

AS BIG AS ANTARCTICA

GRADE LEVEL 2-3





Photo: BBC NHU

ANTARCTICA EDUCATOR GUIDE

AS BIG AS ANTARCTICA

GRADE LEVEL 2-3

60 minute Lesson

Standards (NGSS):

2-ESS2-2 Earth's Systems

Develop a model to represent the shapes and kinds of land and bodies of water in an area.

From the Film:

In the film, *Antarctica*, we learn that Antarctica is one and a half times the size of the United States and slightly over one and a half times the size of Europe. We also learn that Antarctica is a continent that holds 90% of the Earth's ice. Much like other land masses, Antarctica has a unique shape and physical features that sets it apart from other continents. In addition to being surrounded and sustained by the sea, it also has bays, mountains, and coasts.

Lesson Overview:

The class will be divided into groups of four students, with each group being responsible for creating a textured, topographic map of Antarctica. Using a provided outline of the landmass divided into 4 sections, students will label the different areas of the land mass and use various art materials to add texture and detail to their maps. When they have completed their maps, the four sections will be reassembled into one complete map of Antarctica.

Materials:

- Blue construction paper
- Outline of four parts of Antarctica, I, II, III, IV handouts - pp. 22-25
- Continent matching sheet, handout - p. 26
- Assortment of white, gray, and light blue project materials. May include:
 - Yarn, paper, lace, tissue paper, crepe paper, napkins, tissues, masking tape, white or silver ribbon, markers, scissor, glue sticks or glue
- Clip from *Antarctica* of Globe for reference:
[CLICK HERE](#) for video

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EDUCATOR PREP:

Print map and a set of four sections of the Antarctica map for each

group in the class. Gather a variety of art supplies for each group.

EDUCATOR GUIDE:

1. In the film, *Antarctica*, we learned that Antarctica is about one and a half times the size of the United States and slightly over one and a half times the size of Europe. But more importantly, we also saw that Antarctica is not just a vast range of ice, but a continent with different features and topographies.
2. Ask students in groups of three to name as many of the seven continents as they can: Asia, Africa, Antarctica, and Australia, Europe, North America, and South America. After a couple of minutes, bring the whole group together and have them collectively create a list of the seven continents. Write these on the board or chart paper.
3. Inform students that even though these landmasses are all continents, they are different in size and features. First, we are going to take a quick look at the size of these continents and compare them. Use the following questions to define a continent:

What is a continent?

Answers may include that continents are large pieces of land surrounded by water. The seven continents make up 99% of the land that is on planet earth.

Why are they different sizes and shapes?

Answers may vary depending on the background knowledge of the students. Let students know that millions of years ago, all of the continents were actually connected and were one huge continent. Scientists call this continent Pangaea. Over time, the continents separated to become seven different land masses.

4. Pass out the continent matching sheets. Ask students to talk with their elbow partner and work together to match each continent to its correct size. Project or display a map of the globe that students can reference as they consider which continents correspond with



The distinctive characteristic of a topographic map is the use of elevation contour lines to show the shape of the Earth's surface.

Photo: Shutterstock / Pongpinun Traisisilp

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which size.

5. Circulate and get a sense of how students are conceptualizing which continent is bigger or smaller and trying to match sizes.

Note: The goal here is for them to talk through the logic of matching up area measurements with size. This can be done through comparing, ordering or another approach to conceptualize what the area numbers mean.

6. After about five to seven minutes, go over the answers, asking the following questions:

Were you surprised by how small or how big any of the continents were?

Students may be surprised by any number of things related to size and depending on how they have conceptualized visual maps and compared continents on a globe. As this is a quantitative exercise, some of their previous observations may be confirmed or challenged.

Which continents are closest to being as big as Antarctica?

Antarctica is bigger than Europe and Australia, close to South America and smaller than North America, Asia, and Africa. As a fun fact, share with students that Antarctica is also about 1.5 times bigger than the United States, which is about 10.1 million km², and part of North America.

7. Continents, like people and things, are not one dimensional. Inform students that we will work together to learn more about the continent of Antarctica and create a map to gain a better understanding of different features and inhabitants of Antarctica.
8. Divide the class evenly into groups of four and give each group a set of the four sections of Antarctica and the reference map.
9. Tell students that they will work together using the information on the Overview Map to create a three-dimensional map of the continent.
10. Have students look at the blue lines on the Overview Map and explain that these lines are contour maps. The closer the lines are, the steeper the slope. The farther apart they are, the flatter the land. The blue lines will be used to model Antarctica's landscape on their maps.
11. Using various paper types and glue sticks, students will begin to "mold" or "build" their topography for their particular section. Inform students that their area of the map might consist of mountain ranges and steep cliffs.

Educator Notes:

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12. Check in with groups and individual students to see how they are thinking about representing the variations in elevation on Antarctica. If they are having trouble getting started, give them some ideas on how they can fold, crumple, or layer different types of paper to add texture to their maps.

13. After about fifteen minutes, when student are feeling like they have made progress on their map sections, ask them to use a pen or marker to label three to five of the areas that are found in their section using the reference maps. This could include bodies of water, an ice shelf, a mountain range, a town or research station. Give them about five minutes to do this for their individual section.

14. Inform students that Earth is known as the Blue Planet because 70% of it is covered by water. We now need to place their map sections into their context in the South Seas before combining them into a complete map. Ask students to glue their section onto a blue piece of construction paper. Then they will use scissors to cut away construction paper to align with the flat sides of their sections.

15. Bring students together as a whole group and ask one student from each group to bring their section and tape it to the board. In this way, they can jigsaw their four sections together to create a complete map of Antarctica and attach them. Ask them to label three bodies of water around the continent.

16. In their notebook or journal, ask students to reflect on this experience of creating a model of Antarctica with their classmates using one or more of the following questions or prompts:

What are three things that you learned about Antarctica that you did not know before this activity?

Student responses will vary but should reflect some things that they learned during the lesson.

What are two questions that you have about Antarctica?

Student responses will vary but should reveal their thinking and curiosity about the continent of Antarctica.

What is one thing that you did today with a classmate today and how did it make you feel?

Student responses will vary, but should encourage awareness and labeling of different types of emotions that can emerge during a collaborative experience.



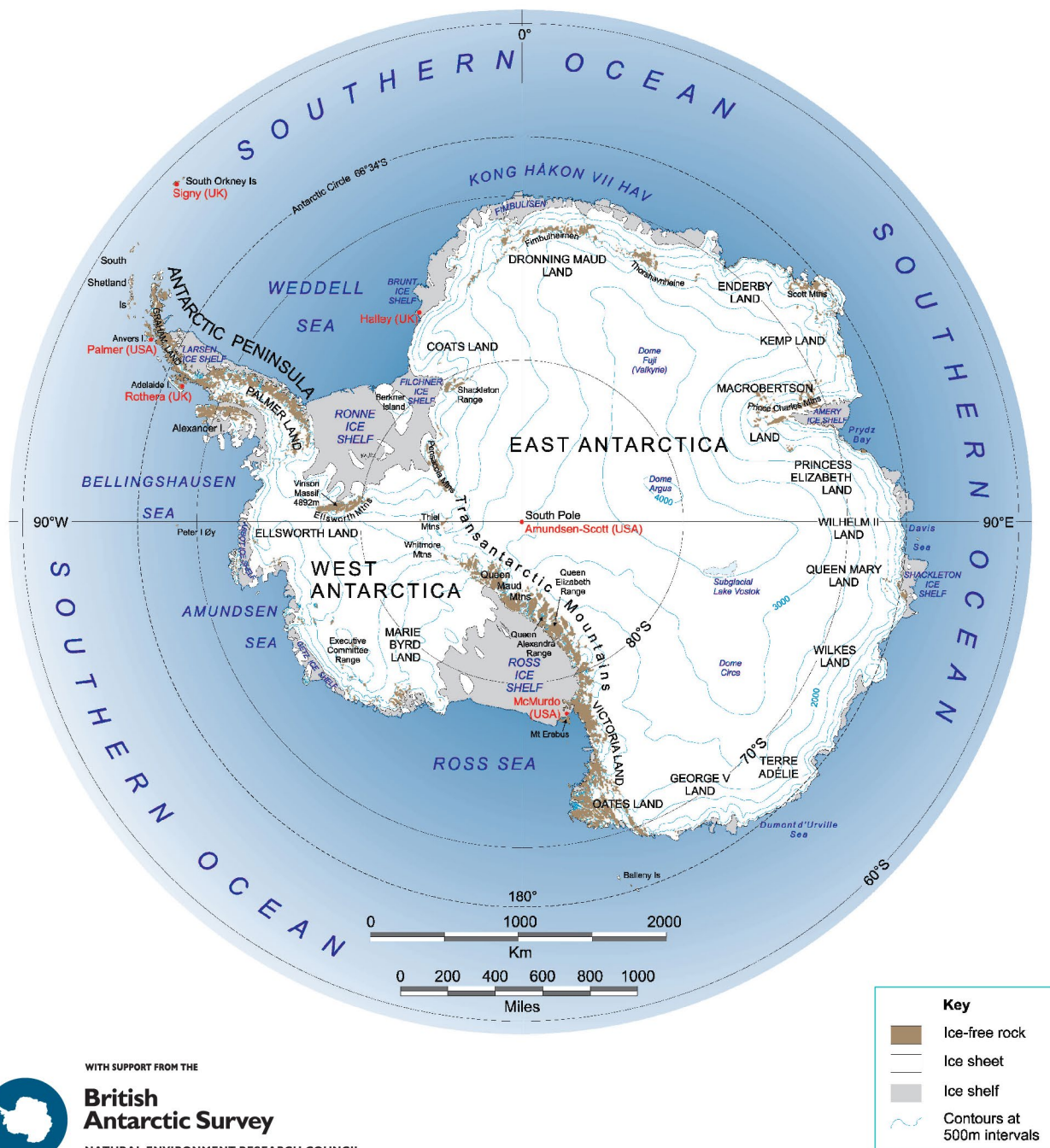
The film team spent 8 weeks on this German ice-breaker in search of the biggest aggregation of great whales that has ever been filmed.

Photo: © BBC

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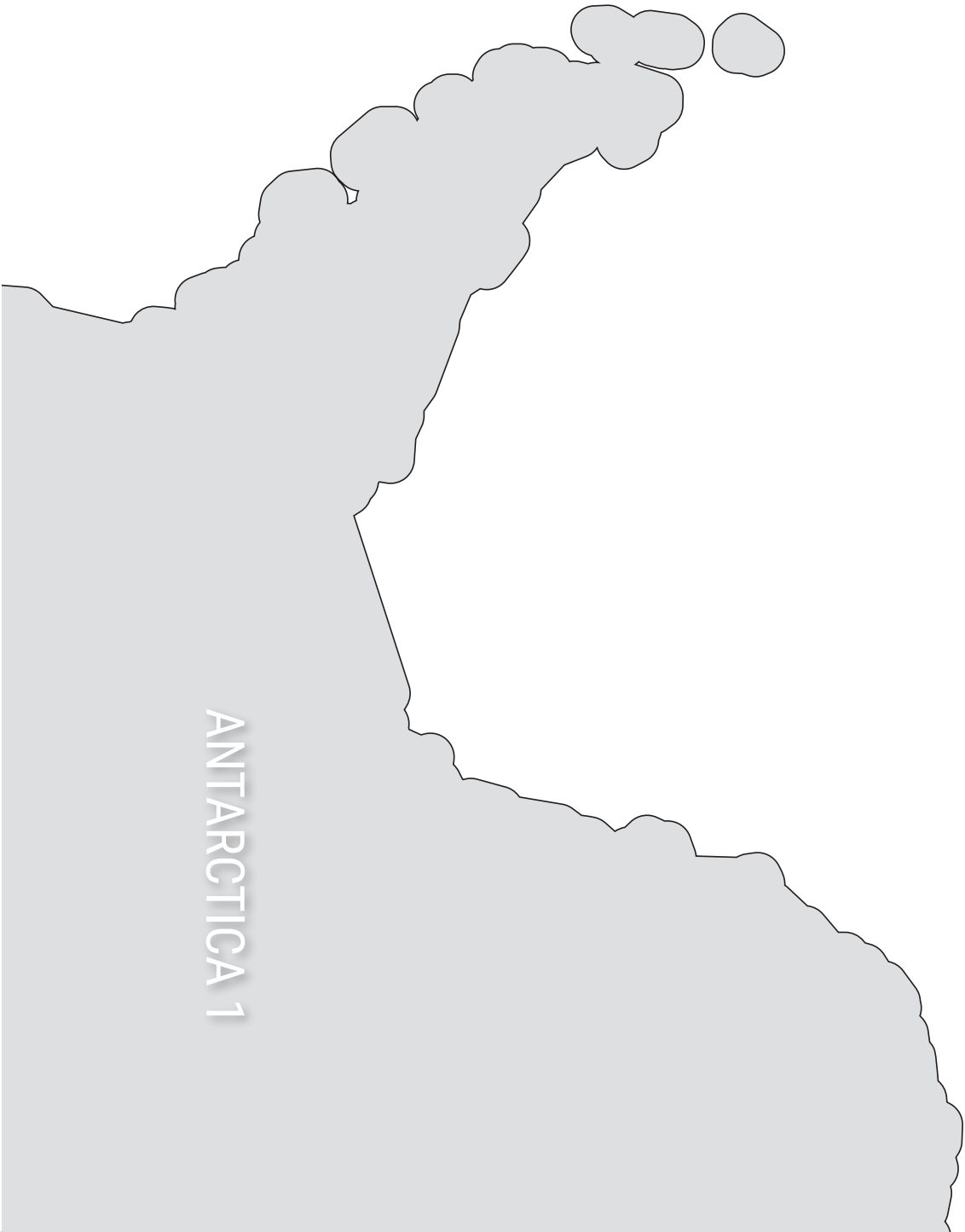
Overview Map

Directions: Notice the blue lines. These are contour lines. The closer together the lines are, the steeper the slope. The farther apart they are, the flatter the land. We are going to use these to model Antarctica's landscape on your map.



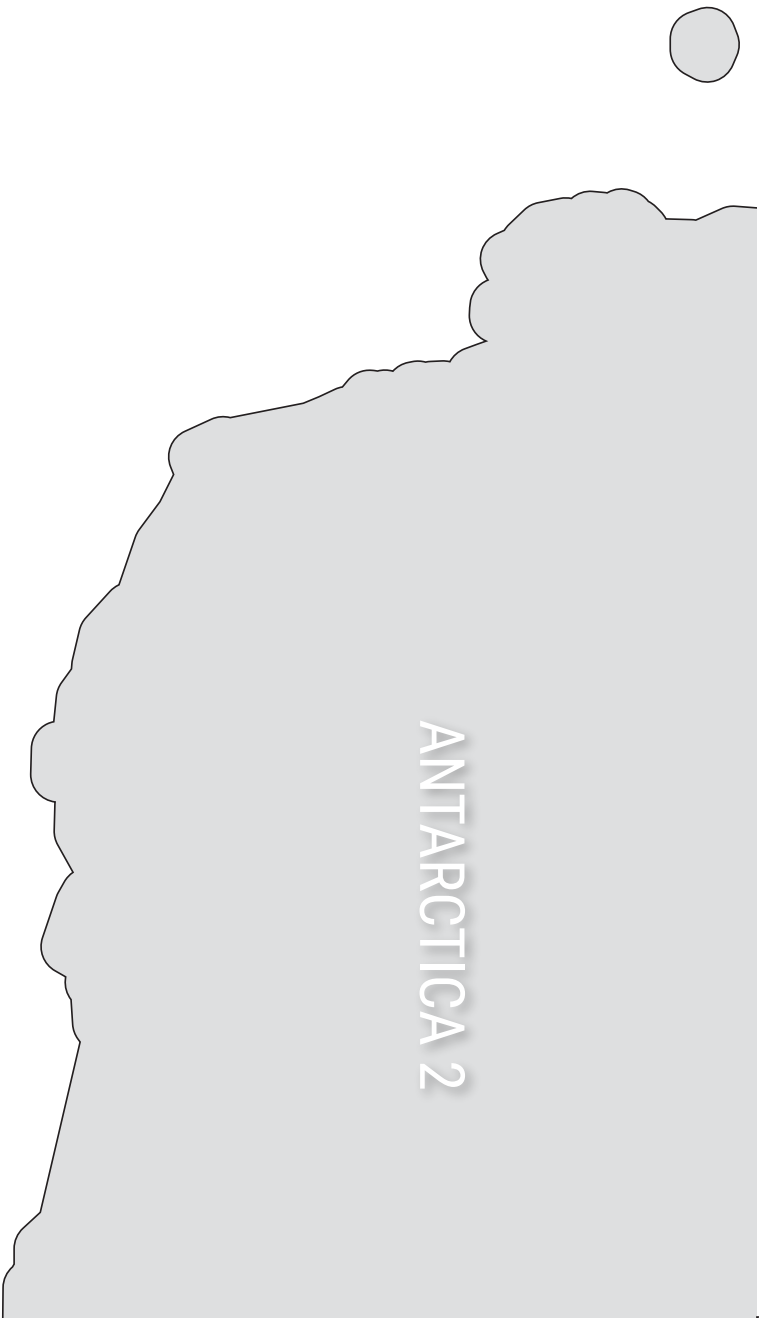
AS BIG AS ANTARCTICA

Map 1



AS BIG AS ANTARCTICA

Map 2



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Map 3

ANTARCTICA 3

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Map 4

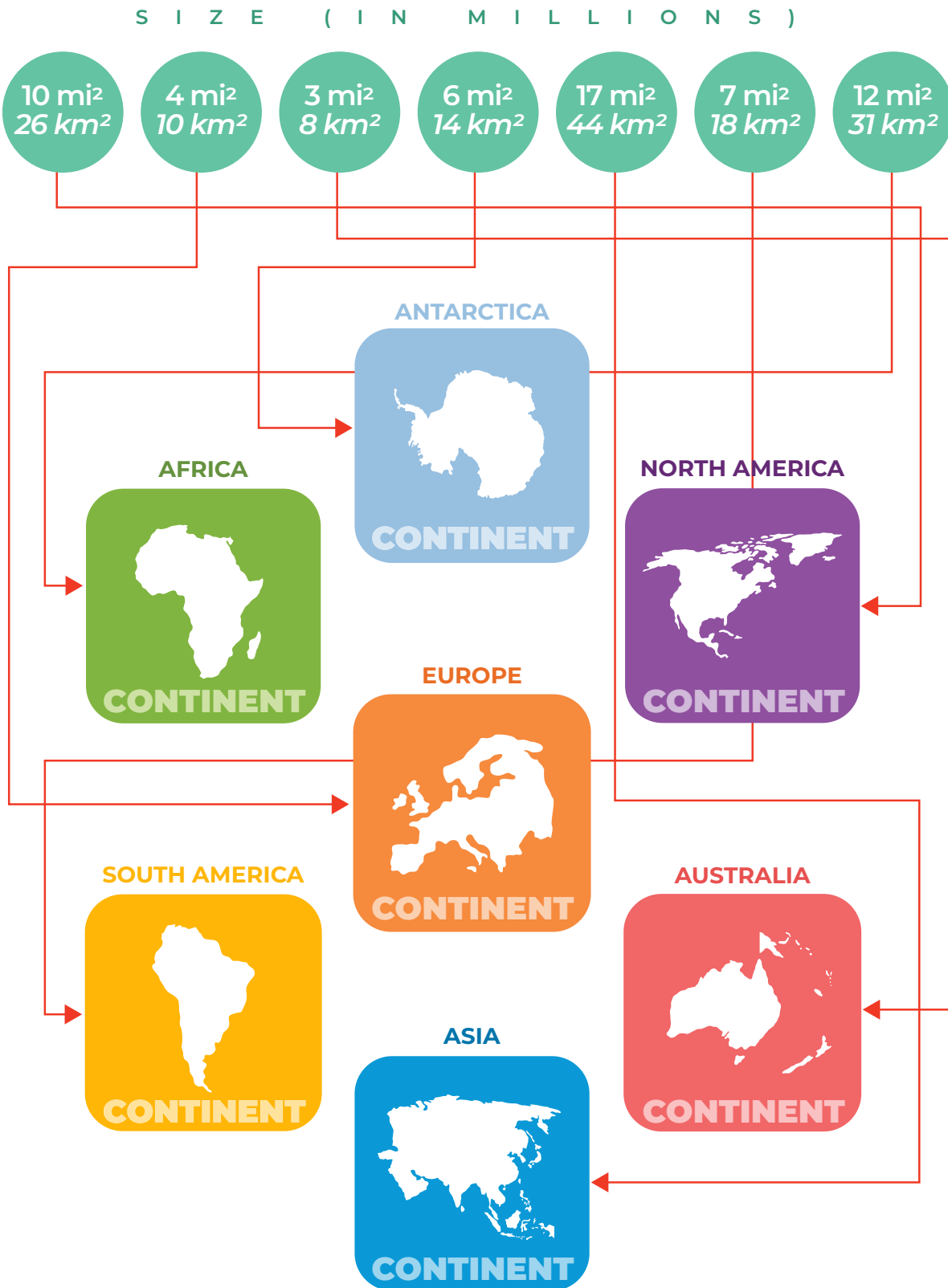
ANTARCTICA 4

Match the continent to its size in millions of km² or mi²

S I Z E (I N M I L L I O N S)



Match the continent to its size in millions of km² or mi²



Educator Key

EXTREME SURVIVAL: ANTARCTICA!

GRADE LEVEL 2-3





Photo: BBC NHU

ANTARCTICA EDUCATOR GUIDE

EXTREME SURVIVAL: ANTARCTICA!

GRADE LEVEL 2-3

60 minute Lesson

Standards (NGSS):

3-LS4-3

Construct an argument with evidence that in particular habitats some organisms thrive, others barely survive, and others face extinction.

From the Film:

The film, *Antarctica*, showcases a variety of animals with incredible adaptations that allow them to survive extreme conditions. We see other adaptive behaviors such as antifreeze proteins in icefish, waterproof feathers of penguins, special vocal calls by young animals, and blubber in seals. We also see behaviors such as whale feeding, ice-cutting by seals, and nesting behaviors.

Lesson Overview:

Students will discuss the examples of animal adaptations and behaviors seen in the film. They will design and create a 2D or 3D model of an animal that would survive in Antarctica and discuss the adaptations that would give the animal an advantage (ex. Antifreeze in fish, feathers, blubber, ice-cutting, teeth, feeding behaviors). The educator will demonstrate the feeding behavior of humpback whales seen in the film using a model representation.

Materials:

- My Antarctic Animal Handout, p. 34 (one per student)
- Pictures, p. 33 of Antarctic animals from the film:
[See the Antarctica film Wildlife List here](#)
- Paper and Colored pencils or Markers for 2D Antarctic animal model
- Recycled materials for 3D model (optional)
This could include cardboard, paper, fabric, plastic bottles, egg cartons, etc.
- Tape or hot glue gun (optional)
- Large container filled with water
- Small sequins or other small object that will float
- Small strainer or slotted spoon with a handle (should be easily maneuvered in container)

EXTREME SURVIVAL: ANTARCTICA!

EDUCATOR PREP:

Print **My Antarctic Animal** Handout. If students are making a 3D model of their Antarctic Animal, prepare enough materials for each student. Print or prepare the Antarctic Animal photos to be digitally shared with students.

EDUCATOR GUIDE:

1. In the film, **Antarctica**, we observed many animals with special behaviors and adaptations that allow them to survive in an extreme environment. Ask students:

What is an adaptation?

An adaptation is a change or the process of change by which an organism or species becomes better suited to its environment. These changes are developed through natural selection and evolution over many generations.

What is a behavior?

A behavior is the way in which an animal or person acts in response to a particular situation or stimulus.

Can you give me an example of special adaptations or behaviors humans have?

This question has many possible answers. For example, humans have opposable thumbs, which allow them to grip objects in a way that is different from animals. It gives them an advantage by allowing them to create tools and pick up smaller objects.

What are some special adaptations you saw in the film Antarctica?

Multiple answers are possible. Examples include the Gentoo Penguins shedding their down feathers to be able to swim, or seals, who have adapted the ability to chew the ice with its teeth creating space for itself to breathe. Another example is the icefish with the antifreeze protein that allows it to swim in icy waters.



Using a feeding technique called 'bubble netting' the humpback whales blow bubbles as they rise up under a shoal of krill. The bubbles act like a net to the krill, and the whales spiral inwards to concentrate the swarm.

Photo: BBC NHU

EXTREME SURVIVAL: ANTARCTICA!

2. Instruct students that you will demonstrate a special behavior observed in the film when the humpback whale is feeding on krill. Carefully pour the sequins into the large container filled with water. Inform students that the sequins represent the krill in the ocean. Use the strainer to carefully stir inside the container, starting at the outer edges and moving in a spiraling movement into the center. This should corral the sequins in the same way that the humpback whale corrals the krill. Scoop the sequins up while the water drains out of the strainer, which is reflective of the way whales can push out water while only ingesting the krill.

Ask students:

What would happen if I just scooped the strainer in the water?

The scooper would not pick up as many krill, so you would need to exert more energy to get the same amount of sustenance.

Why do you think the whale spirals around the krill to feed?

The whale has learned that creating the spirals traps the krill in a confined space, therefore allowing it to collect and eat a lot of them very quickly.

What would happen if we used a solid spoon to scoop up the krill?

It would also end up scooping up a lot of water which would reduce the amount of krill that is caught. It would also make the spoon very heavy and more difficult to move out of the water.

How is this model similar and different to what we saw in the film?

It uses the same spiral motion to corral the sequins and the slotted spoon is like the mouth of the whale. The difference is, unlike the strainer, the whale has to create this spiral from in the water using its body and energy.

3. Show students pictures of some of the Antarctic animals they observed in the film (icefish, penguin, anemone, sea star, seal, whale). Ask students what special behavior or adaptations each of these animals have that allow them to survive in Antarctica. Record the groups answers on chart paper or white board.

4. Hand out the *My Antarctic Animal* handout and inform students that they will create their own animal that lives in Antarctica, able to withstand the conditions and fit into the ecosystem.

5. Give students time to brainstorm. Have students brainstorm specific adaptations that would make their animal more likely to survive in Antarctica. After ten minutes of planning, have students share their design with a small group.

Educator Notes:

EXTREME SURVIVAL: ANTARCTICA!

6. As an extension activity, if time and supplies permit, allow students to create 3D models of their animals. Students also have the option to draw and color a final 2D model of their animal.

7. Once students are finished with their model, ask them to use their notebooks and reflect on their experience. Describe the adaptations of their animals. Use the following prompts:

Which animals were your inspiration for the animal that you designed?

Why did you choose these animals?

How do the adaptations of your animal give it an advantage and allow it to survive in Antarctica?

8. If time allows, or as an extension, have students create a story about their animal where they tell about the animal, its adaptations and how that helps them survive.



Antarctic Krill. The combined weight of every single krill together is likely heavier than any other animal species on the planet.

Photo: BBC NHU

Antarctica Animal Photos

Use the photographs below to give you inspiration for the animal that you are going to design to survive in Antarctica.

Photo: Shutterstock / Paul S. Wolf



Photo: Shutterstock / Andrea Izzotti



Photo: Shutterstock / Andrea Izzotti



Photo: Shutterstock / Charles Bergman



Photo: Shutterstock / Andrea Izzotti



Photo: Shutterstock / Lua Carlos Martins



My Antarctic Animal

Directions: Use the space below to design and draw an animal that could survive in Antarctica. This does not have to be an animal that already exists.

What special adaptations does your animal have?
