and observations)

4 7 3
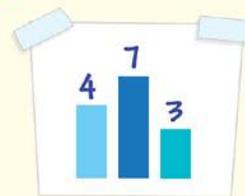
SURVEY 3 How we would protect our chicks:

(Insights and observations)

A B C D

SURVEY 4 How people could save our habitat:
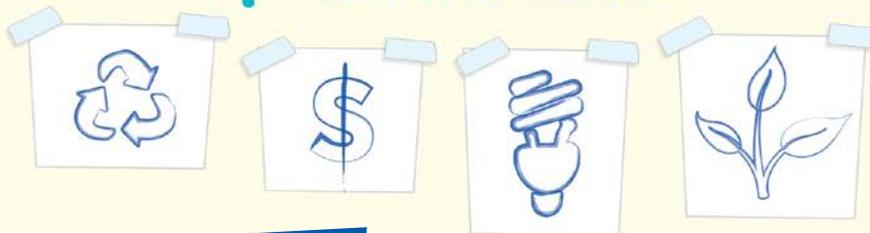
Have students design pictographs or logos to represent what they can do to help save Adélie penguin habitats.

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Grades 4-6 | **Content Areas Science, Art, & ELA**

Infographics: Show, Don't Tell

ESSENTIAL QUESTIONS

What information about Adélie penguins can you represent (threats, lifecycle, behaviors, habitat, food sources) in an infographic? How does the design of infographics show organization and relationships among Adélie penguin data?

Materials

- computers with internet access (optional)
- Presentation or layout software for creating digital infographics
- large poster board or butcher paper, markers
- colored pencils
- crayons
- tape or display putty
- *Activity Sheet: Draft an Infographic*
- sticky notes

Vocabulary

- gallery walk
- hierarchy
- infographic
- layout

WARM UP

a) Introduce the class to infographics which use text and graphics to communicate complex ideas, organize data and show relationships. Discuss other ways of presenting information visually such as posters which represent one idea and how that compares to an infographic that has one theme with multiple ideas charts, and images.

b) Have students use *Activity Sheet: Draft an Infographic* to analyze an infographic you've displayed for the class. Discuss the layout, the main idea, what catches the students' attention first and why. Ask students why they think the text, symbols, numbers and images are arranged on the page in the way the creator chose and how the layout aligns with the purpose. Lastly, instruct students to use their findings to create a final version of their infographic.

CREATING AN INFOGRAPHIC

After brainstorming have students work in small groups to decide on a penguin related topic, conduct research or draw from previous Disneynature **Penguins** lessons and complete *Activity Sheet: Draft an Infographic.* Explain that the activity sheet is designed to help them focus their topic, organize information and create a layout for the display of their infographic.

WRAP UP

Invite students to participate in a gallery walk of their infographics that are posted around the room. Ask students to take notes about each infographic and place sticky notes including their most interesting insights from each. Following the gallery walk, discuss at least one feature that enhanced each infographic as a class.

Note

As a stand-alone lesson, researching and making an infographic helps students organize their thinking, focus on a theme and show relationships among data sources. As a folllow-up to other Disneynature **Penguins** lessons, the infographic helps students show what they have learned in a visual way.

Key Infographic Concepts to Display

- Visually organized information.
- Focused on main points.
- Contains at least 4 facts, data, information that is clear, and in order of importance.
- Includes color, shape, size and symbols to lead viewers through the information in a logical way.
- References sources of information.

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DRAFT AN INFOGRAPHIC

NAME _____ DATE _____

Infographic Formats

TIMELINE

PURPOSE:
Visualize history of something or provide a timeframe.

LAYOUT:
- Central line shows span of time.
- Contrasting color on font highlights each event.
- Graphics and short text for each point.

PROCESS

PURPOSE:
Overview of steps.

LAYOUT:
- Numbers show steps.
- Arrows or lines connect to details.
- For a complex process use S or a snake layout.

GEOGRAPHIC

PURPOSE:
For location related data.

LAYOUT:
- Numbers show steps.
- Arrows or lines connect to details.
- For a complex process use S or a snake layout.

COMPARISON

PURPOSE:
Consider different POV or show differences and similarities.

LAYOUT:
- Split down the middle.
- Side 1 vs side 2.
- Use brighter color for option you prefer.
- Contrast background colors.

MIND MAP/WEB

PURPOSE:
How items are related to core concept.

LAYOUT:
- Oval in middle with bright color.
- Lines radiate to smaller ovals with varying. sizes of colors based on importance.

HIERARCHY

PURPOSE:
Pyramid or Inverted Pyramid.

LAYOUT:
- From not important to mid-level to details.
- From least important to mid-level to most important.

Draft your infographic

1. Write topic and title.

2. Gather data, conduct research.

3. Select format.

4. Sketch a draft of your layout.

5. Sketch in text and graphics for each part of the layout.

6. Peer check for feedback and revise.

7. Create the infographic on poster paper, a long strip of butcher paper or a computer with presentation or layout software.

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