POLAR TREC
Learning Resources

Details

Completion Time: Less than a week

Permission: Download, Share, and Remix

The Amazing Antarctic Trek

Overview

This versatile activity was inspired by my own Antarctic voyage (Lollie Garay, Oden Expedition 07) and The Amazing Race. As my students followed the journey through the Antarctic Seas on a USGS map, I realized what a great opportunity this was for them to "see" where I was in a part of the world so foreign to us. It also made me realize how little of the continent we knew about. Using lat/long coordinates and research skills, students can learn about the geography, history, and climate of this incredible continent in an engaging format. The format of this activity allows flexibility in modifying it to fit any Polar study.

Objectives

1. To enhance map skills using lat/long coordinates
2. To identify geographic locations on the continent of Antarctica and its seas
3. To provide an engaging mechanism for review or assessment at the end of an Antarctic study
4. To provide a research-based activity students would enjoy doing while learning about the geography/environment of Antarctica

Lesson Preparation

Version 1 – One-two class periods
Version 2 – Two or more class periods

Version 1

This version can be used as a pre/post assessment or for review. If using for review or post assessment, all the topics must have already been studied. All the information used for the questions and answers here came from Antarctica, written by Edward G. Atkins and Larry Engel under the auspices of and in cooperation with The Office of Polar Programs and the Informal Science Education Program, National Science Foundation. Teachers can modify the questions to fit the resources they use.

Materials

For all students:

- A USGS RADARSAT Image map of Antarctica -shows all of the geographic points I have included and is a large group-sized map. Quantity will depend on class/group size. I use 1 map for every 4-6 students and recommend laminating it. I actually cut it in half to fit our school's laminating machine and was able to match it up just fine!
- Wipe-off markers to identify locations.
- One copy of the questions. (attached) Copy of Teacher answer key (attached). These can be modified to your learning objectives.
- One copy of the Lat/Long key
- 30 envelopes or pockets labeled with the names of the geographic locations from the lat/long
- Index cards
- Tri-panel, poster board, etc. for displaying labeled envelopes. (optional)
- Version 1 Student Data Log

For Version 2:

- Access to internet
- Version 2 Student Data Log

• Cut out questions and glue to index cards- laminate for longer use.
• Label lower backside of envelope with location name from Lat/Long Key.
• Glue envelopes with front side back onto tri-panel, poster board, etc; or you may simply lay them on a table.
• Insert any question card inside.
• Make enough copies of Student Data Log as required. If you are using this as review, you may not need the Data Log.

Version 2
• Copy of Student Data Log for each student or team. You will need to make additional copies of the second page for each team.

Procedure
Version 1 (one-two class periods)
• Tri-panel or board with envelopes set up for easy access to students
• Distribute Student Data Logs and read over the instructions
• Students will work individually or in teams to find the locations given the Lat/Long
• When they identify the location, they will go to the corresponding envelope and read the question
• Answers to the questions will be written in the Log
• Completed Logs will be handed in as directed
• This version gives the teacher many options: to be done as a group aloud; to be worked in teams; to be timed for competition, etc. Teachers will determine how it is best used.

Version 2 (two or more class periods)
• This version can be used at any point in a study, but is optimal after students have been studying about the various research and methods used in Polar Studies. PolarTREC expeditions are a great way to introduce them to many research projects and methods!
• Distribute Student Data Logs and read over directions
• Assign work to partners or teams (remember they will have to share maps).
• As per directions, students will use the Lat/Long coordinates to mark the location on the map then record the name in the Log.
• For each location, they will give a brief description. Ex: ice shelf, volcano, research station etc.
• Next, they will find out about its history. Ex: when it was discovered or named, when it was established, etc.
• Based on what they have learned, they will propose the research they will do there and the methods they will use. Ex: Ice core drilling on the edge of the ice shelf to measure the presence of CO_2
• This version works well with middle school students working in competitive teams. Before they can proceed to the next lat/long, they have to show the teacher that they have included all information required. If not, they have to continue to work on it before they can advance! It's a race!

Learning Resources

Extensions

• My students suggested that I include "a task" they have to do along with the Log at each location - stay tuned for the modification!!
• This activity has many uses. Other ideas have been discussed in the lesson. I have also used this activity in family science events and teacher workshops. I'd like to know how you use it!!

Resources

• www.polartrec.com Arctic/Antarctic expedition experiences between teachers and researchers documented through photos and journals. Site includes additional resource information, links, and activities for Polar Studies.
• Maps – www.usgs.gov
• Antarctica, Edward G. Atkins Ph.D and Larry Engel in cooperation with the Office of Polar Programs and the Informal Science Education Program, National Science Foundation, 2001, Sesame Workshop.

Assessment

Version 1
• Will depend on use
• Communicated concept understanding
• Ability to find locations using Lat/Long and number of correct answers will determine points/grades if applicable
• Completion of Data Log if applicable
Version 2
• Completion of Data Log (see rubric attached)

Credit

Lollie Garay, PolarTREC Oden Expedition 07, lolgaray@gmail.com

Learning Resources

National Science Education Standards (NSES):

Content Standards, Grades 5-8

Content Standard D: Earth and Space Science
a. Structure of the earth system
b. Earth's history

Content Standard F: Science In Personal and Social Perspectives
b. Populations, resources, and environments
e. Science and technology in society

Other Standards:

TEKS (Texas-Science)
Version 1 – 5.9, 5.11A, 5.12A; 6.8C,6.12C; 7.12; 8.6C
Version 2 – 6.6C; 7.14; 8.12B, 14

The Amazing Antarctic Trek

Student Data Log Version 1

Name:

Directions:

- Using the Lat/longs given, find the locations on the Antarctic map.
- Mark them with a dot using the wipe-off markers.
- Write the name of the location on your data log
- Match the location on your map with an envelope bearing the same name.
- Write the number and answer to the question from the envelope in your log

LAT/LONG - ANTARCTIC TREK – A

61 03 S 54 50 W	
67 s 61 30 W	
70 S 75 W	
68 S 92 W	
74 33 S 99 42 W	
76 28 s 112 08 W	
74.32 S 109.12 W	
73 58 S 120 45 W	
80 S 140 W	
79 29 s 162 W	
78 36 S 163 43 W	
81 S 168 W	
82 93 S 172 5 W	
76 S 180 E	
76 55 s 166 5 E	

The Amazing Antarctic Trek

Student Data Log Version 1

Name:

Directions:

- Using the Lat /longs given, find the locations on the Antarctic map.
- Mark them with a dot using the wipe-off markers.
- Write the name of the location on your data log
- Match the location on your map with an envelope bearing the same name.
- Write the number and answer to the question from the envelope in your log

LAT/LONG - ANTARCTIC TREK – B

64.8 S 64.1 W	
77.49 S 38.02 W	
81 S 60 W	
71.40 S 23.39 E	
74 51 S 14 43E	
66 36 S 97 16 W	
78 4 S 106.9 E	
90 S 0 E	
85 S 170 W	
82 5 S 159 E	
80 S 162 E	
77 5 S 166.4 E	
72 18 S 170 16 E	
69 S 165 E	
66.7S 140 E	

Answer Sheet

Write the answers to your questions here. Be sure to write the question number. They will not be in order!

Question #	Answer

The Amazing Antarctic Trek

Student Data Log Version 2

Name:

Directions:

- Using the coordinates given, find the locations on the Antarctic map
- Mark the location with a dot on the map using the wipe-off markers
- Write the name of the location on your log and describe it (landform? Research station? etc)
- Find historical information about each location as listed in the Log (use the internet &/or any resource provided)
- Propose the type of research you might conduct here and what method (s) you would use.
- Get teacher approval before moving to next coordinate.
  Good Luck!!

Lat/Long - Antarctic Trek– A

61 03 S 54 50 W	
67 s 61 30 W	
70 S 75 W	
68 S 92 W	
74 33 S 99 42 W	
76 28 s 112 08 W	
74.32 S 109.12 W	
73 58 S 120 45 W	
80 S 140 W	
79 29 s 162 W	
78 36 S 163 43 W	
81 S 168 W	
82 93 S 172 5 W	
76 S 180 E	
76 55 s 166 5 E	

The Amazing Antarctic Trek

Student Data Log Version 2

Name:

Directions:

- Using the coordinates given, find the locations on the Antarctic map
- Mark the location with a dot on the map using the wipe-off markers
- Write the name of the location on your log and describe it (landform? Research station? etc)
- Complete information about each location as stated on the second page (use the internet &/or any resource provided)
- Propose the type of research you might conduct here and what method (s) you would use.
- Get teacher approval before moving to next coordinates.

Good Luck!!

LAT/LONG – ANTARCTIC TREK – B

64.8 S 64.1 W	
77.49 S 38.02 W	
81 S 60 W	
71.40 S 23.39 E	
74 51 S 14 43E	
66 36 S 97 16 W	
78 4 S 106.9 E	
90 S 0 E	
85 S 170 W	
82 5 S 159 E	
80 S 162 E	
77 5 S 166.4 E	
72 18 S 170 16 E	
69 S 165 E	
66.7S 140 E	

Location Name:

Describe the geography or place (landform-what type, research station? etc):

History (who discovered it, how was it named, etc):

What kind of research will you do there? (Describe the project and method/tools)
Ex: Ice core drilling to measure levels of CO_2 in the ice

Location Name:

Describe the geography or place (landform-what type, research station? etc):

History (who discovered it, how was it named, etc):

What kind of research will you do there? (Describe the project and method/tools)
Ex: Ice core drilling to measure levels of CO_2 in the ice

Assessment Rubric

Scoring:
3 – Complete and accurate
2 – Missing a few details
1 – Not enough information!
0 – incorrect

Team#	Location Name	Description	History	Science research proposed

Total Points: _____

Answer Keys

Lat/Long - Antarctic Trek Key – A

61 03 S 54 50 W	*Elephant Island*
67 s 61 30 W	*Larsen Ice Shelf*
70 S 75 W	*Charcot Island Wilkins, Ice Shelf*
68 S 92 W	*Bellingshausen Sea, near Abbot Ice Shelf*
74 33 S 99 42 W	*Hudson Mountains*
76 28 s 112 08 W	*Mt. Takahe*
74.32 S 109.12 W	*Amundsen Sea*
73 58 S 120 45 W	*Getz Ice Shelf*
80 S 140 W	*MacAyeal Ice Stream*
79 29 s 162 W	*Roosevelt Island*
78 36 S 163 43 W	*Bay of whales*
81 S 168 W	*Steershead Crevasses*
82 93 S 172 5 W	*Crary Ice Rise*
76 S 180 E	*Ross Sea*
76 55 s 166 5 E	*Beaufort Island*

LAT/LONG - ANTARCTIC TREK Key – B

64.8 S 64.1 W	*Palmer Station*
77.49 S 38.02 W	*Filchner Ice shelf*
81 S 60 W	*Henry Ice Rise*
71.40 S 23.39 E	*Sor Rondane Mountains*
74 51 S 14 43E	*Valkyrie Dome*
66 36 S 97 16 W	*Henderson Island, Shackleton Ice shelf*
78 4 S 106.9 E	*Vostok Station*
90 S 0 E	*Amundsen-Scott South Pole*
85 S 170 W	*Commonwealth Range Trans- Ant Mts*
82 5 S 159 E	*Nimrod Glacier*
80 S 162 E	*Byrd Glacier*
77 5 S 166.4 E	*McMurdo Station*
72 18 S 170 16 E	*Cape Hallett*
69 S 165 E	*Off the Pennell/Oates coast*
66.7S 140 E	*Dumont D'Urville*

1. How far is the closest continent to Antarctica?	2. What kind of wheels do planes use to fly in and out of Antarctica skiways?	3. What are the most common forms of transportation on the ice?
4. When was the first time (year) anyone saw Antarctica?	5. What is sea ice?	6. Why does Antarctica "double" in size each winter?
7. What kind of plane carries people to work on Antarctica from South America or New Zealand?	8. Why don't planes land on the ice in winter?	9. How do people in Antarctica communicate with the rest of the world?
10. How far from Antarctica is New York City?	11. If you are standing at the South Pole, which direction is North?	12. Why are there so many time zones in Antarctica?
13. How do they know what "time" it is in Antarctica if there are so many time zones?	14. Which is bigger- Antarctica or the US?	15. How much of Antarctica is covered by ice and snow? (percentage)
16. Where does the ice on Antarctica come from?	17. How thick is the ice on Antarctica?	18. True or false? The ice on Antarctica can move.
19. How much of an iceberg is under water? 30%, 50% or more?	20. How are icebergs formed?	21. Which gets colder, the seas or the land in Antarctica?
22. Antarctica is called the windiest place on Earth. How strong are the winds in mph?	23. What parts of your body are most in danger in temps that get 80 degrees below zero?	24. Where do we find most of the life in Antarctica?-inland or near the coasts?
25. There are 18 species of Penguins that live south of the equator. How many live in Antarctica?	26. Name one kind of Penguin that lives in Antarctica.	27. Name one kind of whale we can find in the Antarctic oceans.
28. Name a seal that lives in Antarctica.	29. What's the main difference between the geography of the Arctic and Antarctica?	30. True or false- There is an active volcano in Antarctica.

ANTARCTIC TREK ANSWER SHEET

1. Closest continent to Antarctica is South America, 650 miles away (New Zealand is 2000miles away)
2. They don't use wheels, they use skis!
3. Tractors and helicopters, with snowmobiles next.
4. 1820
5. Ice that forms and floats on the ocean surrounding Antarctica.
6. Because the sea ice forms a barrier 30-900 miles wide around the continent.
7. A C130 military cargo plane.
8. Because of the darkness and the temperature (very cold!)
9. By using the internet and satellite phones. Satellites and modern technology make this possible!
10. 8,850 miles
11. Every direction!
12. Because all the time zones of the world come together at the South Pole.
13. They use Zulu (Greenwich Mean time) the time zone that runs through England so if its noon in England, its noon at Antarctica!
14. Antarctica is as big as the US and Mexico combined!- 5,400,000 square miles.
15. 98% is covered by ice and snow, the other 2% is a dry valley.
16. Any snow that falls rarely melts-new snow piles on older snow, packing the snow beneath it until it becomes ice. This has been going on for millions of years!
17. Scientists say the ice can be 3 miles thick or about 15,000 ft deep.
18. True, the ice flows from the center of the continent to its edges and passes through mountains as glaciers.
19. 85%
20. When glaciers get to the sea, ice breaks off forming icebergs.

21. The land.
22. Winds can gust up to 200 mph!
23. Hands, feet, face-we lose a lot of heat through them.
24. Near the coasts where oceans meet the land.
25. Four different species.
26. Emperor, Gentoo, Chinstrap, or Adele
27. Orca, minke, humpback, blue, sperm, or Finn
28. Weddell, Leopard, Ross, crabeaters
29. 29. The Arctic is ice on an ocean surrounded by land (continents). The Antarctic is land with ice on it surrounded by ocean.
30. True -Mt. Erebus