SHACKLETON’S ANTARCTIC ADVENTURE

The greatest survival story of all time.

TEACHER’S GUIDE
to accompany the giant-screen film
2 Who Was Sir Ernest Shackleton?

6 A Journey Unexpected
   Activity 1: Track the Expedition
   Students use latitude and longitude coordinates to track Shackleton’s epic journey.

10 Ice-Cold Continent
   Activity 2: All About Antarctica
   Students learn basic information about Antarctica and compare the continent to the places where they live.

12 Seal for Breakfast?
   Activity 3: What’s on Your Plate?
   Students compare the nutritional value and variety of their own meals to those eaten by the early Antarctic explorers.

16 In Their Own Words
   Activity 4: In Your Words
   Students read journal entries written by Shackleton and his crew and create passages documenting their own lives.

20 Stormy Seas Ahead
   Activity 5: Craft the Caird
   Students use mathematical scale to create a life-size outline of the James Caird lifeboat.

22 Finding the Way
   Activity 6: Find Your Latitude
   Students make their own quadrants and use them to determine their latitude.

24 Resources
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.

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.
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.
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.

Film Web Site
www.shackletonsantarcticadventure.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.
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.

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### Curriculum Connections

<table>
<thead>
<tr>
<th>Activity</th>
<th>Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Science</td>
</tr>
<tr>
<td>1. Track the Expedition</td>
<td></td>
</tr>
<tr>
<td>2. All About Antarctica</td>
<td></td>
</tr>
<tr>
<td>3. What's on Your Plate?</td>
<td></td>
</tr>
<tr>
<td>4. In Your Words</td>
<td></td>
</tr>
<tr>
<td>5. Craft the Caird</td>
<td></td>
</tr>
<tr>
<td>6. Find Your Latitude</td>
<td></td>
</tr>
</tbody>
</table>

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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.”

Frank Hurley, courtesy of The Macklin Collection

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### 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

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.

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?

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.
The Timeline

1914

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

**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).

**January 18**
The *Endurance* becomes trapped in the 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.

**March 17**
The crew’s camp drifts to about 40 miles (64.4 km) south of Paulet Island.

**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.

**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.

**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.

**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.
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.

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

June 22
The crew celebrates Midwinter’s Day with a feast.

December 23
The crew again begins marching toward open water, averaging just a mile and a half a day.

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.

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.

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
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.

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?

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.

### Features

<table>
<thead>
<tr>
<th>Features</th>
<th>Facts About Where I Live</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land area</td>
<td>5,500,000 square miles (14,000,000 sq km)</td>
</tr>
<tr>
<td>Average temperature</td>
<td>-57°F (-49.4°C)</td>
</tr>
<tr>
<td>Average rainfall</td>
<td>2–4 inches (5.0–10.2 cm) (est.)</td>
</tr>
<tr>
<td>Average elevation</td>
<td>7,500 feet (2,286 m)</td>
</tr>
<tr>
<td>Typical terrain</td>
<td>rocks, snow, and ice</td>
</tr>
<tr>
<td>Government</td>
<td>International Treaty</td>
</tr>
<tr>
<td>Population size</td>
<td>less than 4,000, mostly scientists</td>
</tr>
<tr>
<td>Common life forms</td>
<td>seals, whales, penguins, moss</td>
</tr>
<tr>
<td>Natural resources</td>
<td>almost none; a little whaling</td>
</tr>
</tbody>
</table>

### 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.
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.

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).
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.

### A representative meal at the beginning of the expedition

<table>
<thead>
<tr>
<th>Food</th>
<th>Carbohydrate</th>
<th>Protein</th>
<th>Fat</th>
<th>Calories*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quaker Oats</td>
<td></td>
<td></td>
<td></td>
<td>350</td>
</tr>
<tr>
<td>Tinned meat</td>
<td></td>
<td></td>
<td></td>
<td>500</td>
</tr>
<tr>
<td>Bacon</td>
<td></td>
<td></td>
<td></td>
<td>300</td>
</tr>
<tr>
<td>Dried fruit</td>
<td></td>
<td></td>
<td></td>
<td>300</td>
</tr>
<tr>
<td>Cocoa</td>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### A representative meal later on in the expedition

<table>
<thead>
<tr>
<th>Food</th>
<th>Carbohydrate</th>
<th>Protein</th>
<th>Fat</th>
<th>Calories*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seal steak</td>
<td></td>
<td></td>
<td></td>
<td>800</td>
</tr>
<tr>
<td>Penguin liver</td>
<td></td>
<td></td>
<td></td>
<td>800</td>
</tr>
<tr>
<td>Boiled seaweed</td>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>Tea with sugar</td>
<td></td>
<td></td>
<td></td>
<td>30</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 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?

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### 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.

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### Calorie Counts

*Estimated calorie counts*
## 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.

### Beverages

<table>
<thead>
<tr>
<th>Calorie</th>
<th>Item Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>120</td>
<td>1 cup 2 percent milk</td>
</tr>
<tr>
<td>180</td>
<td>1 cup 2 percent chocolate milk</td>
</tr>
<tr>
<td>180</td>
<td>1 cup 2 percent chocolate milk</td>
</tr>
<tr>
<td>0</td>
<td>8 ounces brewed tea, plain</td>
</tr>
<tr>
<td>80</td>
<td>1 cup orange juice, canned</td>
</tr>
<tr>
<td>85</td>
<td>1 cup apple juice, canned</td>
</tr>
<tr>
<td>110</td>
<td>1 cup cranberry juice, bottled</td>
</tr>
<tr>
<td>100</td>
<td>8 fluid ounces lemonade, from frozen</td>
</tr>
<tr>
<td>5</td>
<td>12 fluid ounces diet cola</td>
</tr>
<tr>
<td>125</td>
<td>8 fluid ounces grape soda, canned</td>
</tr>
<tr>
<td>355</td>
<td>1 10-ounce vanilla shake</td>
</tr>
</tbody>
</table>

### Breakfast foods

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

### Snack/Lunch foods

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

*Source: U.S. Department of Agriculture*
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
  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
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.

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

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?
“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)

“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)
"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)

"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 available, 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)

Sources
(2) Shackleton. South, 93–94.
(3) Shackleton. South, 93.
(5) Shackleton. South, 231.
(6) Shackleton. South, 222–223.
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.
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.

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.

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.

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

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:

<table>
<thead>
<tr>
<th>Food</th>
<th>Instruments</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 cases sledging rations</td>
<td>sextant</td>
</tr>
<tr>
<td>2 cases nut food</td>
<td>binoculars</td>
</tr>
<tr>
<td>2 cases biscuits</td>
<td>prismatic compass</td>
</tr>
<tr>
<td>1 case lump sugar</td>
<td>sea anchor</td>
</tr>
<tr>
<td>30 packets of Trumilk</td>
<td>charts</td>
</tr>
<tr>
<td>1 tin of Bovril cubes</td>
<td>aneroid</td>
</tr>
<tr>
<td>1 tin of Cerebos salt</td>
<td></td>
</tr>
<tr>
<td>36 gallons of water</td>
<td></td>
</tr>
<tr>
<td>250 pounds of ice</td>
<td></td>
</tr>
</tbody>
</table>

### 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?
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.

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 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.

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.

Have students research and explain how some other early celestial navigational instruments work, such as the:
- kamal
- astrolabe
- cross-staff
- back-staff
- octant
- sextant
Find Your Latitude

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.

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?

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.
Shackleton’s Expedition

Books


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.


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


Web Sites
*Antarctic Meteorology Research Center—RealTime 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.
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.