Name:
Date:

How does the changing climate impact the penguins around Antarctica? - Student Handout

Driving Question(s):

- What species of penguins make their home in and around Antarctica? What are the penguins' requirements for survival?
- How are penguin populations changing as the climate changes in Antarctica?
- What about behaviors are also contributing to changes in their populations?

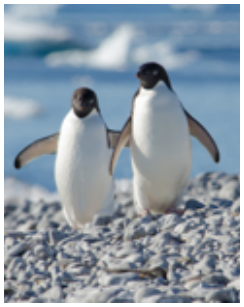
Part 1: Penguin Behavior and Habitat Requirements

There are 17 species of penguins in the world; eight of which live around Antarctica and its surrounding islands. Of these 8 species, two live exclusively on the Antarctic continent (Emperors and Adelies), three live in both northern Antarctica and the sub-Antarctic islands (Chinstraps, Macaronis, and Gentoos).

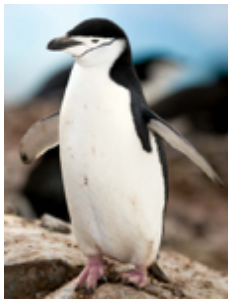
In this activity, you will focus on the Emperor, Adelie, Chinstrap, and Gentoo penguins. In a group, you will focus on one of these species. You will research and include specified information about your species. Your findings can be presented in either a shared Google document or slideshow or on posters.



Emperor



Adelie



Chinstrap



Gentoo

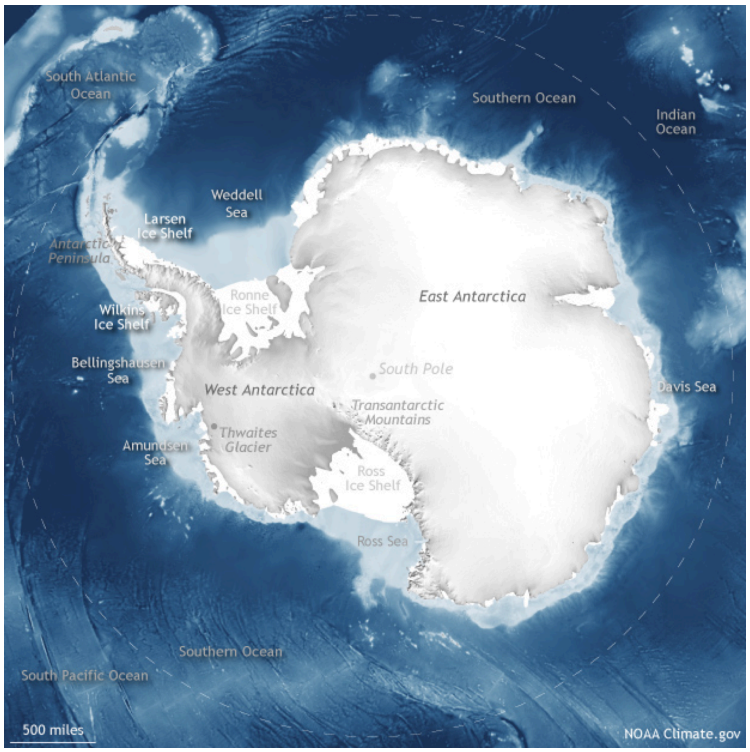
For each assigned species, include the following information

- Scientific name
- Physical description, include a picture or sketch
- Breeding behaviors, including raising young
- Feeding requirements and behaviors
- Habitat requirements
- Current location, include a map if possible
- Unique and notable facts

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- Once all groups have completed their research, you will share your findings with the rest of the class.

Part 2: Penguin Population Dynamics

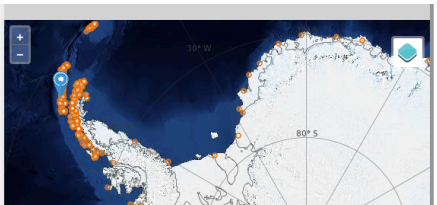


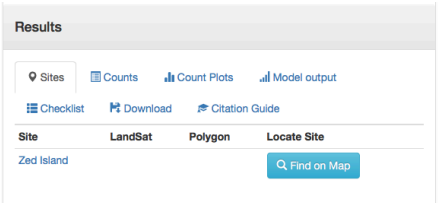
The climate changes observed on Earth have also impacted Antarctica. However, it appears to be impacting parts of the continent differently. West Antarctica temperatures have increased by 4.3 ℉. East Antarctica has experienced less change, increasing by 0.11℉. The Antarctic Peninsula, with its lower elevations and southernmost location, has experienced the largest increase in temperatures - between 5 ℉ in the summer and 9 ℉ in the winter.

As a result of the changing climate impacting Antarctica, penguin populations have changed. Just as the changing climate has impacted Antarctica differently across the continent, the populations of penguins have responded differently. You will be using a website to examine population data for the species that you just researched.

Researchers use a variety of sources to estimate and predict penguin populations. Satellite imagery allows researchers to detect patches of guano (penguin poop) to estimate the number and size of colonies. Researchers visit breeding colonies to make population counts. Finally, the researchers used published data from other projects. This information is used to estimate penguin population sizes. This information is summarized on the website: Mapped Application for Penguin Populations and Projected Dynamics
http://www.penguinmap.com/mapppd

Once on the MAPPPD website, under the map, click on “search by species”. Choose your species, then click on the green “View Sites”. The maps will display the blue icons indicating that there is data available for your species.

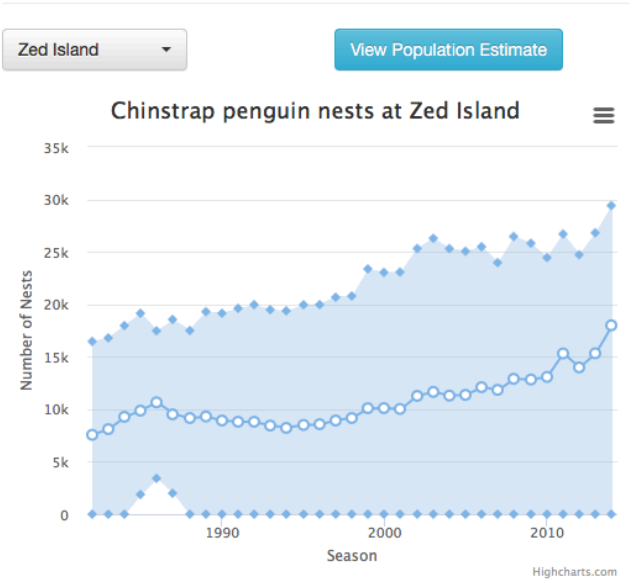






Choose one blue icon by clicking on it. The name of the site will display in the box on the right. See the example for Zed Island. At the top of the box, select “Model Output”. Click on the name of the site again in the dropdown box, then click the “Generate Models” box. Once the data has been loaded, click the “View population estimate” button. Once your graph is generated, you may save it by clicking on the three lines at the top right corner. You can download the graph as a JPEG and it can be easily added to another document.

Observe and generate graphs for two different locations within each of the three regions. Some penguins may not be found in each region.Make a summary description of the trend seen in your graphs in the table below. If you have made a Google presentation for your species, you can insert the graphs into it. If you have made a poster, you may sketch the graph or include the description from the table below.



Species:

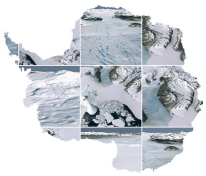
	Location 1	
East Antarctica		

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West Antarctica		
Antarctic Peninsula		

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Part 3: Connecting the data

After you have examined all of your results for the different areas, look through your information on your species. Is there anything about your species - their breeding behavior, habitat requirements, food requirements - that may explain the results that you see? What about the climate changes seen in the regions are connected to what you have learned about your penguin species and their population changes?

Include your answers to these questions on your poster or in your Google presentation.

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