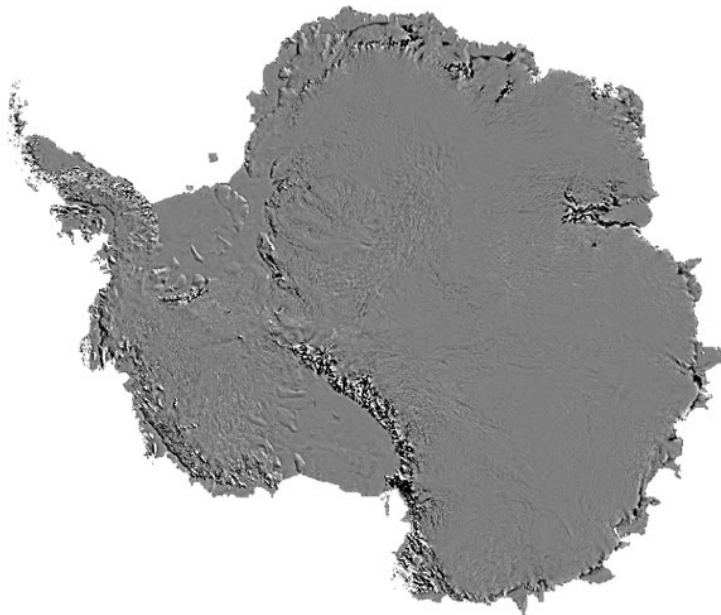


Amazingly Antarctica

**An Educator's Guide to Lesson Plans
about the Frozen Continent**



Amazingly Antarctica

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Related Exhibitions

Antarctica Stories

Lesson Title: Antarctica Stories: *Antarctic Journal: 4 Months at the Bottom of the World*

Illinois Learning Standards:

Language Arts:

Goal 1 – Reading: 1.B.1a, 1.B.2a, 1.B.3a, 1.B.4a, 1.B.5a, 1.C.1a, 1.C.2a, 1.C.3a, 1.C.4a, 1.C.1d, 1.C.2d, 1.C.3d, 1.C.4d

Goal 2 – Literature: 2.B.1a, 2.B.2a

Goal 3 – Writing: 3.A.1, 3.A.2, 3.A.3, 3.A.4, 3.B.1a, 3.B.2a, 3.B.3a

Goal 4 – Listening and Speaking: 4.A.1a, 4.A.2a, 4.A.3a, 4.A.4a, 4.A.1b, 4.A.2b, 4.A.3b, 4.A.4b, 4.A.1c, 4.A.1d, 4.B.1b, 4.B.2b

Social Studies:

Goal 17 – Geography: 17.A.1a, 17.A.2a, 17.B.1a, 17.C.1a, 17.C.3a, 17.C.2c,

Objectives:

Students will be able to:

- Build on existing vocabulary.
- Gain an appreciation for the diversity of life encountered in Antarctica.
- Create a journal of daily activities.

Materials:

- Book: *Antarctic Journal: 4 Months at the Bottom of the World*
- Student Activity Sheet
- Pencil

Instructional Procedures:

- 1) Begin by introducing Antarctica and its extreme climate. Explain how scientists travel to Antarctica to learn more about the frozen continent and the life forms that live there.
- 2) Read *Antarctic Journal* to students.
- 3) Ask students to answer the questions about the book on the student activity sheet.

Antarctica Stories: Antarctic Journal

Student Activity Sheet

Name _____

Activity Questions:

1. How long was the author in Antarctica? _____

2. At which Antarctic station did she stay? _____

3. What kinds of things did she have to pack? _____

4. From what city in the United States did she depart from? _____

5. Where did she fly to? _____

6. By which means of transportation did she use to get to the Antarctic continent? _____

7. List 5 kinds of animals that the author journals about: _____

8. Why do you think people like to journal (record their daily experiences in writing)? _____

9. Journal about the events of your day: _____

Antarctica Stories

Lesson Title: Antarctica Stories: *How to Survive In Antarctica*

Illinois Learning Standards:

Language Arts:

Goal 1 – Reading: 1.B.1a, 1.B.2a, 1.B.3a, 1.B.4a, 1.B.5a, 1.C.1a, 1.C.2a, 1.C.3a, 1.C.4a, 1.C.1d, 1.C.2d, 1.C.3d, 1.C.4d

Goal 2 – Literature: 2.B.1a, 2.B.2a

Goal 3 – Writing: 3.A.1, 3.A.2, 3.A.3, 3.A.4, 3.B.1a, 3.B.2a, 3.B.3a

Goal 4 – Listening and Speaking: 4.A.1a, 4.A.2a, 4.A.3a, 4.A.4a, 4.A.1b, 4.A.2b, 4.A.3b, 4.A.4b, 4.A.1c, 4.A.1d, 4.B.1b, 4.B.2b

Social Studies:

Goal 17 – Geography: 17.A.1a, 17.A.2a, 17.B.1a, 17.C.1a, 17.C.3a, 17.C.2c,

Objectives:

Students will be able to:

- Build on existing vocabulary.
- Explain the risks and dangers of traveling to Antarctica.
- Describe how humans prepare for survival in Antarctica.

Materials:

- Book: *How to Survive In Antarctica*
- Student Activity Sheet
- Pencil

Instructional Procedures:

- 1) Begin by introducing Antarctica and its extreme climate. Explain how such extreme climate can be very dangerous for humans. Ask students in what ways they think Antarctica's climate is dangerous to humans.
- 2) Read *How to Survive In Antarctica* to students.
- 3) Ask students to answer the questions about the book on the student activity sheet.

Antarctica Stories: How to Survive In Antarctica

Student Activity Sheet

Name _____

1. When is the best time to visit Antarctica? _____ What months are these? _____

2. How many miles is Antarctica from:

New York? _____ Africa? _____ Australia? _____ South America? _____

3. Who was the first person to cross the Antarctic Circle? _____

4. Why is wearing lots of sunscreen so crucial in Antarctica? _____

5. There are lots of things that are important to pack for a trip to Antarctica. But what shouldn't you pack? List three things that should never be taken to Antarctica:

1) _____ 2) _____ 3) _____

6. What is the difference between a trench and a mound snow shelter? _____

7. What form of transportation do scientists use to travel to islands or to collect water samples from the sea?

8. What are crevasses and why should you avoid them? _____

9. Weather codes are used to monitor safe travel. Which of the following codes indicates that the weather is so severe (whiteouts, katabatic winds, poor visibility), that you are not supposed to leave the building you occupy?

Condition 1

Condition 2

Condition 3

10. What are crampons and what are they used for? _____

Where In the World Is Antarctica?

Lesson Title: Where In the World Is Antarctica?

Illinois Learning Standards:

Language Arts:

Goal 3 – Writing: 3.A.1, 3.A.2, 3.A.3, 3.A.4, 3.B.1a, 3.B.2a, 3.B.3a, 3.C.1a, 3.C.2a, 3.C.3a

Goal 4 – Listening and Speaking: 4.A.1a, 4.A.2a, 4.A.3a, 4.A.4a, 4.A.1b, 4.A.2b, 4.A.3b, 4.A.4b, 4.A.1c, 4.A.1d

Goal 5 - Research: 5.A.1a, 5.A.2a, 5.A.1b, 5.A.2b

Science:

Goal 12 – Concepts and Principles: 12.A.1a, 12.A.1b, 12.E.1a

Social Science:

Goal 17 – Geography: 17.A.1a, 17.A.1b, 17.A.2b, 17.A.3b, 17.B.1a, 17.B.1b, 17.B.2b

Objectives:

Students will be able to:

- Locate the Antarctic continent on a globe and map.
- Locate and label various geographical features in and around Antarctica.
- Determine which life forms live in and around Antarctica.

Materials:

- World Atlas
- Student Activity Sheet
- Colored Pencils or Crayons

Background:

The Antarctic continent is the coldest region on Earth. Most of this land is buried underneath masses of ice and snow that can grow to be one mile thick. Mountains peek out of the top of Antarctica's thick glaciers. There are many kinds of animals that live in the water and on the land that surrounds Antarctica. Two six month long winter weather seasons along with severe winds make the Antarctic polar region more than just a cold place. Only part of Antarctica has been explored and scientists are hoping to be able to study more of this frigid environment in the next few years.

Instructional Procedures:

- 1) Show the slide show of various Antarctic maps.
- 2) Using the world atlas and colored pencils, ask students to locate and then label the various geographical features, life forms (likely to be found) and Antarctic stations from the list provided on the student activity sheet.
- 3) When labeling, instruct the students to use the colored-coded guide provided.
- 4) Once students are finished labeling, ask them to answer the questions on the student activity sheet.

Where In the World Is Antarctica?

Student Activity Sheet

Name _____

Color Guide for Labeling

Geographic Feature, Life Form or Station to Label	Color to Use
Geographic Feature	Blue
Life Form	Green
Antarctic Station	Red



Label the following on the map of Antarctica.

Geographic Features:

Indian Ocean
Atlantic Ocean
Pacific Ocean
Weddell Sea
Ross Sea
Ross Ice Shelf
Queen Maud Land
Larsen Ice Shelf
McMurdo Sound
Vinson Massif
Mt. Kirkpatrick
Berkner Island
Wilkes Land

Life Forms:

Adelie Penguins
Emperor Penguins
Weddell Seals
Antarctic Skua
Leopard Seals
Krill
Antarctic Hairgrass

Antarctic Stations:

McMurdo
Vostok
Palmer
Halley
South Pole
Novolazarevskaya
Casey

Activity Questions:

1. What is an ice shelf? _____
2. Are any of the life forms only found on land? Which one(s)? _____
3. What is the elevation for both Vinson Massif and Mt. Kirkpatrick? _____
4. Match each of the Antarctic stations with its home nation. The options are below.



- _____ McMurdo
_____ Vostok
_____ Palmer
_____ Halley
_____ South Pole
_____ Novolazarevskaya
_____ Casey

5. Which other nations have stations and are involved with Antarctic research?

Planning an Expedition

Lesson Title: Planning an Expedition

Illinois Learning Standards:

Language Arts:

Goal 3 – Writing: 3.A.1, 3.A.2, 3.A.3, 3.A.4, 3.C.1a, 3.C.2a, 3.C.3a

Goal 5 - Research: 5.A.1a, 5.A.2a, 5.A.3a, 5.B.1a

Mathematics:

Goal 6 – Number Sense: 6.A.1a, 6.A.2, 6.B.1, 6.B.2, 6.B.3a, 6.B.4, 6.C.1a, 6.C.2a, 6.C.3a

Goal 7 – Estimation and Measurement: 7.B.1a

Science:

Goal 11 – Inquiry and Design: 11.B.1a, 11.B.2a

Social Studies:

Goal 17 – Geography: 17.A.3a, 17.A.4a, 17.A.1b, 17.A.2b

Objectives:

Students will be able to:

- Graph coordinates.
- Estimate costs of an Antarctic expedition.
- Solve problems related to managing money.
- Keep a daily log of activities.

Materials:

- Student Activity Sheet
- Pencil

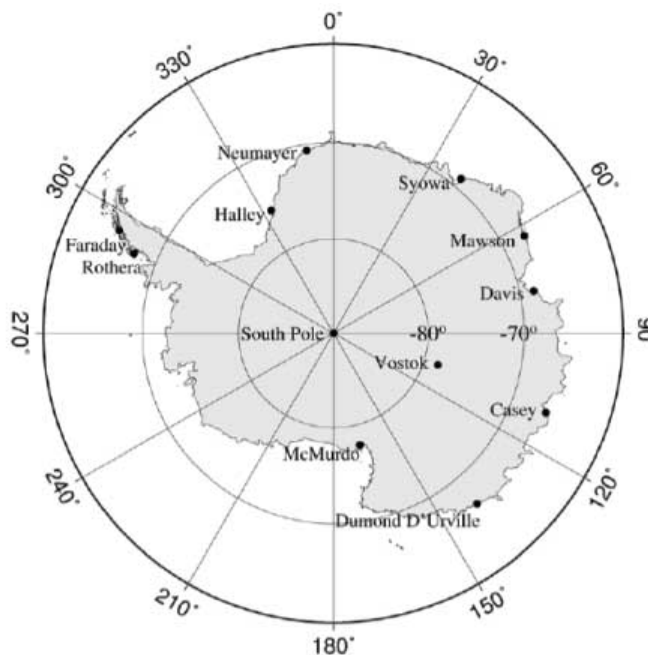
Background:

Antarctica is one of the last frontiers on Earth. If you arrive without a key piece of equipment, or if it breaks and you have no spare, it will very probably be impossible to recover. It requires a great deal of preparation and planning to successfully carry out an Antarctic expedition. If your students think attention to detail is only required when doing schoolwork, this activity

will make them think again. The Antarctic sets tougher tests than any teacher can, and you really don't want to receive a failing grade on "the Ice!" Students will have the opportunity to experience just a small piece of the planning that goes into ensuring their survival at the coldest place on the planet.

Instructional Procedures:

- 1) Explain to students that they are planning an expedition to Antarctica. Their objective is to reach the South Pole from Vostok Station (see map). Each student will have two people in their expedition group and will have \$15,000 to spend on the expedition. They must decide what to purchase from the list provided on the student activity sheet.
- 2) Show the slide show of Antarctic Gear.
- 3) Instruct students that they must use internet sources to determine the distance from Vostok to the South Pole (1300 km/807 miles).



Student Activity Sheet

Name _____

Transportation:

Snowmobile (carries 1 person) \$4,375 each. The snowmobile travels 110 miles per day.

Gasoline (if you have a snowmobile) \$3.55 per gallon. Each gallon lasts for about 100 miles.

OR

Dog sled (carries 1 person) \$675 each. The dog sled travels 75 miles per day.

Dogs (you need at least 6, no more than 10) \$150 each.

I will buy: _____

Total cost: _____

Food:

You will need 5 pounds per day per person. 1 pound of food costs \$5.75.

If you have sled dogs, you will need 5 pounds of food per dog per day. 1 pound of dog food costs \$1.25.

I estimate the trip will take _____ days.

I will buy: _____

Total cost: _____

Supplies:

Decide what you will need for the trip:

Flashlight \$18.55

Sleeping bag \$145.25

Insulated tent \$357.57

Heated air cushion \$226.45

Heavy coat \$465.55

Thick gloves \$45.34

Goggles \$125.44

Snow boots \$123.55

Cross-country skis \$445.55

Snow shovel \$45.45

First aid kit \$57.57

Signal flares \$127.85

Radio \$774.40

Laptop computer \$2,345.55

Rifle and ammunition \$659.40

Gasoline powered heater \$845.40

I estimate I can spend: \$ _____

I will buy: _____

Total cost \$ _____

Amount left over \$ _____

Daily Log of Travel

Day Date _____ Coordinate Location _____ Miles Traveled _____

Weather _____

Events of the Day _____

Day Date _____ Coordinate Location _____ Miles Traveled _____

Weather _____

Events of the Day _____

Day Date _____ Coordinate Location _____ Miles Traveled _____

Weather _____

Events of the Day _____

Day Date _____ Coordinate Location _____ Miles Traveled _____

Weather _____

Events of the Day _____

Daily Log of Travel Continued

Day Date _____ Coordinate Location _____ Miles Traveled _____

Weather _____

Events of the Day _____

Day Date _____ Coordinate Location _____ Miles Traveled _____

Weather _____

Events of the Day _____

Day Date _____ Coordinate Location _____ Miles Traveled _____

Weather _____

Events of the Day _____

Day Date _____ Coordinate Location _____ Miles Traveled _____

Weather _____

Events of the Day _____

Just How Cold Will It Be In Antarctica?

Lesson Title: Just How Cold Will It Be In Antarctica?

Illinois Learning Standards:

Language Arts:

Goal 3 – Writing: 3.A.1, 3.A.2, 3.A.3, 3.A.4, 3.B.1a, 3.B.2a, 3.B.3a, 3.C.1a, 3.C.2a, 3.C.3a

Goal 5 - Research: 5.A.1a, 5.A.2a, 5.A.3a, 5.A.1b, 5.A.2b, 5.B.1a, 5.C.1a, 5.C.1b

Mathematics:

Goal 6 – Number Sense: 6.C.1a, 6.C.2a, 6.C.1b, 6.C.2b, 6.D.2

Goal 7 – Estimation and Measurement: 7.A.1d

Goal 10 – Data Analysis and Probability: 10.A.1a, 10.A.2a, 10.A.3a, 10.A.1b, 10.A.2b, 10.A.3b, 10.A.2c, 10.A.3c, 10.B.1b, 10.B.2b, 10.B.1c, 10.B.2d

Science:

Goal 11 – Inquiry and Design: 11.A.1a, 11.A.2a, 11.A.3a, 11.A.1b, 11.A.2b, 11.A.3b, 11.A.1c, 11.A.2c, 11.A.3c, 11.A.1d, 11.A.2d, 11.A.1e, 11.A.2e

Goal 12 – Concepts and Principles: 12.E.1a, 12.E.2a, 12.E.1b, 12.E.2b, 12.E.3b

Social Studies:

Goal 17 – Geography: 17.A.1a, 17.A.2a, 17.A.2b

Objectives:

Students will be able to:

- Read a weather map to interpret local, regional and national weather.
- Record local weather information and describe changes over a period of time.
- Organize temperature data in Microsoft Excel.
- Create bar graphs using temperature data.

Materials:

- Microsoft Excel
- Internet Access
- Student Activity Sheet
- Pencil

Background:

People frequently react to the news of travels to Antarctica with the question, “How are you ever going to stand those extremely cold temperatures, especially in January?” In this lesson, students will use the Internet and Microsoft Excel to graph annual temperatures of their own city; Palmer Station Antarctica; and McMurdo Station, Antarctica. They will compare and contrast the temperatures of each of the cities and use Internet resources to explain the temperature of each in relation to proximity of the sun and longitudinal location.

Instructional Procedures:

- 1) Ask students the following question: “How do people stand the extremely cold temperatures in Antarctica, especially in January?” Discuss what average January temperatures are like in their city.
- 2) Using computers with internet access and Microsoft Excel, have students complete the lab procedure outlined on the student activity sheet.

Just How Cold Will It Be In Antarctica?

Student Activity Sheet

Name _____

Activity Questions:

1. What do you think the average (mean) temperature is during the month of January where you live? _____
2. What do you think the temperature will be in January at Palmer Station? _____
3. In January, do you think there will be much temperature difference between Palmer Station and McMurdo Polar Stations? _____

You are going to create a chart comparing the temperature of your city, Palmer and McMurdo Polar Stations. Follow the directions below.

4. Open a new spreadsheet page by clicking on the **Start** button on the lower left corner of your screen. Then select **Programs** and then **Microsoft Office** then **Microsoft Excel**.
5. You should now have a new spreadsheet. You want to save your document so select **File Save As** and open a new file and call it **Antarctica Weather Comparison Chart**.
6. Enter the following data. Fill in the following cells with each of the months.
A1 **Month**
A2 **January**
A3 **April**
A4 **August**
A5 **November**
A6 **Overall Average**
B1 **Type in the name of your city**
C1 **Palmer Station**
D1 **McMurdo**
7. Minimize the screen.
8. Open a new screen and go to the Internet. Go to **www.weather.com** and collect and record the mean (average) temperature for your city for January, April, August, and November of 2007 and enter the information in cells B2, B3, B4, and B5.
9. Go to **www.weatherunderground.com** and collect and record the mean temperature for Palmer Station, Antarctica for January, April, August, and November of 2007 and enter the information in cells C2, C3, C4, and C5. Make sure you use the same scale for temperature that you used for your city (Celsius or Fahrenheit).
10. Collect the same data for McMurdo Polar Station in Antarctica. Enter the temperature in cells D2, D3, D4 and D5.
11. Left click on cell B6. Next click on **Insert** and select **Function**. Double click on **Average**. Make sure the formula has B2:B5 and then click **OK**.
12. Repeat step #8 but use cell C6 instead of B6. The cell range should be C2:C5.
13. Repeat step #8 for use cell D6 instead of B6. The cell range should be D2:D5.
14. You will now create your chart (graph) by highlighting cells A1 through cell D6. Click on **Insert** and select **Chart**. Select **Column** as in the picture and click on **Next**.
15. The Chart Title will be **Average temperature**. Category (x) axis: **Months**. Value (Y) axis: **Temperature**.
16. Check as **Object In** and then click **Finish**.

Post Activity Questions:

17. Were your predictions correct? _____

18. Summarize your findings and include a discussion of why you think there are so many differences in the temperatures for each location. You may wish to conduct additional research to support your statements. Start with this website: <http://pao.cnmoc.navy.mil/pao/Educate/WeatherTalk2/indextemp.htm> for help.

Antarctica Movies

Lesson Title: Antarctica Movies: *Encounters at the End of the World*

Illinois Learning Standards:

Language Arts:

Goal 3 – Writing: 3.A.1, 3.A.2, 3.A.3, 3.A.4, 3.B.1a, 3.B.2a, 3.B.3a, 3.C.1a, 3.C.2a, 3.C.3a

Goal 4 – Listening and Speaking: 4.A.1a, 4.A.2a, 4.A.3a, 4.A.4a, 4.A.1b, 4.A.2b, 4.A.3b, 4.A.4b, 4.A.1c, 4.A.1d, 4.B.1b,

Science:

Goal 12 – Concepts and Principles: 12.E.1a

Goal 13 – Science, Technology and Society: 13.A.3b, 13.A.1c, 13.A.2c, 13.A.4c, 13.B.1a, 13.B.2a, 13.B.3a, 13.B.2b, 13.B.3b, 13.B.1c, 13.B.2c, 13.B.3c, 13.B.1d

Social Studies:

Goal 17 – Geography: 17.C.1a, 17.C.2a, 17.C.3a, 17.C.1b

Goal 18 – Social Systems: 18.A.2, 18.B.2a, 18.B.3a, 18.B.1b, 18.C.1

Objectives:

Students will be able to:

- Describe how humans have adapted to life in Antarctic extremes.
- Describe the kinds of research being done in Antarctica.
- Identify how interactions of individuals from different cultures can act cooperatively for the benefit of science.

Materials:

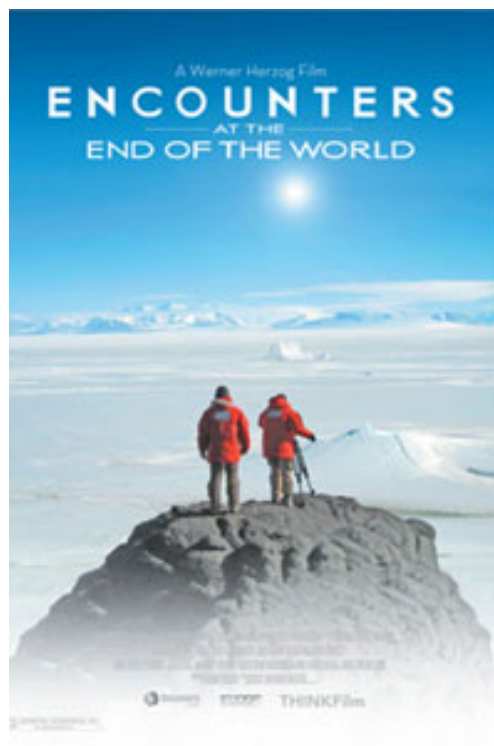
- *Encounters at the End of the World* DVD
- Student Activity Sheet
- Pencil

Background:

There is a hidden society at the end of the world. One thousand men and women live together under unbelievably close quarters in Antarctica, risking their lives and sanity in search of cutting-edge science. Now, for the first time, an outsider has been admitted. In his first documentary since *Grizzly Man*, Werner Herzog, accompanied only by his cameraman, traveled to Antarctica, with rare access to the raw beauty and raw humanity of the ultimate Down Under. *Encounters at the End of the World*, Herzog's latest meditation on nature, explores this land of Fire, Ice and corrosive Solitude.

Instructional Procedures:

- 1) Watch the film *Encounters at the End of the World*.
- 2) Instruct students to complete the questions on the student activity sheet.



Antarctic Movies: *Encounters at the End of the World*

Student Activity Sheet

Name _____

Activity Questions:

1. Give three reasons why people would want to travel to Antarctica. _____

2. Who is the director of the film? _____

3. What was the director's motivation for wanting to make this film? _____

4. Describe the kind of research/work that was captured on film: _____

5. Describe several ways in which humans have acclimated themselves to this environment. You can include in your answer: the kinds of food eaten, living quarters, clothing, safety training, etc..



**Suggested Books for
Children**

Bramwell, Martyn. 1998. *Polar Exploration: Journeys to the Arctic and Antarctic*. DK Publishing, New York, NY.

Kimmel, Elizabeth, C. 1999. *Ice Story: Shackleton's Lost Expedition*. Houghton Mifflin Publishing, New York, NY.

Kostyal, K.M. 1999. *Trail By Ice*. National Geographic Society, Washington, D.C.

Taylor, Barbara. 1995. *Arctic and Antarctic*. DK Publishing, New York, NY.

Suggested Books for Educators

Armstrong, Jennifer. 1998. *Shipwreck at the Bottom of the World*. Crown Publishing, New York, NY.

Myers, Walter, D. 2004. *Antarctica: Journeys to the South Pole*. Scholastic Press, New York, NY.

Roberson, Dennis. 2003. *Antarctica: Endangered Animals and Habitats*. Lucent Books, Farmington Hills, MI.

Suggested Websites

United States Antarctic Program

Information on USAP and its activities. Links for maps, images and video clips. The Antarctic Photo Library section contains hundreds of photos.

www.usap.gov

Scientific Committee on Antarctic Research (SCAR)

SCAR is charged with the initiation, promotion and coordination of scientific research in Antarctica. It also provides scientific advice to the Antarctic Treaty System. The site has a listing of facts, educational and information on various scientific working groups and specialists.

www.scar.org

70 South

Links to news sources, contributed items, and interesting or important Antarctic anniversaries for the current month. An award winning website, recognized as a leading independent news and information resource on Antarctica and other polar related topics. The site is dynamic and updated daily with the latest news and information on or related to Antarctica, and has an ever-increasing amount of reference and educational information. In addition, the site contains a virtual tour, photographs, video clips, a dynamic events calendar for future and past events with exhibit information, hundreds of categorized links and much more.

www.70south.com

Scott Polar Research Institute

Scott Polar Research Institute (SPRI) is the world's leading academic polar organization. This site is detailed and comprehensive. There are Kid's Pages including Polar Jokes.

<http://www.spri.cam.ac.uk>