SHACKLETON'S ANTARCTIC ADVENTURE

The greatest survival story of all time.

TEACHER'S GUIDE

to accompany the giant-screen film

Contents

Kelly Tyler/WGBH

The *James Caird* was the boat that carried Sir Ernest Shackleton and five others from Elephant Island to South Georgia Island in 17 days. This replica of the *Caird* was made especially for the film *Shackleton's Antarctic Adventure*.

Who Was Sir Ernest Shackleton?

Born in 1874 in County Kildare, Ireland, Ernest Shackleton lived with his family first in Dublin, Ireland, and then in England, where he was educated at Dulwich College. At age 16, Shackleton joined the British Merchant Navy. A decade later he volunteered to accompany the National Antarctic Expedition under British Captain Robert Falcon Scott, which became the first of four polar adventures Shackleton would undertake.

Scott Polar Research Institute

Sir Ernest Shackleton

The 1901–1904 Scott expedition aboard the ship *Discovery* came within a record-breaking 400 miles (643.7 km) of the South Pole, but was ultimately unsuccessful in reaching its destination.

Shackleton returned to England, married, and tried to establish a name for himself in journalism, business, and politics.

By 1908, however, Shackleton was again drawn to the Antarctic. Deciding to attempt the South Pole trek himself, he raised the funds for his own *Nimrod* expedition. But the *Nimrod's* quest for the Pole failed, too. His crew got within a scant 100 miles (160.9 km) of the Pole—farther south than anyone had gone before—when Shackleton was forced to turn back because of the party's ill health and dwindling supplies. To the dismay of England's citizens, boasting rights to the Pole went three years later to Norwegian explorer Roald Amundsen.

At this juncture, Britain had now been "beaten" to both the North and South Poles. Shackleton set out to gain Britain the honor of what he called "the largest and most striking of all journeys—the crossing of the Continent."

To recruit the crew of his British Imperial Trans-Antarctic Expedition, who would sail aboard the *Endurance*, it is said that Shackleton posted the following notice: "Men wanted for hazardous journey. Small wages. Bitter cold. Long months of complete darkness. Constant danger. Safe return doubtful. Honour and recognition in case of success." Shackleton chose 27 men to serve a variety of positions, such as running and navigating the ship, cooking the meals, and keeping track of supplies. He also took scientists, surgeons, a carpenter, and a photographer on board. The crew set forth from Buenos Aires, Argentina, on October 26, 1914.

Scott Polar Research Institute

Endurance crew members pose beneath the ship's bow.

Web Trek

More on Shackleton

www.pbs.org/nova/shackleton/

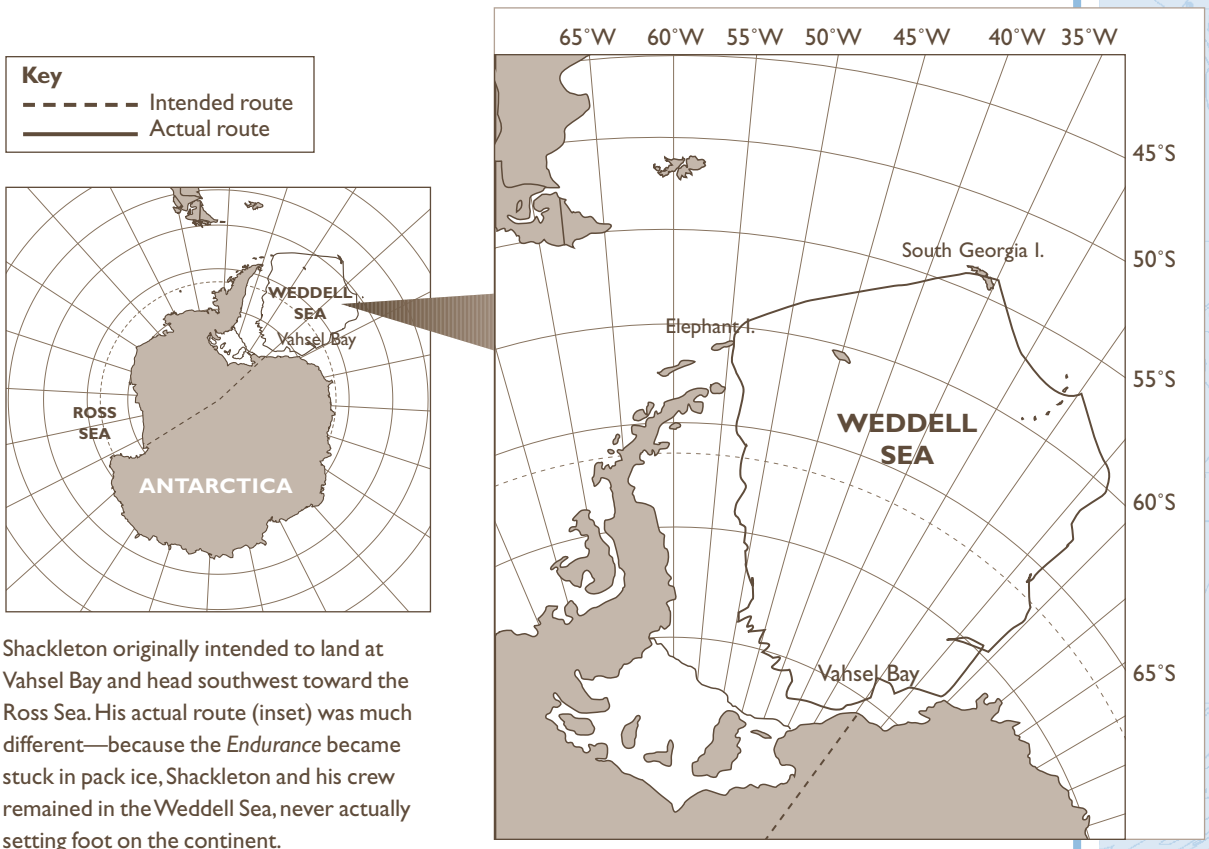
Find more information about Shackleton's expedition, including sounds and interactive activities, on *Shackleton's Antarctic Odyssey*, the NOVA/PBS Online Adventure Web site that documents the two filming expeditions in the Antarctic.

Biographers have said that Shackleton was drawn to polar exploration by his romantic, adventurous nature rather than scientific interest. But Shackleton knew that expeditions were formally sanctioned by their scientific goals; therefore, he recruited a scientific staff of four—a biologist, a geologist, a meteorologist, and a physicist. The plan was for these men to work from their base on the Weddell Sea to investigate Graham Land to the West and Enderby Land to the East; the *Endurance* was equipped for dredging and hydrological work. These original goals were thwarted, so, in the end, the crew's most significant contribution to science was its careful record of the Weddell Sea's infamous drift.

While Shackleton and his crew failed to make the first crossing of the Antarctic continent, their expedition became a larger-than-life testament to heroism and human endurance, with all 28 men surviving two years in the barren, frigid Antarctic after their ship, the *Endurance*, was caught in pack ice and eventually crushed.

The crew officially dispersed in October 1916, with most of the men returning to England to serve in World War I. The expedition team was later awarded the Polar Medal, although Shackleton denied it to four of his men who he seemed to feel had not given their all in that dire time.

In 1921, Shackleton led his final journey to the Antarctic on the ship *Quest*, bringing with him a handful of the original *Endurance* crew members. But shortly after the start of the expedition—on January 5, 1922—Shackleton died of a heart attack; he was in his late 40s. At the request of his wife, he was buried at Grytviken, the South Georgia Island whaling station that played a pivotal role in his journey of endurance.



Shackleton originally intended to land at Vahsel Bay and head southwest toward the Ross Sea. His actual route (inset) was much different—because the *Endurance* became stuck in pack ice, Shackleton and his crew remained in the Weddell Sea, never actually setting foot on the continent.

Note: Shackleton's routes are approximated.

Shackleton's Antarctic Adventure

The giant-screen film *Shackleton's Antarctic Adventure* transports viewers back in time to experience Sir Ernest Shackleton's amazing tale of leadership, heroism, endurance, and epic adventure. The film:

- explains that no place on Earth is more hostile to life than Antarctica, which is surrounded by immense ice floes and gripped by temperatures that dip well below -100°F (-73.3°C) and winds up to 200 miles per hour (321.9 kph). It is the only continent never permanently settled by people and the last to be explored.
- tells how Shackleton twice attempted to reach the South Pole, only to have it claimed first by Norwegian explorer Roald Amundsen. Shackleton set a new goal: He would be the first to cross the entire Antarctic continent, some 1,700 statute miles wide (2,735.8 km).
- describes how Shackleton recruited his 27-man crew of scientists, officers, and seamen, and how they finally set sail from South Georgia Island in December 1914 for the Weddell Sea coast of Antarctica.
- portrays Shackleton as a man of towering ambition and boundless optimism, whose crew members dubbed him "The Boss."
- recounts how his wooden ship, the *Endurance*, became trapped in the pack ice of the Weddell Sea before ever reaching Antarctica. For 10 months, the ship drifted, locked in ice, until millions of tons of moving pack ice pressed against the *Endurance* with tremendous pressure, crushing it.
- re-creates life at Patience Camp, the camp on an ice floe where the crew lived for five months after they had to abandon ship.
- shows how the men played games and engaged in sing-alongs, plays, and skits.
- chronicles how once their camp drifted close to open areas of water, Shackleton and his men rowed their three lifeboats as far as uninhabited Elephant Island.
- depicts the perilous 800-mile (1,287.5-km) journey made by Shackleton and five others in a 23-foot (7.0-m) lifeboat called the *James Caird* through the world's worst seas to seek help at South Georgia Island.
- introduces three of today's most accomplished mountaineers—Reinhold Messner, Stephen Venables, and Conrad Anker—who retrace Shackleton's final leg of the journey to seek help: crossing 26 miles (41.8 km) of mountain peaks and crevassed glaciers on foot across South Georgia Island to a whaling station.
- reenacts the rescue of all 22 men left on Elephant Island, 22 months after their initial departure from Buenos Aires, Argentina.

Web Trek

Film Web Site

www.shackletonsantarctic adventure.com

Visit the *Shackleton's Antarctic Adventure* Web site to find e-mail postcards featuring images from the film, a downloadable version of this teacher's guide, a listing of special events nationwide, and more.

Frank Hurley, courtesy of The Macklin Collection

When Shackleton purchased his 144-foot-long (43.8-m), 300-ton, (272.2-metric tons) wooden sailing ship, it was named *Polaris*; he renamed it the *Endurance* in honor of his family motto: *Fortitudine Vincimus*—"by endurance we conquer."

Using This Guide

This guide is intended to be used with the giant-screen film, *Shackleton's Antarctic Adventure*. The multidisciplinary activities presented here are designed for students ages 7 through 14.

Each lesson features teacher and student pages. Teacher pages include topical background information and a setup to provide instruction for carrying out the activity. Web Treks offer more information on each activity topic, and Extensions offer ideas for augmenting the activity.

Student pages include activity instructions, additional information to help students understand the activity, and follow-up questions. Additional student pages provide supplementary material to help students complete the activity.

Curriculum Connections

Activity	Subject				
	Science	Health	Mathematics	Social Studies	English
1. Track the Expedition				●	
2. All About Antarctica	●			●	
3. What's on Your Plate?	●	●	●		
4. In Your Words				●	●
5. Craft the *Caird*			●		●
6. Find Your Latitude	●		●	●	

Teacher Page

A Journey Unexpected

Background

When Sir Ernest Shackleton and his crew members left South Georgia Island on December 5, 1914, they sailed south into the Weddell Sea. Their destination was Vahsel Bay, where they would disembark the *Endurance* and begin their southwest trek across the Antarctic continent toward the Ross Sea. Shackleton brought 69 Canadian sledge dogs to aid the expedition's transcontinental passage, and he arranged for a separate crew to travel inland from the Ross Sea to deposit additional supplies he and his crew would use during their crossing. Everything seemed set.

But what Shackleton and his crew members didn't anticipate was the amount of pack ice—solid or broken up ocean ice—that they would encounter. And so, about a month and a half into their journey, they found themselves on a very different expedition from the one they had so carefully planned: The *Endurance* became trapped by pack ice, which crushed the ship 10 months later. This left Shackleton and his 27 men stranded on the ice with only three lifeboats, limited provisions for food and shelter, and little hope of rescue.

Web Trek

Mapping Terra Incognita

www.pbs.org/nova/shackleton/surviving/mapping.html

Presents the evolution of Antarctic mapmaking, from ancient Roman times to present day.

Satellite Image of Antarctica

terraweb.wr.usgs.gov/TRS/projects/Antarctica/AVHRR.html

Posts various satellite images courtesy of the U.S. Geological Survey.

U.S. Census Bureau

www.census.gov/cgi-bin/gazetteer

Gives the actual latitude and longitude of different areas when town name and zip code are entered.

Extension

Have students brainstorm and create alternative ways to represent the timeline's events. Examples include creating a timeline that is:

- scaled to visually display the length of time between events.
- illustrated to highlight one theme that runs through the time period.
- abbreviated to emphasize key events.
- presented along with a simultaneous timeline of events occurring in other regions or worldwide.
- audio-recorded and presented along with visuals.

Activity 1: Track the Expedition

Objective

Students use latitude and longitude coordinates to track Shackleton's epic journey.

Materials for each student

- copy of **Track the Expedition** activity sheet on page 7
- copy of **The Timeline** activity sheets on pages 8–9
- adhesive tape

Procedure

1. Tell students that Shackleton originally planned to be the first to cross Antarctica, but that because his ship got caught in pack ice, he and his crew members never actually set foot on the continent itself. Instead, they found their ship immobilized, and they had no knowledge of how long their expedition would be stalled.

2. Make copies of **Track the Expedition** and **The Timeline** activity sheets. Tape **The Timeline** activity sheets together so that they are side-by-side. Distribute all activity sheets to students.

3. Have students read **The Timeline** once through before they do the mapping activity.

4. Once everyone has read the timeline, have students read it again, this time locating the latitude and longitude coordinates listed within the text. As they find each coordinate, have them map it on their **Track the Expedition** activity sheet.

5. When students have completed the mapping exercise, have them answer the questions listed on the student activity page.

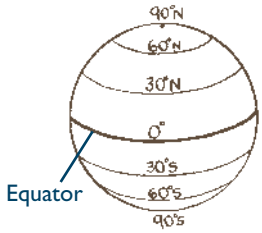
Track the Expedition

Student Page

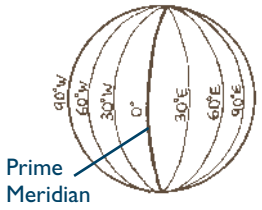
Background

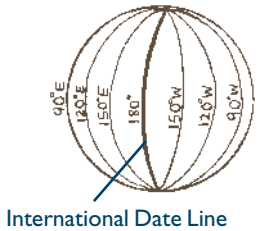
Where did Sir Ernest Shackleton begin his journey? When did his ship get caught in pack ice? When did it get crushed? Where were his men stranded for months?

Find out the answers to these questions and more as you track Shackleton's extraordinary journey to and from the Antarctic. Use the map below with the latitude and longitude coordinates listed in **The Timeline** activity sheets to plot Shackleton's journey.



Latitude





Longitude

About Latitude and Longitude

Latitude lines represent the distance **north** or **south** of the Earth's equator. **Longitude lines** represent the distance **east** or **west** of the prime meridian, or the International Date Line. Both are measured in angular degrees. On this map, Punta Arenas, Chile, is located at a latitude of 53°S and a longitude of 71°W.

Note: Coordinates in this activity approximate Shackleton's journey.

Questions

1. What were the northernmost and southernmost lines of latitude that the *Endurance* passed through?

2. What were the easternmost and westernmost lines of longitude?

3. In degrees of latitude, about how far is Coats Land, Antarctica, from the equator, which lies at 0° latitude?

4. In degrees of latitude, about how far is the South Pole, which lies at 90°S, from the North Pole, which lies at 90°N?

Student Page

The Timeline

1914

August 1
The *Endurance* departs London, England, the same day Germany declares war on Russia.

The *Endurance*

August 3
Sir Ernest Shackleton offers his ship and crew to the British government for the war effort.

August 8
After Shackleton receives a one-word telegram from the Admiralty ("Proceed"), the *Endurance* departs Plymouth, England.

October 26
With the final crew on board, the *Endurance* leaves Buenos Aires, Argentina, for South Georgia Island.

1915

December 30
The *Endurance* crosses the Antarctic Circle.

January 10
The *Endurance* crew first sights the Antarctic continent (Coats Land).
Lat: 72°S – Long: 16°W

January 18
The *Endurance* becomes trapped in the pack ice.
Lat: 77°S – Long: 30°W

Pack ice

February 22
The *Endurance* drifts to its farthest point south.

September 2
Pressure from the ice makes the *Endurance*, according to steward Perce Blackborow, "literally [jump] into the air and [settle] on its beam."

October 27
At 5 p.m., Shackleton gives the order to abandon the *Endurance*.

November 1
After a futile, three-day attempt to march over the ice, Shackleton has the crew erect Ocean Camp on an ice floe.

November 21
With a single cry of "She's going, boys!" Shackleton and his crew watch the *Endurance* sink.
Lat: 68°S – Long: 52°W

March 17
The crew's camp drifts to about 40 miles (64.4 km) south of Paulet Island.
Lat: 63°S – Long: 54°W

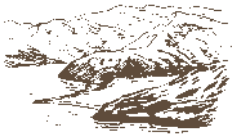
March 31
The ice floe that the men are living on splits in two, separating them from their three lifeboats, which are later recovered.

April 7
Elephant Island appears on the horizon.

Elephant Island

April 9
The crew goes to sea in the three lifeboats, the *James Caird*, the *Dudley Docker*, and the *Stancomb Wills*.

May 10
After 17 days in stormy seas, and with superior navigation by *Endurance* Captain Frank Worsley, the *Caird* miraculously arrives on the west coast of South Georgia.
Lat: 54°S – Long: 38°W



May 19
Shackleton, Worsley, and Second Officer Tom Crean set off to cross the previously unexplored interior of South Georgia, heading toward the east coast's whaling stations. The other three men remain behind.

South Georgia

May 20
Having trekked without a break for 36 hours over glaciers and mountains, Shackleton, Worsley, and Crean arrive at Stromness whaling station.

May 23
Picking up the other three men on the west coast of South Georgia, Shackleton, Worsley, and Crean depart on the English-owned *Southern Sky* to rescue men on Elephant Island, but are stopped by ice 100 miles (160.9 km) short of land.

Student Page

November 5

The *Endurance* arrives at Grytviken whaling station on South Georgia Island.
Lat: 54°S – Long: 36°W

December 5

The *Endurance* departs Grytviken, South Georgia Island. This is the last time the crew would touch land for 497 days.

Whaling station

December 7

The *Endurance* enters Antarctic pack ice.
Lat: 57°S – Long: 25°W

December 12

The *Endurance* continues advancing through the pack ice.
Lat: 60°S – Long: 18°W

February 24

Shackleton orders a halt to the ship's routine.

May 1

The sun vanishes for the season, not to reappear for four months.

May 2

Noon temperatures are -5°F (-20.6°C).
Lat: 75°S – Long: 42°W

1916

December 23

The crew again begins marching toward open water, averaging just a mile and a half a day.

December 29

Shackleton abandons the march; the crew sets up Patience Camp on the ice.

Patience Camp

January 21

A blizzard blows the ice floe on which the camp is located north across the Antarctic Circle.

February 29

In honor of Leap Year Day, the crew enjoys three full meals.

April 16

After seven grueling days at sea, the lifeboats land safely on Elephant Island at Cape Valentine.
Lat: 61°S – Long: 55°W

April 17

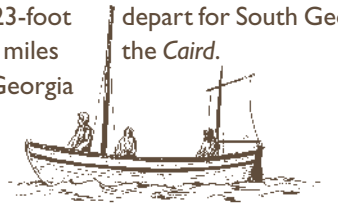
Shackleton moves camp seven miles to the west, to a spot that comes to be known as Point Wild—named after Frank Wild, the *Endurance* crew member who found it.

April 20

Shackleton announces that he will attempt to sail the 23-foot (7.0-m) *James Caird* 800 miles (1,287.5 km) to South Georgia Island.

April 24

Shackleton and five others depart for South Georgia in the *Caird*.



The *James Caird*

June 17

The Uruguayan government loans Shackleton the survey ship *Instituto de Pesca No. 1*, which comes within sight of Elephant Island before accumulating pack ice turns it back.

July 12

Shackleton sets out from Punta Arenas, Chile, on *Emma*, a schooner chartered by the British Association, but only gets to within 100 miles (160.9 km) of Elephant Island before storms and ice force it to return.

The *Yelcho*

August 25

Chilean authorities loan Shackleton the *Yelcho*, a small steamer, which sets sail from Punta Arenas with Shackleton, Worsley, and Crean for Elephant Island.
Lat: 53°S – Long: 71°W

August 30

"I felt jolly near blubbing for a bit & could not speak for several minutes," Frank Wild wrote about seeing Shackleton arrive with the *Yelcho*, which rescued the crew on this day in 1916, 22 months after they'd set out from Buenos Aires, Argentina.
Lat: 61°S – Long: 55°W

Teacher Page

Ice-Cold Continent

Background

Antarctica is one of the most remote and hostile places on Earth; it was the last continent to be explored. When Sir Ernest Shackleton and his crew started their 1914 journey to the continent, no one had yet successfully crossed it from sea to sea. Today, the ice-laden region hosts about 4,000 scientists and visitors during the Antarctic summer. As the fifth largest continent, Antarctica comprises about 10 percent of the Earth's land surface and lays claim to being the coldest and windiest continent on the planet. Seventy percent of the world's fresh water resides there.

Antarctica is governed by the international Antarctic Treaty of 1959, which establishes the continent as an area of scientific research. The treaty prohibits military activity like weapons testing, but military personnel and equipment may be used for scientific research or peaceful purposes. A special protocol to the Treaty in 1991 added environmental protection measures. One measure was the banning of non-indigenous species, so all sled dogs were airlifted to a new home in arctic Canada.

Web Trek

Explore Antarctic Islands

www.pbs.org/nova/shackleton/1999/islands.html

Displays 360-degree QuickTime virtual reality scenes of the Drake Passage, the Weddell Sea, and the Antarctic islands.

CIA World Factbook

www.odci.gov/cia/publications/factbook/index.html

Features information about individual countries as compiled for the Central Intelligence Agency.

The 50 States

www.50states.com

Offers links to state facts such as climate, economy, and geography.

State Fact Sheets

www.ers.usda.gov/epubs/other/usfact

Lists state-specific facts on population, employment, income, and agriculture.

Counties of England

www.camelotintl.com/heritage/counties/england/index.html

Offers facts and short features about each of England's counties.

Extension

Have students find ways to visually represent the differences between their home and Antarctica, such as showing the difference in size between the two locations or the different kinds of wildlife that exist in each place.

Activity 2: All About Antarctica

Objective

Students learn basic information about Antarctica and compare the continent to the places where they live.

Materials for each student

- copy of **All About Antarctica** activity sheet on page 11
- access to print or Internet resources that include information about where students live

Procedure

1. Ask students what they know about Antarctica. Specifically:

- How big do they think it is compared to where they live?
- How cold is it compared to where they live?
- What does the landscape look like?
- How many people live there? What kind of work do they do?
- What kind of wildlife lives there?

2. After students have answered these questions, organize them into groups and give each group a copy of the **All About Antarctica** activity sheet. Review with students the various facts about Antarctica found on the student page.

3. Have students use print and Internet resources to find out information about where they live. As students find the information, have them fill in the chart comparing facts about their home to facts about Antarctica.

4. Once students have completed the chart, have them answer the questions listed on the student activity page.

All About Antarctica

Antarctica is vast and cold. But what does that mean exactly? One way to understand what it is like in Antarctica is to compare it to something that you are already familiar with—like where you live now. Look at all the facts below about Antarctica and see if you can find information for the same categories about your home. Then compare how Antarctica and your home are alike and contrast how they are different.

Student Page

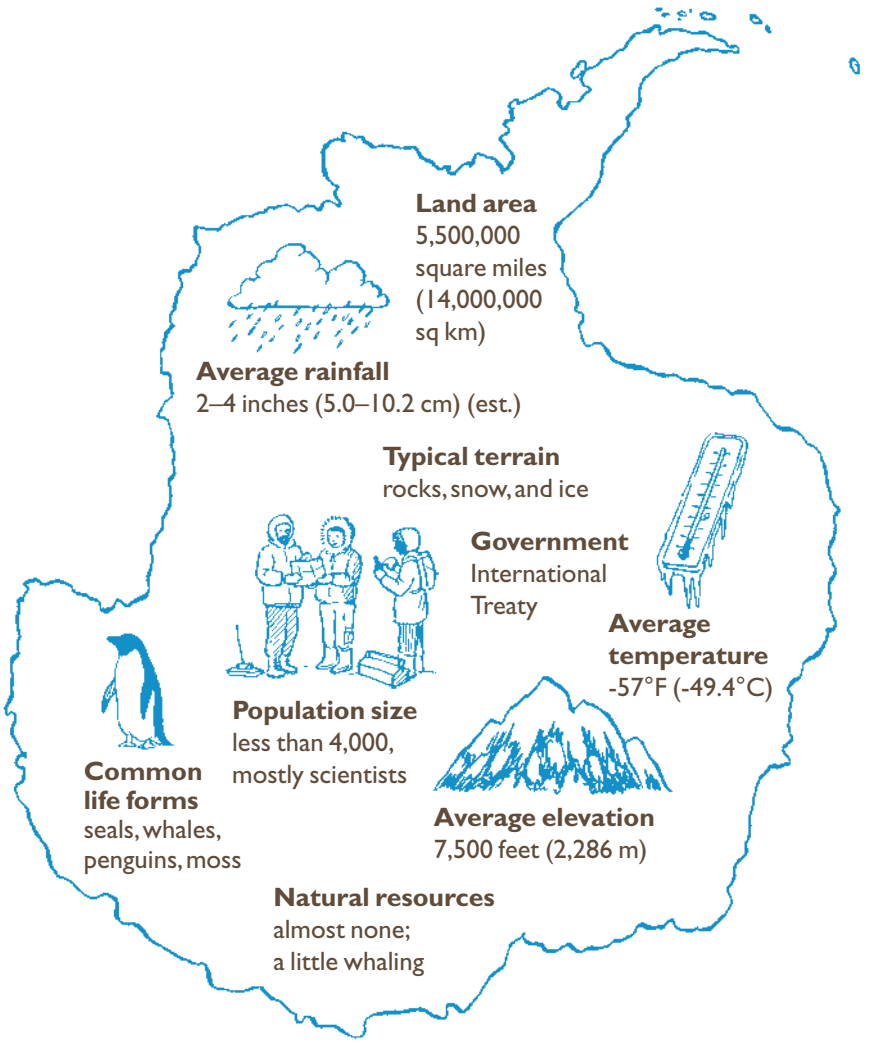
Features	Facts About Where I Live
Land area	
Average temperature	
Average rainfall	
Average elevation	
Typical terrain	
Government	
Population size	
Common life forms	
Natural resources	

Questions

1. What are the biggest differences between Antarctica and the place where you live?
2. What features seem to be the most alike?
3. What do you think would be the most difficult part about living in Antarctica?

About Living in Antarctica

Did you know that the Antarctic winter happens during June, July, and August? And that "night" is theoretically six months long at the geographic pole, where it is continuously twilight or dark during the winter months? The height of Antarctic summer is in January, bringing 24 hours of continuous sunlight.



Teacher Page

Seal for Breakfast?

Background

Dietary guidelines recommend that Americans' diets consist of fat at approximately 30 percent of calories; protein at about 10 percent; and carbohydrates at about 60 percent; the explorers' diets near the end of the *Endurance* crew's journey were comprised mainly of protein and fat. At this point, crew members neither consumed enough calories nor did they have the variety (carbohydrates and certain vitamins) in their diets necessary to fulfill basic nutritional requirements. One of the most difficult times for crew members was when they were forced to eat the dogs to survive. In his memoir, Sir Ernest Shackleton remembers: "It was the worst job that we had had throughout the Expedition, and we felt their loss keenly."

In terms of calories, teenage girls should consume about 2,200; teenage boys about 2,800. The U.S. Department of Agriculture (USDA) recommends that a 2,200-calorie diet include the following servings: 9 grain group, 4 vegetable group, 3 fruit group, 3 milk group, and 6 ounces of the meat group (total fat equals 73 grams). For a 2,800-calorie diet, the USDA recommends: 11 grain group, 5 vegetable group, 4 fruit group, 3 milk group, and 7 ounces of the meat group (total fat equals 93 grams).

Web Trek

Food and Nutrition Information Center
www.nal.usda.gov/fnic/

Provides links to numerous nutrition resources, including young children and ethnic/cultural food guide pyramids.

Health Finder for Kids
www.healthfinder.gov/kids/home.htm

Offers kid-friendly health information, along with related activities and games.

Extension

Have students list all the food they would ideally take on an expedition to a freezing-cold climate. Then have them consider why this food would or would not be good to bring (for example, weight, perishability, nutrition, variety) and revise their lists based on the discussion. How many of their foods would make the revised list? What kinds of new foods would they now consider?

Activity 3: What's on Your Plate?

Objective

Students compare the nutritional value and variety of their own meals to those eaten by the early Antarctic explorers.

Materials for each student

- copy of the **What's on Your Plate?** activity sheet on page 13
- copy of the **Calorie Counts** activity sheets on pages 14–15
- additional print and Internet references for calorie counts

Procedure

1. Tell students that when Sir Ernest Shackleton and his men started their journey, they had a variety of foods to meet their nutritional needs. But six months before they were rescued, their diet was mainly seal steaks, stewed seal, penguin steaks, stewed penguin, and penguin liver.

2. Organize students into teams and distribute the **What's on Your Plate?** and **Calorie Counts** activity sheets. Have students characterize the food listed in the explorers' meal charts by placing a check in the appropriate food category or categories (carbohydrate, protein, and/or fat). Then have students add up the estimated calories that crew members consumed.

3. Have students fill in the charts with what they ate yesterday for breakfast, lunch, and dinner. Then have students categorize their meals (some foods may qualify for more than one category) and use the information listed in **Calorie Counts** and other resources to find their total daily calories consumed.

4. When students are finished, have them answer the questions listed on the student activity page.

What's on Your Plate?

How does the food you eat compare to what *Endurance* crew members ate at the beginning and later on in their Antarctic voyage? To compare, first categorize the kind of foods the explorers ate, and then use the **Calorie Counts** activity sheets and other resources to examine the kind of foods you eat.

Enter everything you had for breakfast, lunch, and dinner yesterday. When you've finished, put a mark in the box or boxes that most closely describes the type of food you ate. Then add your total calories together and compare your daily menu to some of those of Shackleton and his crew.

Endurance *crew meals*

A representative meal at the beginning of the expedition

Food	Carbohydrate	Protein	Fat	Calories*
Quaker Oats				350
Tinned meat				500
Bacon				300
Dried fruit				300
Cocoa				100
Total				

A representative meal later on in the expedition

Food	Carbohydrate	Protein	Fat	Calories*
Seal steak				800
Penguin liver				800
Boiled seaweed				100
Tea with sugar				30
Total				

* Estimated calorie counts

About Food Categories

There are three main food groups: carbohydrates, fats, and proteins. Carbohydrates are foods like oatmeal, bread, cereal, potatoes, rice, pasta, fruits, and vegetables; fats primarily include oils and fats from meat and dairy products; and proteins come in the form of nuts, fish, meat, poultry, eggs, and beans.

Your meals

Breakfast

Food	Carbohydrate	Protein	Fat	Calories*
Total				

Lunch

Food	Carbohydrate	Protein	Fat	Calories*
Total				

Dinner

Food	Carbohydrate	Protein	Fat	Calories*
Total				

Questions

1. What type of food did you eat most of? Least of?

2. What percentage of each food group would you estimate you ate?

3. What percentage of each food group did Shackleton and his men eat in the meals above?

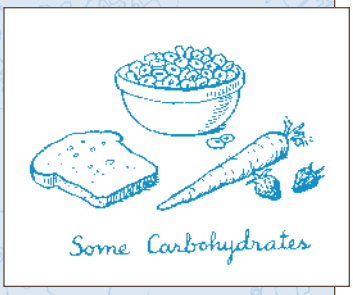
4. How do each of your meals compare with the explorers' meals at different times during the journey?

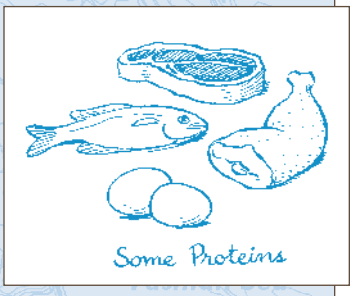
5. What do you think your energy needs are compared to those of the explorers?

Student Page

Calorie Counts

The following are the calorie values for some foods you may commonly eat for breakfast, lunch, or dinner. If you don't see a particular food in one category, check for it in a different category. Use additional resources to find foods that are not listed here.





While these foods are representative of their groups, most foods—including these—contain a variety of components.

Beverages

120	1 cup 2 percent milk
180	1 cup 2 percent chocolate milk
180	1 cup 2 percent chocolate milk
0	8 ounces brewed tea, plain
80	1 cup orange juice, canned
85	1 cup apple juice, canned
110	1 cup cranberry juice, bottled
100	8 fluid ounces lemonade, from frozen
5	12 fluid ounces diet cola
125	8 fluid ounces grape soda, canned
355	1 10-ounce vanilla shake

Breakfast foods

165	1 plain bagel
100	1 ounce cream cheese
230	8 ounces whole-milk yogurt. flavored
105	1 banana
25	½ cup cantaloupe, cubed
35	½ cup grapefruit, sectioned
80	1 medium apple
40	½ cup blueberries, raw
25	½ cup strawberries, raw, sliced
35	1 pat salted butter
50	1 tablespoon jelly
65	1 slice white bread
60	1 slice whole wheat bread
70	1 slice raisin bread
165	1 blueberry muffin
125	1 bran muffin

130	1 English muffin, plain
100	1 waffle, from frozen
165	1 plain cake doughnut
395	1 plain danish pastry
230	1 croissant
95	1 large fried egg
80	1 large poached egg
150	1 packet instant oatmeal, flavored
110	1 ounce Cheerios cereal
110	1 ounce corn flakes
70	1 ounce All-Bran cereal
110	1 ounce Rice Krispies cereal

Snack / Lunch foods

30	1 carrot, raw
5	1 stalk celery, raw
40	1 snack-pack raisins
160	1 ounce cashews, dry- or oil-roasted
40	1 peanut butter cracker sandwich
105	10 potato chips
150	1 ounce corn chips
20	10 pretzel sticks
30	1 cup popcorn, air-popped
5	1 dill pickle
115	1 pita bread, whole wheat
50	1 tablespoon jelly
95	1 tablespoon peanut butter
100	1 tablespoon regular mayonnaise
110	3 ounces tuna, canned in water
180	2 slices beef or pork bologna

*Source: U.S. Department of Agriculture

Student Page

115	1 ounce Cheddar cheese
105	1 ounce American cheese
105	1 ounce Swiss cheese
85	1 cup tomato soup, made with water
75	1 cup chicken noodle soup, canned
325	1 enchilada, with beef and cheese
150	1 cup macaroni & cheese, from mix
255	1 slice cheese pizza
110	1/2 cup creamed cottage cheese, small curd
95	1 cup sweetened applesauce, canned
50	1/2 sweet cherries, raw
65	1 medium nectarine, raw
60	1 medium orange, raw
90	1 slice watermelon
100	1 medium pear, raw
70	1 popsicle
95	1 ounce jelly beans
145	1 sponge snack cake, without frosting
120	2 oatmeal raisin cookies
175	1 brownie with nuts & frosting
110	2 fig bar cookies
100	2 chocolate chip cookies, homemade

Dinner foods

230	3 ounces ground beef, lean, broiled
130	1 hamburger roll
150	1 beef or pork hot dog
130	1 hot dog roll
5	1 teaspoon yellow mustard, prepared
20	1 tablespoon sweet relish
20	1 tablespoon catsup
0	1 teaspoon salt
58	1 fish stick, from frozen
150	1 cup plain spaghetti noodles, cooked

25	1 tablespoon parmesan cheese, grated
140	1/2 skinless chicken breast, roasted
365	1 breast chicken, batter-fried
290	3 ounces pork chop, broiled
240	3 ounces sirloin steak, broiled
110	3 ounces haddock, baked or broiled
145	3 ounces salmon, baked or broiled
470	1 slice Quiche Lorraine
65	1/2 cup green peas, cooked
15	4 medium spears asparagus, cooked
25	1/2 cup broccoli, cooked
20	1/2 cup spinach, cooked
40	1/2 cup winter squash, baked
80	1 ear corn, cooked
5	1 cup loose-leaf lettuce
40	1/2 cup onion, raw, sliced
25	1 medium tomato, raw
20	1/2 cup green pepper, raw
85	1 dinner roll
80	2 onion rings, breaded, from frozen
130	1/2 cup potato salad made with mayonnaise
110	1/2 cup mashed potatoes, from flakes
220	1 baked potato, with skin
115	1/2 cup brown rice, cooked
110	1/2 cup white rice, cooked
145	1 piece angel food cake, from mix
455	1 piece apple pie, double crust
70	1/2 cup gelatin dessert
160	1/2 cup instant chocolate pudding
350	1 cup premium vanilla ice cream
70	1 fruit juice bar, frozen
155	1 chocolate cupcake, with frosting
105	1/2 cup yogurt, frozen

Teacher Page

In Their Own Words

Background

Without the diaries of Sir Ernest Shackleton and other *Endurance* crew members, people would be left to wonder exactly what happened to the men. For 22 months, the men protected their personal diaries, which captured everything from daily facts to personal feelings.

What makes the journals of the *Endurance* crew so interesting is that the men recorded not only the facts about what was happening to them, but also how they felt about what was happening and how they felt about each other. While much of what occurred to Shackleton's men was high adventure, many days were extremely boring. Yet, the men kept writing it all down in a way that still makes us want to read it today.

Web Trek

Dispatches

www.pbs.org/nova/shackleton/dispatches/

Provides present-day observations from a correspondent who traveled to the Antarctic with the film crew that produced *Shackleton's Antarctic Adventure*.

The Ice

www.theice.org/

Details what it's like to work in Antarctica from a technician who travels there each year. Includes essay entries from people who have lived and worked in Antarctica.

The Write Site

www.writesite.org

Offers interactive language arts and journalism activities for kids and includes advice about how to keep a journal.

Extension

Ask students to write a passage detailing what they remember about the last time that their class met. What do they remember most? What was the topic of discussion? Who asked questions? Which students were in attendance or absent? Have students write everything they can remember and then compare different students' recollections. How similar were the accounts? How different were they and in what ways? What might explain the differences?

Activity 4: In Your Words

Objective

Students read journal entries written by Shackleton and his crew and create passages documenting their own lives.

Materials for each student

- copy of **In Your Words** activity sheet on page 17
- copy of **Journal Entries** activity sheets on pages 18–19

Procedure

1. Tell students that some members of Shackleton's crew kept journals for almost two years, chronicling different aspects of the journey.

2. Distribute copies of the **In Your Words** and **Journal Entries** activity sheets to each student. Have students read the excerpts on the **Journal Entries** activity sheets that represent viewpoints of different crew members.

3. Have students identify what it is about the language that makes the diary extracts interesting. Which entries do they enjoy more—the ones using just factual language or those revealing a more personal experience? Why?

4. After students have analyzed and discussed the passages, have them write their own journal entries describing their day.

5. When students have completed their journal entries, have them answer the questions listed on the student activity page.

In Your Words

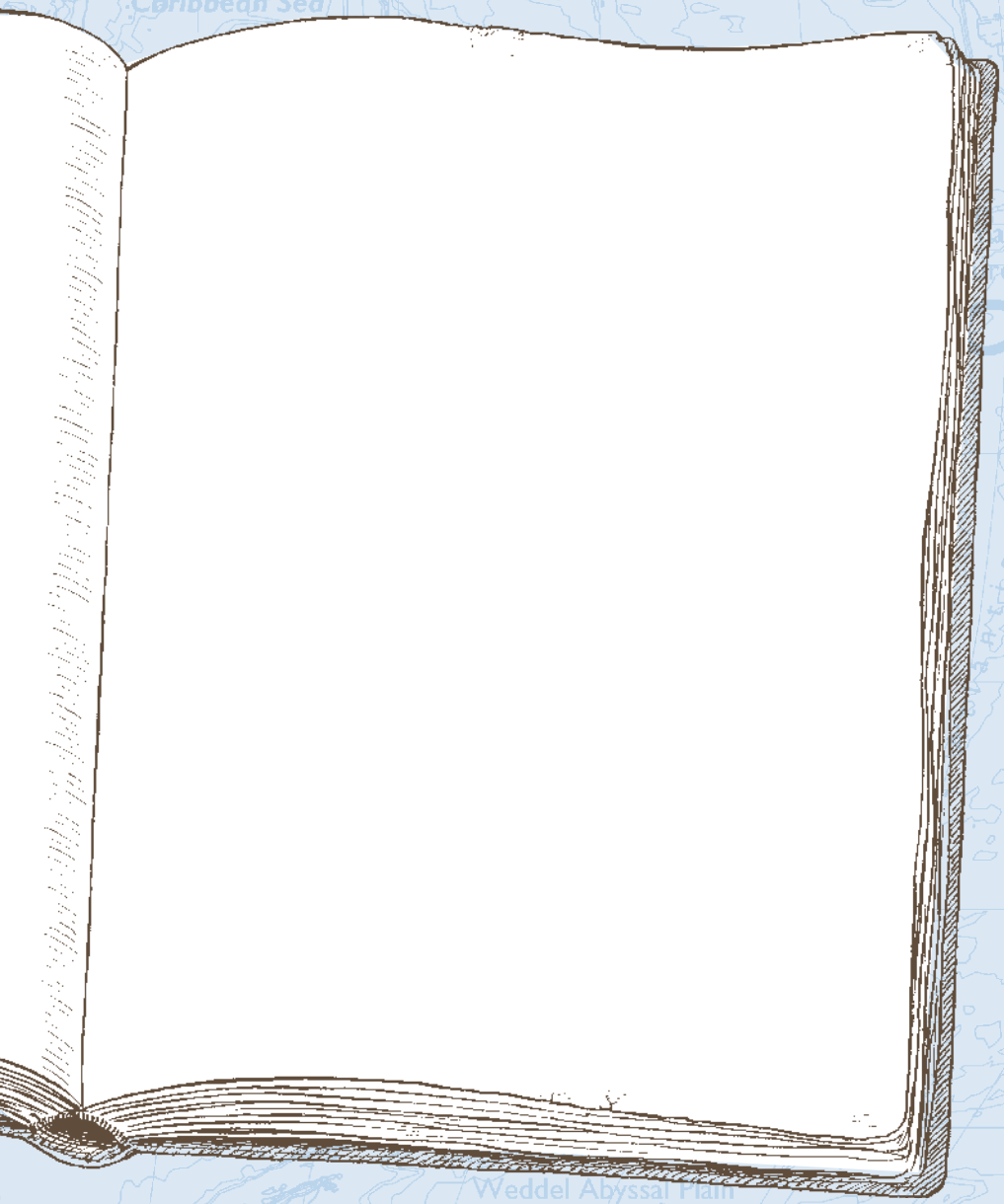
Student Page

Read the excerpts on the **Journal Entries** activity sheets to see the kinds of things that Sir Ernest Shackleton and his men thought about when they wrote their journal entries. Then write about your own day.

Think about why events from today stand out in your mind. For example, instead of noting "The bus was late this morning, and I missed the first part of gym," think about how you could more fully describe what happened.

For example:

- "I paced around, feeling really angry about being kept waiting."
- "It was raining—my shoes got soaked."
- "I heard the bus before I saw it; the gears were grinding out loud as it turned onto my street. I felt so relieved!"



About Feelings

Facts alone don't tell a story. As you think about your day, consider whether you felt any of the following:

- bored
- comfortable
- disappointed
- excited
- great
- happy
- loved
- frustrated
- mad
- nervous
- overwhelmed
- proud
- sad
- shy

Questions

1. What was the easiest part of your day to remember? The most difficult?

2. List all the feelings you had today. Which one was the strongest?

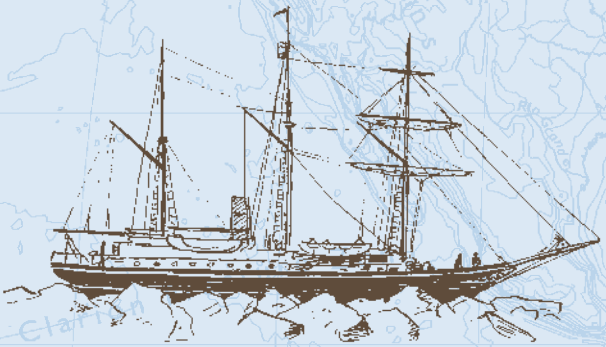
3. Think about your day one week ago. What can you remember? How do the facts differ from what you remembered about your day today?

Student Page

Journal Entries

"This is not a pleasant job. We have to dig a hole down through the coal while the beams and timbers groan and crack all around us like pistol–shots. The darkness is almost complete, and we mess about in the wet with half–frozen hands and try to keep the coal from slipping back into the bilges. The men on deck pour buckets of boiling water from the galley down the pipe as we prod and hammer from below, and at last we get the pump clear, cover up the bilges to keep the coal out and rush on deck, very thankful to find ourselves safe again in the open air."

—Frank Worsley, writing about having to go down in the bunkers of the *Endurance* and clear ice from the bilge pumps a few days before the crew was forced to abandon the ship (1)



The *Endurance*

"In addition to the daily hunt for food, our time was passed in reading a few books that we had managed to save from the ship. The greatest treasure in the library was a portion of the Encyclopædia Britannica. *This was being continually used to settle the inevitable arguments that would arise. The sailors were discovered one day engaged in a very heated discussion on the subject of* Money and Exchange. *They finally came to the conclusion that the* Encyclopædia, *since it did not coincide with their views, must be wrong."*

—Shackleton, describing an occurrence at Ocean Camp in his memoir of the *Endurance* voyage (2)

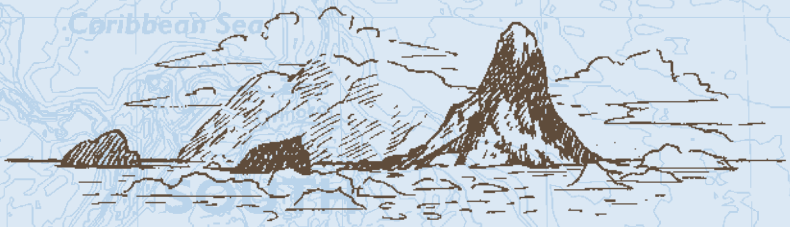
"There are no spoons, etc., to wash, for we each keep our own spoon and pocket–knife in our pockets. We just lick them as clean as possible and replace them in our pockets after each meal. Our spoons are one of our indispensable possessions here."

—A crew member writing about daily rituals at Ocean Camp (3)

Student Page

"It's a hard, rough, jolly life, this marching and camping; no washing of self or dishes, no undressing, no changing of clothes. We have our food anyhow … sleeping almost on the bare snow and working as hard as the human physique is capable of doing on a minimum of food."

—A crew member recording what it was like to leave the tedious life of Ocean Camp and begin a march toward open water (4)



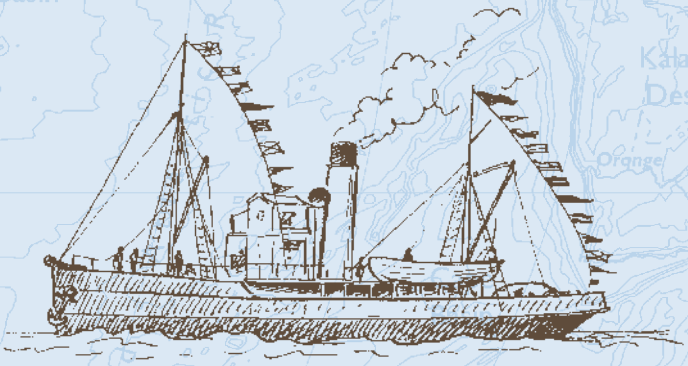
Elephant Island

"The hut grows more grimy every day. Everything is sooty black. We have arrived at the limit where further increments from the smoking stove, blubber lamps, and cooking gear are unnoticed. It is at least comforting to feel that we can become no filthier. … From time to time we have a spring cleaning, but a fresh supply of flooring material is not always avail–able, as all the shingle is frozen up and buried by deep rifts. Such is our Home Sweet Home."

—A crew member writing about living conditions at their Elephant Island camp (5)

"It had been arranged that a gun should be fired from the relief ship when she got near the island. Many times when the glaciers were 'calving,' and chunks fell off with a report like a gun, we thought that it was the real thing, and after a time we got to distrust these signals. As a matter of fact, we saw the Yelcho *before we heard any gun. It was an occasion one will not easily forget."*

—Second-in-Command Frank Wild, recounting the crew's rescue from Elephant Island, more than four months after Shackleton and five others had left the island to secure rescue (6)



The *Yelcho*

Sources

(1) Shackleton, Ernest. *South: A Memoir of the Endurance Voyage*. New York: Carroll & Graf Publishers, Inc., 1998, 73.
(2) Shackleton. South, 93–94.
(3) Shackleton. South, 93.
(4) Shackleton. South, 104–105.
(5) Shackleton. South, 231.
(6) Shackleton. South, 222–223.

Teacher Page

Stormy Seas Ahead

Background

Once Sir Ernest Shackleton and his crew made it to Elephant Island, Shackleton was faced with an enormous decision: Stay on the uninhabited island through the winter or sail to the whaling station on South Georgia Island, braving 800 miles (1,287.5 km) of difficult seas in one of their small lifeboats to do so. Shackleton chose the latter, and had his carpenter, Chippy McNeish, modify the 23-foot (7.0-m) *James Caird* to make it as seaworthy as possible.

On April 24, 1916, Shackleton and five others set out to try to reach civilization and secure rescue for themselves and the 22 men waiting on Elephant Island. They braved stormy seas, switching off shifts so that three men would sleep below while the others steered, sailed, and bailed water from the boat. After 17 days at sea, the men landed on the remote but inhabited island of South Georgia.

Web Trek

The *James Caird* Sets Sail

www.pbs.org/nova/shackleton/dispatches/19991108.html

Tells how the *Caird* replica used in *Shackleton's Antarctic Adventure* was built and filmed.

Shackleton's Antarctic Adventure

www.shackletonsantarcticadventure.com

Provides additional information about the *Caird*.

The *James Caird* Society

www.dulwich.org.uk/history/jamescaird.htm

Provides facts about and photos of the lifeboat that made the epic open-sea voyage in 1916.

Extension

Have each student choose an object in the room, measure it, and create a scaled-down drawing of the object. Tell students to record the scale used on the paper. Once they are finished, have students trade papers and, using the scales provided, calculate the original dimensions of the chosen object.

*Note: *Caird* replica dimensions based on measurements of the present-day *Caird*.

Activity 5: Craft the Caird

Objective

Students use mathematical scale to create a life-size outline of the *James Caird* lifeboat.

Materials for each student

- copy of **Craft the *Caird*** activity sheet on page 21
- measuring tape
- string
- scissors
- adhesive tape

Procedure

1. To help demonstrate to students how cramped the *Caird* was for the six adult men, tell them they will map out the actual dimensions of the *Caird* replica used in *Shackleton's Antarctic Adventure*.

2. Organize students into groups and give each group a copy of the **Craft the Caird** activity sheet. Tell students to use the scale—**1 inch = 3.3 feet (2.5 cm = 1.0 m)**—to calculate life-size proportions of the boat. The dimensions of the *Caird* replica and the rounded-off dimensions used in the activity follow. Students should also round off their own calculations.

	Caird replica*	Activity
length:	23.2 feet (7.1 m)	23.0 feet (7.0 m)
width:	6.8 feet (2.1 m)	7.0 feet (2.0 m)
depth (amidships):	~2.6 feet (0.8 m)	2.5 feet (0.8 m)

3. After calculating the actual dimensions, have students measure out and mark each off with the string, cutting, and taping each down. For the height measurement, students should measure out and cut a piece of string to the correct size.

4. When students have finished, group them into sets of six and have each set take a turn standing in the cabin space. Have one student hold the 31-inch (0.8-m) string at the boat's middle to represent the vessel's maximum depth.

5. After all groups have tried out the cabin, have students work in their original groups to answer the questions listed on the student activity page. Then have students work independently to write essays describing how they think it might have been for the *Caird* crew.

Craft the *Caird*

Student Page

Sir Ernest Shackleton had three lifeboats from which to choose for his journey. He chose the *James Caird* because it was the largest of the three. Shackleton had the *Caird* modified to make it as seaworthy as possible, including outfitting the top with a canvas cloth to try to keep the men dry and warm.

In addition, the *Caird* needed to bring along extra weight, called ballast, to keep the boat from tipping over. The crew filled the boat bottom with about 1,800 pounds (816.5 kg) of rocks and gravel, which all six men had to both crawl around and sleep on.

How big was the *Caird*? To find out, use the information on this page to scale up the total length, width, and depth of the *Caird* replica used in *Shackleton's Antarctic Adventure*. Then use your string, scissors, and tape to make an outline of the boat's dimensions.

About the *Caird*

Besides the men, supplies such as stoves, paraffin, matches, and sleeping bags had to be carried on the journey. According to Shackleton's memoir, the food and instruments they brought along included:

Food

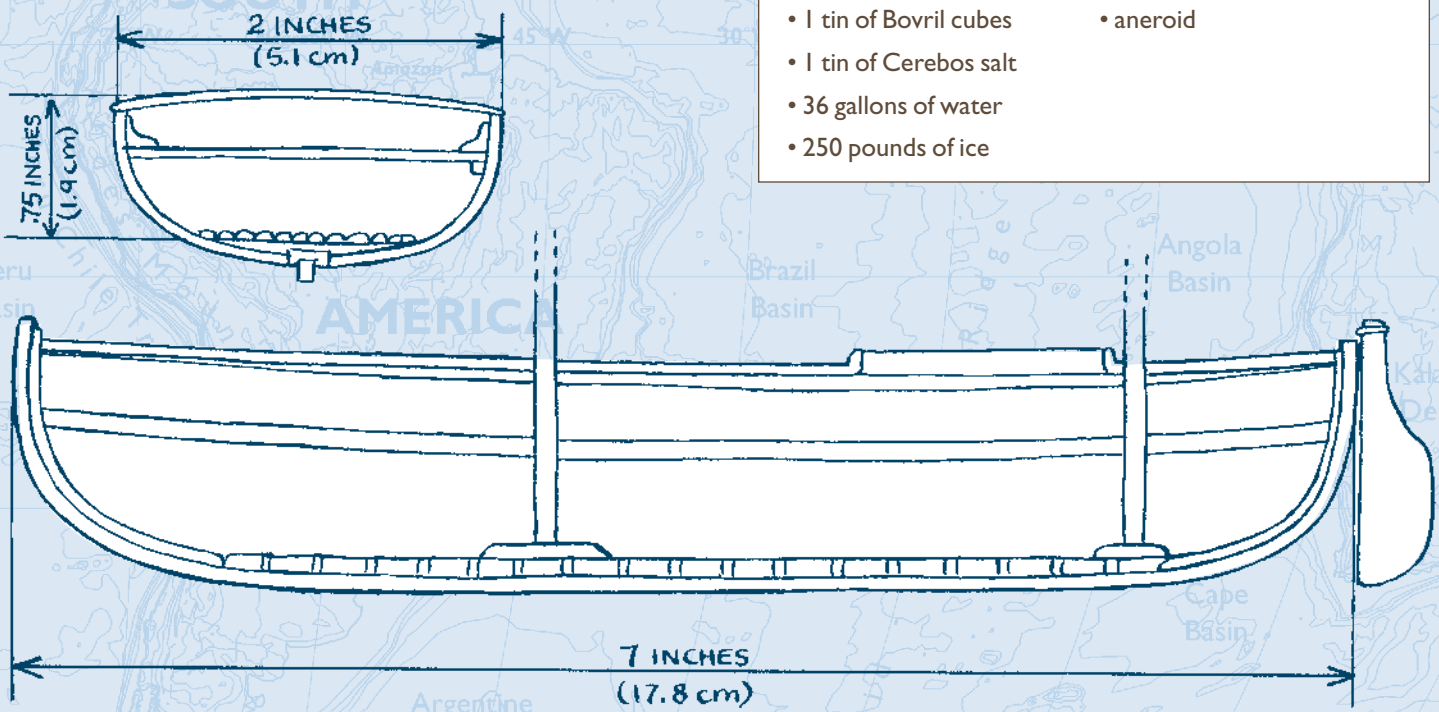
- 3 cases sledgling rations
- 2 cases nut food
- 2 cases biscuits
- 1 case lump sugar
- 30 packets of Trumilk
- 1 tin of Bovril cubes
- 1 tin of Cerebos salt
- 36 gallons of water
- 250 pounds of ice

Instruments

- sextant
- binoculars
- prismatic compass
- sea anchor
- charts
- aneroid

Scale

1 inch = 3.3 feet (2.5 cm = 1.0 m)



Questions

1. What do you think were the three most difficult conditions for the six *Caird* crew members' 17-day journey?

2. What might you think about during such a journey?

3. Besides sailing the boat and bailing out water, what other factors would you need to consider in order to survive?

Teacher Page

Finding the Way

Background

Without ways to navigate, Sir Ernest Shackleton and his crew would never have been able to determine where they were. Navigation became especially important when Shackleton and five others struck out for South Georgia Island in a small boat, the *James Caird*, with only a sextant to guide them. (A sextant measures the angle between two points.)

A sextant is only one of the many ways early mariners used to navigate; another tool they used was called a quadrant. The quadrant, which was popular with Portuguese explorers like Columbus, came into widespread use around 1450 A.D.

Web Trek

Navigate the High Seas

www.pbs.org/nova/shackleton/navigate/

Describes how to use a sextant, how the global positioning system works, and how to determine longitude in three online interactive activities.

Celestial Navigation from Argonauts to Astronauts

www.mat.uc.pt/~asalves/H61iflan.htm

Reviews early navigation instrumentation, including quadrants, astrolabes, and sextants.

Ursa Minor

www.astro.wisc.edu/~dolan/constellations/constellations/Ursa_Minor.html

Shows a diagram and provides directions for locating the star Polaris, which lies in the Ursa Minor constellation.

Extension

Have students research and explain how some other early celestial navigational instruments work, such as the:

- kamal
- astrolabe
- cross-staff
- back-staff
- octant
- sextant

Activity 6: Find Your Latitude

Objective

Students make their own quadrants and use them to determine their latitude.

Materials for each student

- 2 copies of **Find Your Latitude** activity sheet on page 23
- a ruler
- a manila folder
- a pair of scissors
- a 10-inch (25.4-cm) piece of string
- a weight, such as a large metal nut or bolt
- glue
- tape

Procedure

1. Give each student two copies of the **Find Your Latitude** activity sheet. Have them use one copy to make the quadrant and save the other to help find the star Polaris in the night sky.

2. Have students glue the quadrant diagram onto the manila folder, cut it out, and make a hole at the point marked by an "X," through which they will push the end of a 10-inch (25.4-cm) piece of string. Have them tape the end of the string to the back of the folder.

3. Then have students attach a weight at the other end of the string and tape the 90° end of their quadrant diagram to the 1-inch (1-cm) end of the ruler.

4. Once the quadrant is made, have students try it out at night with an adult.

5. Tell students that while people in the Northern Hemisphere can use Polaris to find their latitude, Shackleton couldn't see the North Star from the Antarctic. Instead, *Endurance* captain Frank Worsley, the navigator, mainly relied on a sextant.

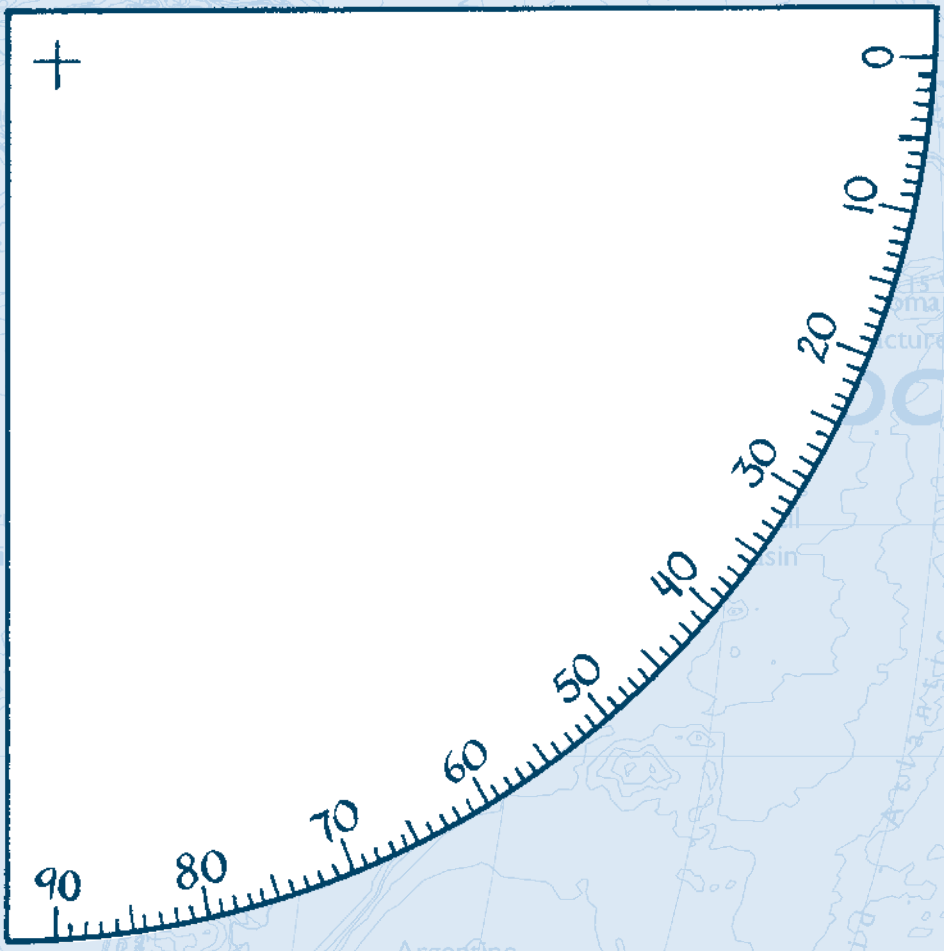
6. When students have tried out the quadrant, have them answer the questions listed on the student activity page.

Find Your Latitude

Student Page

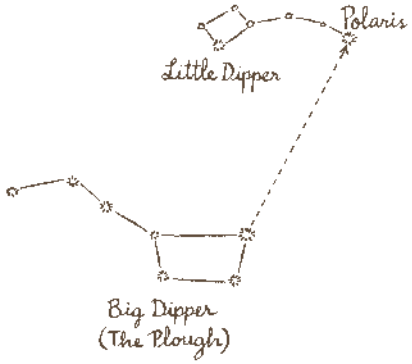
Do you want to determine your latitude? All you need to do is find the angle between your position on Earth and the North Star—called Polaris—and you can figure out your latitude. How do you do that? Build a quadrant, using the pattern and instructions below.

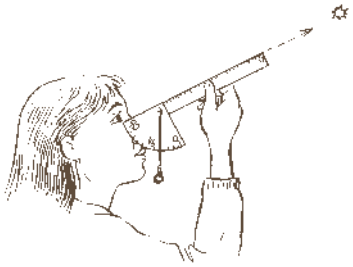
Once you have made your quadrant, try it out. Go out on a clear night and locate the Big Dipper, also known as The Plough, which will point you to the star Polaris. Raise your quadrant to your cheekbone (careful you don't poke yourself!) and, looking down the length of the ruler, line up Polaris with the end of the ruler. Once you have Polaris correctly sighted, press the string against the cardboard and record the angle at which the string crosses the scale. This is your latitude.



About Polaris

Relative to the Earth's movement, Polaris remains fixed in one position in the sky, almost exactly above the North Pole. You can use this fact to determine your latitude. Measuring the angle between your position on Earth and Polaris reveals the altitude of Polaris, which is equal to your latitude.





Questions

1. What is your latitude?
2. What would your latitude be if you were at the North Pole?
3. What would your latitude be if you were standing at the equator?
4. How many degrees are you away from the North Pole? The equator?

Resources

Shackleton's Expedition

Books

Alexander, Caroline. ***The Endurance: Shackleton's Legendary Antarctic Expedition.*** Bloomsbury, U.K.: Knopf, U.S.A., 1998. Blends storytelling with Frank Hurley's expedition photography to chronicle the 22-month epic of survival. Uses excerpts from many previously unavailable journals and documents. Published in association with the American Museum of Natural History for its exhibit of the same name.

Armstrong, Jennifer. ***Shipwreck at the Bottom of the World: Shackleton's Amazing Voyage.*** New York: Crown, 1998. Recounts the expedition of Sir Ernest Shackleton and the crew of the *Endurance*.

Bickel, Lennard and Rt. Hon. Lord Shackleton. ***Shackleton's Forgotten Men: The Untold Tale of an Antarctic Tragedy.*** New York, NY: Thunder's Mouth Press, 2000. Relates the tale of the *Endurance*'s supply party, which set out separately on the other side of Antarctica to leave supplies for Shackleton's crew.

Collier, Graham and Patricia Collier (Photographer). ***Antarctic Odyssey: Endurance and Adventure in the Farthest South.*** New York, NY: Carroll & Graf, 1999. Follows the author in visits to the various camps of polar explorers Captain Robert Falcon Scott and Shackleton, including the *Endurance* team's camp on remote Elephant Island.

Fisher, Margery and James Fisher. ***Shackleton and the Antarctic.*** Boston, MA: Houghton Mifflin, 1958. Written when many of the expedition members were still alive to be interviewed.

Huntford, Roland. ***Shackleton.*** New York, NY: Carroll & Graf, 1998. Offers the comprehensive biography of Shackleton, from his Anglo-Irish childhood through the race for the South Pole to his last expedition to the Antarctic.

Kimmel, Elizabeth Cody. ***Ice Story: Shackleton's Lost Expedition.*** New York, NY: Clarion Books, 1999. This picture book follows the series of disasters that constitute an adventure that, by all accounts, no one should have survived.

Lansing, Alfred. ***Endurance: Shackleton's Incredible Voyage.*** New York, NY: Carroll & Graf, 1999. Reconstructs—through diaries of expedition team members—the months of hardship the *Endurance* crew suffered.

Shackleton, Ernest, and Peter King (ed.) ***South: The Last Antarctic Expedition of Shackleton and the Endurance.*** New York, NY: The Lyons Press, 1998. Shackleton's own account of his odyssey. As he himself wrote, it provides "records of unflinching determination, supreme loyalty, and generous self-sacrifice on the part of my men."

Worsley, F. A. ***Shackleton's Boat Journey.*** New York, NY: W. W. Norton & Company, 1998. Written by Captain Frank Worsley of the *H.M.S. Endurance*, this book reveals Shackleton to be both luckless and lucky, and supremely cool and courageous throughout the entire journey.

Web Sites

The National Maritime Museum
www.nmm.ac.uk/
Features an online tour of the Museum's Antarctic exhibition, "South: The Race to the Pole." Focuses on the early expeditions of Scott, Shackleton, and Norwegian explorer Roald Amundsen.

Sir Ernest Henry Shackleton
indigo.ie/~jshack/ernest.html
Links to information in all forms about the explorer, including books, video and film, upcoming exhibitions, and related Internet sites.

The Endurance
www.kodak.co.uk/US/en/corp/features/endurance/map/
Takes a detailed look at the work of expedition photographer, Frank Hurley, who captured the 22-month adventure on film.

Shackleton's Legendary Antarctic Expedition
www.amnh.org/exhibitions/shackleton/index.html
Features diary excerpts, artifacts, and more than 150 compelling photographs by Hurley, from the American Museum of Natural History's exhibition on the *Endurance* adventure.

General Antarctic

Books

Heacox, Kim. ***Antarctica: The Last Continent*** *(National Geographic Destinations)*. Washington, D.C.: National Geographic Society, 1999. Reveals the continent's physical geography, its explorers, and its wildlife from krill to seal to penguin.

Hempel, Gotthilf. ***Antarctic Science: Global Concerns.*** New York, NY: Springer-Verlag, 1994. Spans a broad spectrum of Antarctic science, from the ozone hole to microbiology to sea ice. Discusses the conflicts among conservationists, researchers, and tourists.

Web Sites

Antarctic Meteorology Research Center—Real Time Data
uwamrc.ssec.wisc.edu/amrc/realtime.html
Includes real-time data for temperature, sea level, dew point, current weather, wind speed and direction, and precipitation.

Antarctica—Research Stations and Territorial Claims
www.lib.utexas.edu/Libs/PCL/Map_collection/islands_oceans_poles/Antarctica_Research_Station.GIF
Gives a detailed map with locations of Antarctic research stations and the land claims made by various nations.

The Antarctic Treaty
www.usatoday.com/weather/antarc/atreaty.htm
Describes how the Antarctic Treaty governs the actions of people in Antarctica. Links to more information on the Treaty.

Field Manual for the U.S. Antarctic Program
quest.arc.nasa.gov/antarctica/background/NSF/field-guide/manual.html
Covers preparations and procedures for Antarctic expeditions including extreme cold weather clothing, snow shelters, glacier travel, and rope use and care.

Glacier (Rice University)
www.glacier.rice.edu/
Site is devoted to Antarctica and the role it plays in Earth systems. Includes a section on ice and glaciers.

South Georgia, South Atlantic Ocean
www.btinternet.com/~sa_sa/south_georgia/south_georgia.html
Focuses solely on South Georgia Island and includes a highly detailed, color map.

Credits

Shackleton's Antarctic Adventure is a co-production of White Mountain Films and NOVA/WGBH Boston, presented by Morgan Stanley Dean Witter.

MORGAN STANLEY DEAN WITTER

Credits

The *Shackleton's Antarctic Adventure Teacher's Guide* is produced by the Educational Print and Outreach Department of the WGBH Educational Foundation.

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Giant-Screen Theater Partners

The following museums with giant-screen theaters are partners in *Shackleton's Antarctic Adventure*.

American Museum of Natural History, New York, NY

Cincinnati Museum Center, Cincinnati, OH

Houston Museum of Natural Science, Houston, TX

Museum of Science, Boston, MA

San Diego Natural History Museum, San Diego, CA

The Science Place, Dallas, TX

The Tech Museum of Innovation, San Jose, CA

NOVA

Paul Marotta/WGBH

Paul Marotta/WGBH

Kelly Tyler/WGBH

Susanne Simpson/WGBH

Kelly Tyler/WGBH

Wildlife abounds in the Antarctic. Clockwise, from left, are present-day photos of a fur seal, King penguins, a Gentoo penguin, a baby albatross, and a just-weaned elephant seal.