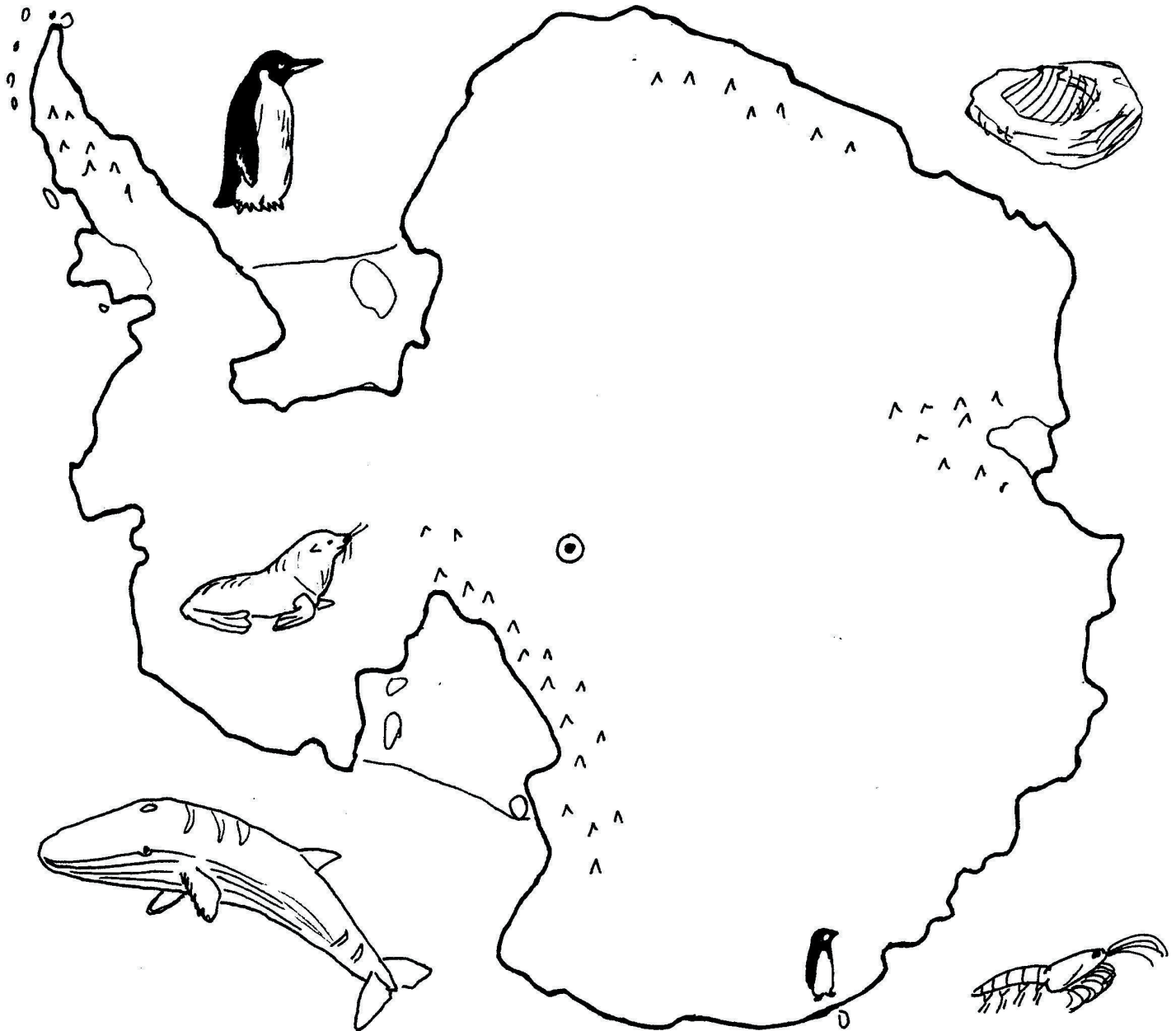


SCIENCE ADVENTURES IN ANTARCTICA



AN ORIGINAL GAME BY ELLEN J. MCHENRY © 2000



ABOUT ANTARCTICA:

Antarctica is the coldest, stormiest, windiest, driest, and most remote place on Earth. So why would anyone want to go there?! Thousands of people go there every year, some as scientists, others as tourists. Some of the scientific stations (McMurdo, for example) have a community of over a thousand people. Most scientists go there just during the sunny summer months (October through March). Because of the tilt of the Earth, it is during these months that the Southern hemisphere receives the most sun. During the May, June, and July the Antarctic is completely dark. Staying on through these months is referred to as "wintering over" and is only for the very hardy.

The frigid ocean waters around Antarctica are surprisingly full of life. The waters teem with krill, fish, penguins, whales, and seals. All of these marine organisms are dependent upon microscope plankton, mostly diatoms, that turn the sunlight into food, just like green plants do. The sediment at the bottom of the Antarctic waters is rich in both organic and inorganic nutrients.

Antarctica is protected from commercial and military exploitation by the Antarctic Treaty of 1961. A group of representatives from all of the major nations got together and agreed that Antarctica would not be owned by anyone, but would belong to all of mankind, and would be used only for scientific purposes. Some nations have been given the responsibility for overseeing certain parts of Antarctica, but these areas do not actually belong to them. Human beings are the only non-native species that are allowed on the continent (sorry, no dogs).

Navigators first discovered Antarctica in the early 1800's, although its existence seemed to have been known as early as time of the ancient Greeks. The first person to set foot on the continent was probably the French explorer Jules Dumont d'Urville, in 1841. By the late 1800's, explorers were determined to find the exact location of the South Pole. The first team to successfully make the trip was a Norwegian team led by Roald Amundsen. Only a month later, a British team led by Robert Flacon Scott also arrived at the pole, only to find the Norwegian flag already flying. Unfortunately, Scott and his team all died on the return trip. The invention of the airplane allowed much easier access to Antarctica. Richard Byrd was the most famous polar pilot. Nowadays, airplanes come and go from Antarctica all the time.

SET UP:

- 1) Cut the black strips off the sides of the four map pieces. Assemble the map (tape the seams on the back using something stronger than Scotch tape, such as clear packaging tape). You may want to color code some things on the map, such as making the dots for the bases red, the mineral symbols yellow, etc. You can color it as much or as little as you want, just so that the words are all visible and readable.
- 2) Cut out the six picture squares and glue one on each side of the die.
- 3) Cut apart the TIME WARP cards and put them in a stack.
- 4) Cut apart the scientist cards (biologist, meteorologist, etc.) and sort them into six their six different types (with the OLOGIST sides up).
- 5) Cut apart the nationality cards and put them in a stack.
- 6) Cut around the larger circles on the clear plastic sheet, so that you have four plastic pieces that look like this:



You may want to use permanent markers of different colors to trace over the rings so that each player has a different color.

INTRODUCTORY COMMENTS:

This game is what I call a "free style" type game. There is no set track or path to follow. There may be times when you have to use your common sense to figure out where to go or what transportation to take. If a problem comes up with a certain card and you are uncertain about the plan of action, just decide what makes sense, and go with it. If you need to make a slight change on one of the task cards in order to have the game make more sense to you, go ahead and change it. The goal of this game is to learn about Antarctica and to absorb its geography into your mind while enjoying yourself!

HOW TO PLAY:

- 1) Each player draws a nationality card. If that country has more than one base, the player may choose which base to start on.
- 2) Each player then decides what type of scientist to be and draws a card from that pile. (You may make the game longer by choosing two or more cards. A one-card game should only take about 10-15 minutes to play, possibly less, depending upon the players and the luck of the rolls.)
- 3) Here are the rules for how the die works:

STORM: You can't go anywhere. (Note: For one of the meteorologist cards, you actually need to roll storm.) Storms are a big, big problem in Antarctica. Antarctica is the stormiest place on Earth!

AIRPLANE: This is your long-range transport. You take this from base to base. You MUST land at a base. You CANNOT take this plane out on the ice to a collection spot. When you use an airplane, you move your plastic circle to where you go, making sure the central dot is right on the base where you want to be.

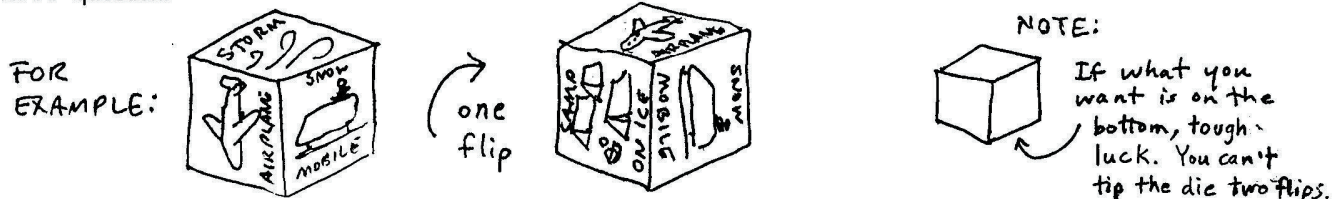
HELICOPTER: This is your medium range transport. You will need a helicopter to go to collection sites that are outside of your small ring but inside your large ring. If your target is outside the large ring, you must figure out how to get closer. You may have to take a plane to a closer base. If your target is inside the small ring, you need a snowmobile, not a helicopter. Sorry, but helicopters don't do super shorts runs that can be accomplished by snowmobile. When you use a helicopter, you go out and do your collection and come back all in one turn. No need to move your plastic circle.

BOAT: Your boat is limited to within your large ring. If the symbol is touching the outer ring at all, it counts as within range. When you roll boat, you go out and do your collection and come back to base all in one turn, so that you are able to turn over your science task card on that turn. Boats can only be taken from bases.

SNOW MOBILE: This is your short range transport. These operate within your small ring. You go do your task and come back to camp all in one turn.

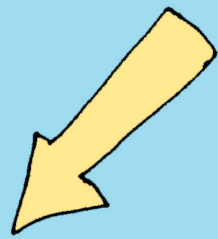
TENTS (CAMP ON THE ICE): These can be used when there is no other way to reach your destination. For example, if you need to set up a telescope out away from any base, you will need to use a camp. Camps take two turns: the camp symbol will get you out there (you must actually move your center dot and put it on where you want to be) then you must roll a helicopter to get you back to your base. You may only establish a camp at a spot within your outer ring, within range of a helicopter ride.

- 4) You may use any technique you want to decide who goes first. Just don't fight about it!
- 5) The first person rolls the die. If it happens to be exactly what he needs, he moves accordingly. If it is not what he needs, here is a second chance option: You may turn one of the vertical faces up IF you can correctly answer a TIME WARP question.



If you choose the wrong answer for the TIME WARP question, your turn is over, but you learned something about Antarctic history, right? Remember what you learned for the next time that card comes up!

- 6) When you have completed a mission you simply turn that card over to show that it is done. When all your missions are done, you will need to roll an airplane to get out of Antarctica and back to your country. The winner is the first person to complete all their missions then roll an airplane. The other players may want to keep playing so that they can accomplish their missions, too.



To
SOUTH
AMERICA

→ Drake's
Passage →

Dorcas (ARG)
Signy S. Orkney
(UK)
Islands

Scotia Sea
Elephant Island

Esperanza (ARG)
Higgins (CHILE)
James Ross Islands

Faraday (UK)

Alexander Island

Weddell Sea

Larsen Ice Shelf

Ronne Ice Shelf

Ellsworth Land

Bellinghousen Sea

ATLANTIC

Neumayer (GER)

Halley (UK)

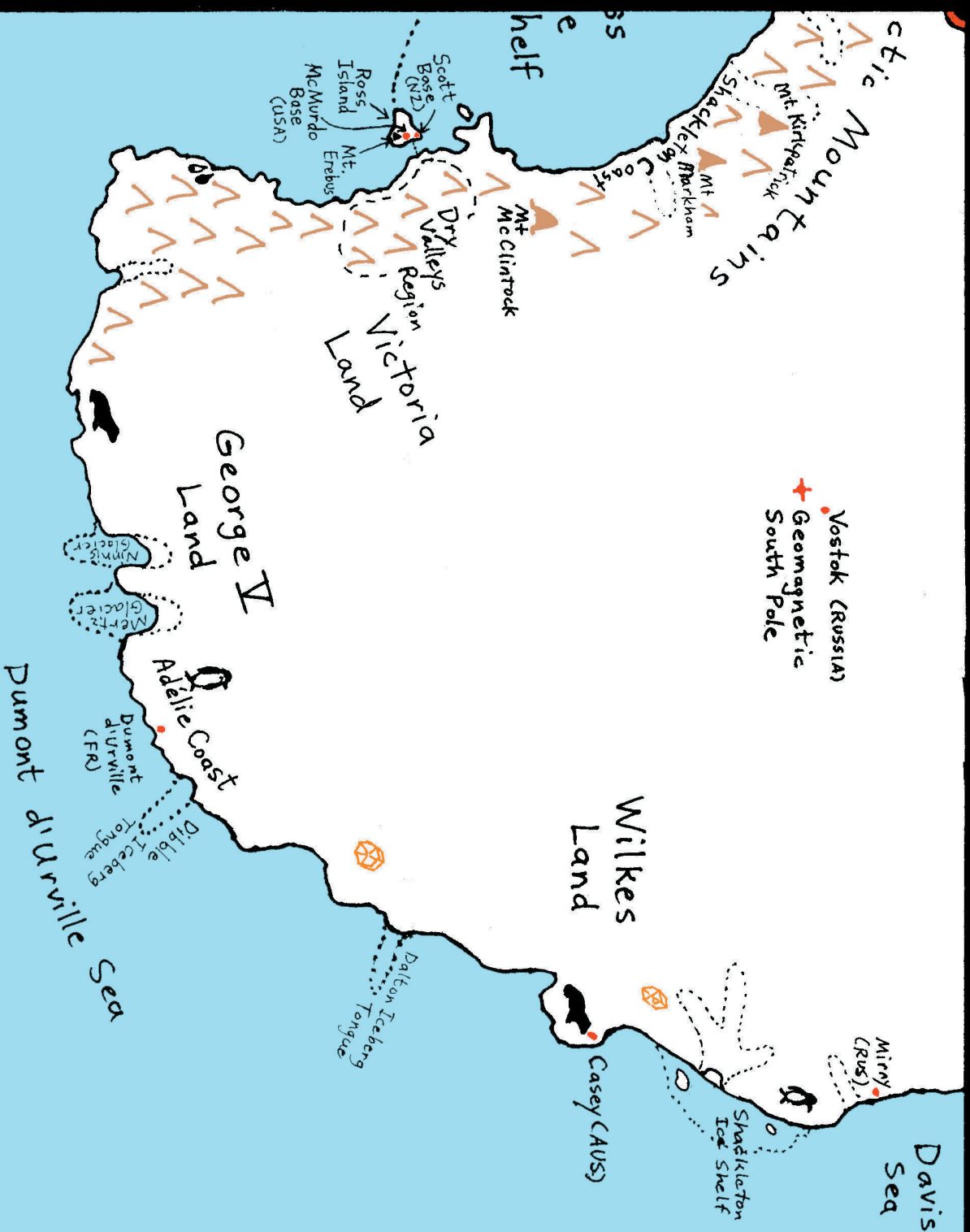
Coats Land

Berkner Island

Vinson Mtn.

Trans

TO
AUSTRALIA





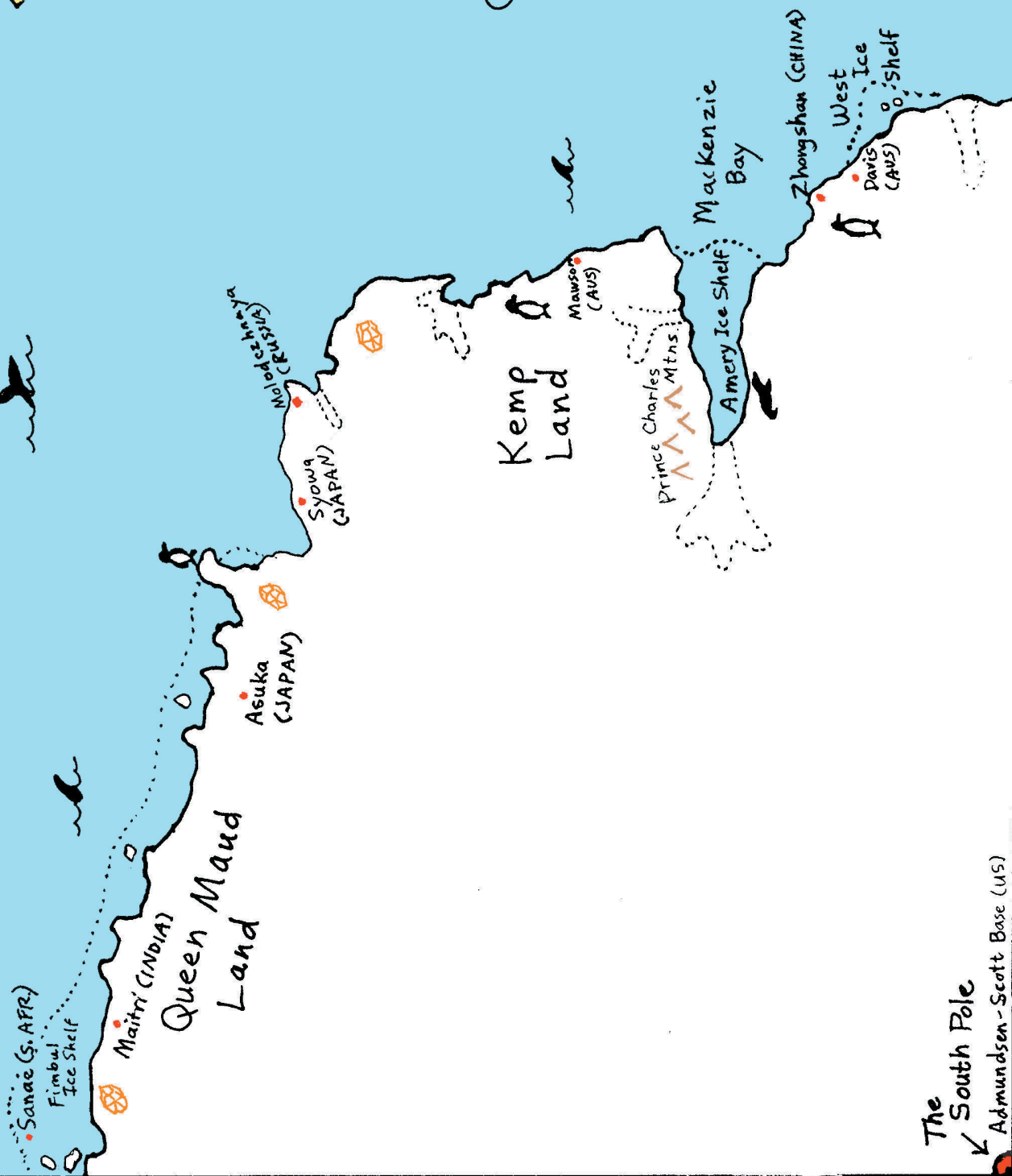
PACIFIC OCEAN

TO
HAWAII
(a long ways!!)

OCEAN



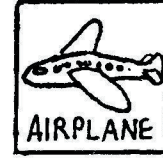
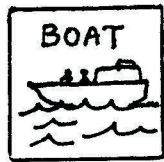
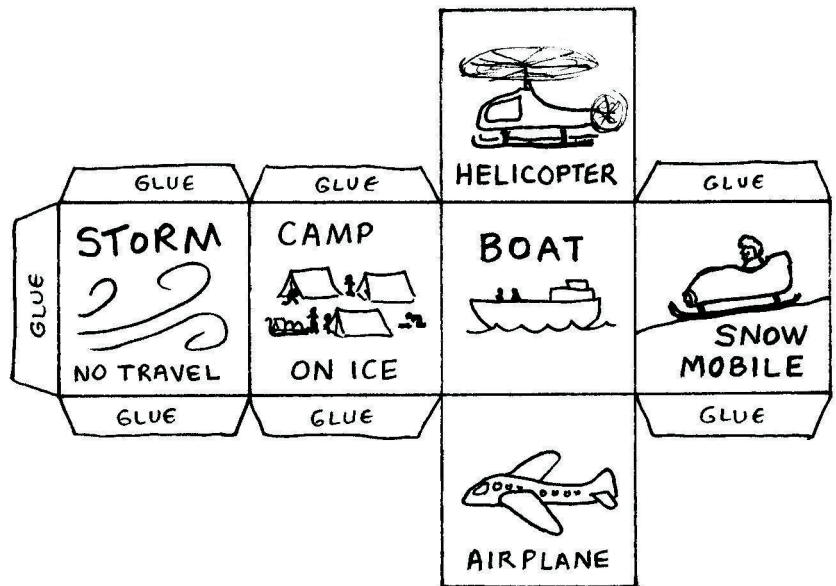
INDIAN OCEAN



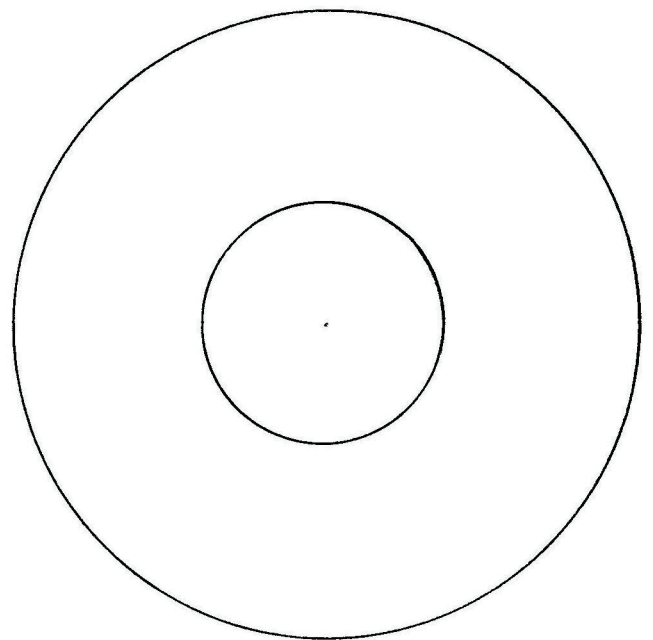
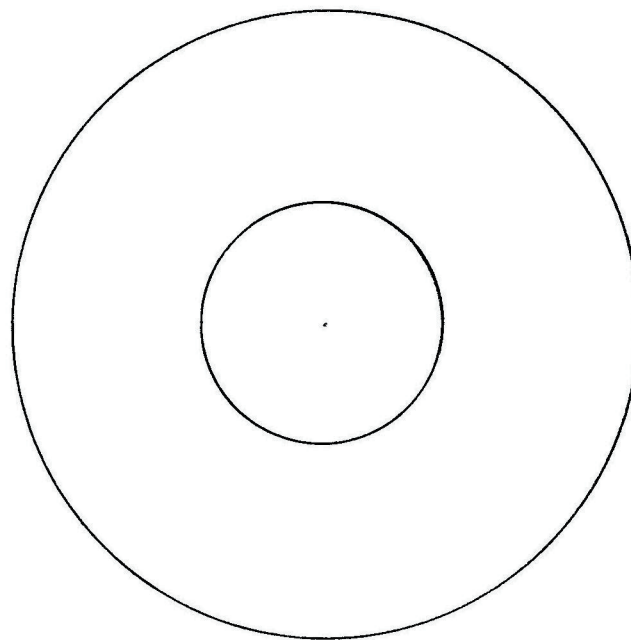
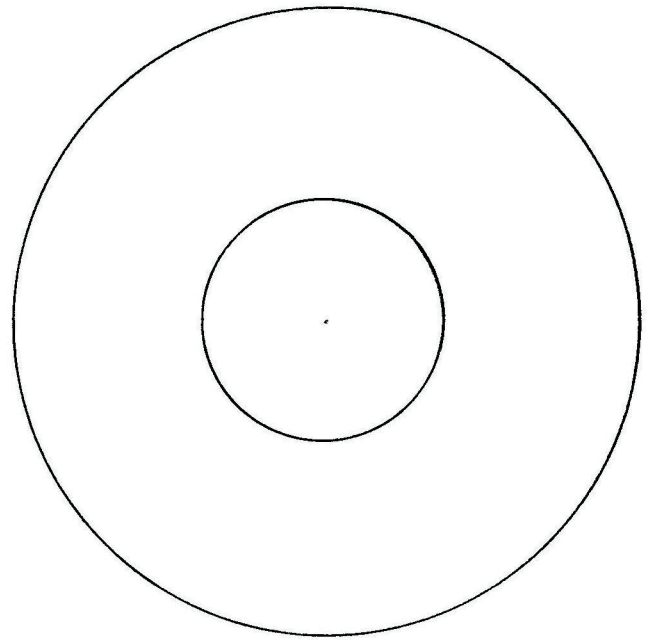
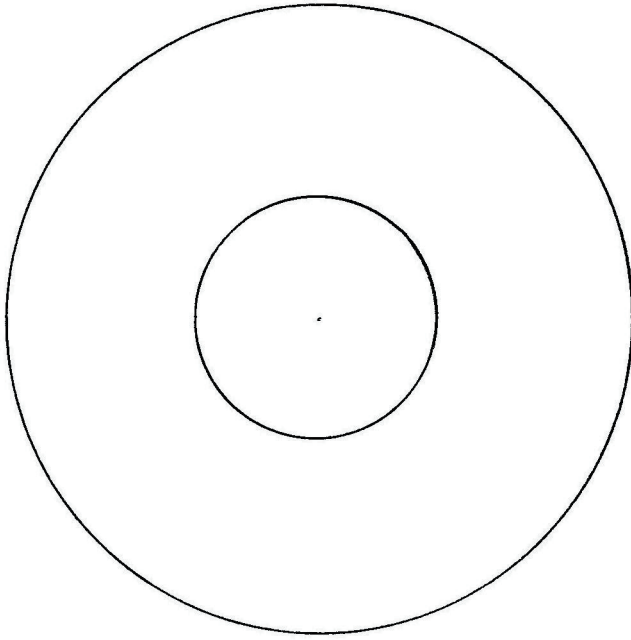
The South Pole
✓ Admundsen-Scott Base (US)

COPY THIS PAGE ONTO
WHITE CARD STOCK

The die at the right may be cut and assembled, or the individual squares below may be glued to the sides of 3/4" or 1" blank wooden die (available in most craft stores).



RUSSIA	UNITED STATES
AUSTRALIA	INDIA
NEW ZEALAND	ARGENTINA
CHILE	SOUTH AFRICA
GERMANY	JAPAN
CHINA	UNITED KINGDOM

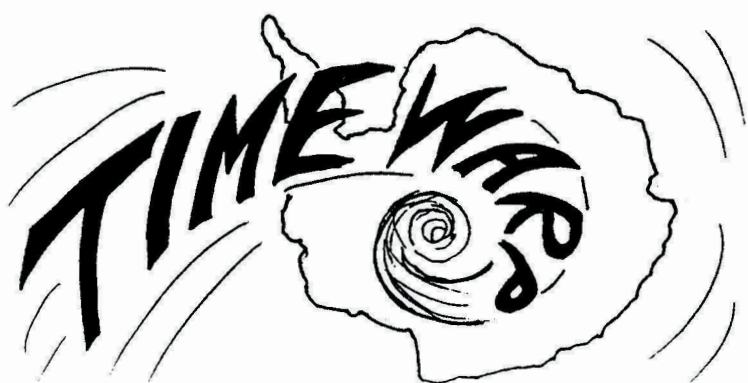


Copy this sheet onto a clear transparency, then cut out the circles. (If you are unable to copy onto a transparency, then find a sheet of thin plastic (even plastic from a product you bought at the store) and trace the circles onto it.) In order for the players to keep track of which circle is theirs, use permanent markers to trace around the outside of each circle. Make sure the center dot is visible.

NOTE ABOUT COPYING THE FOLLOWING PAGES:

The Time Warp cards and the scientist task cards come with a pattern for putting on the top side (the reverse side to the words). This is optional if you feel that it is beyond the capabilities of your printing machines. It shouldn't be too hard to accomplish if you simply make three copies of the patterned pages, then put them back into your printing tray so that the questions then get printed on the backs. (However, the game will still work if you don't put the patterns on the top of the cards. Perhaps you could make the Time Warp cards one color and the task cards another color? You could even handwrite the type of scientist on the top sides of the task cards.)

NOTE: All these pages are simply scans of my original ("analog") patterns, and I apologize for any imperfections. Some day I will get around to making a completely digital copy of the game, but in the mean time I hope this one will work well enough for you.



The date is January 1997. American and British geologists are studying the rocks in the dry, snow-less valleys in the mountains near McMurdo Base. They are very excited about something they've discovered. What is it?

- A) A boulder the size of the Empire State Building.
- B) Rocks that contain large amount of gold and silver.
- *C) Rocks containing fossils of sea creatures.

It is May, 1934. Spring may have sprung in the Northern hemisphere, but here in Antarctica, the coldest and darkest time of the year is approaching. A very brave man is spending the whole Antarctic winter all alone in a hut on the Ross Ice Shelf. Who is this that can stand this kind of solitude?

- A) Ernest Shackleton
- *B) Richard Byrd
- C) Robert Scott

The date January 17, 1912. An exploration team has just arrived at the South Pole, hoping to be the first team in history to stand at the Pole. Their hearts are broken when they see the Norwegian flag flying, proof that another team beat them to it. Who is the leader of this heart-broken team?

- A) Ernest Shackleton
- B) Roald Amundsen
- *C) Robert Scott

The year is 1841. A British explorer has just discovered an island. This explorer has already named and discovered many features of Antarctic, including Mount Erebus (named after his ship), Victoria Land (named after his queen), and McMurdo Bay (named after a lieutenant on his ship). The island he has discovered will eventually bear his name. What is this explorer's last name?

- A) Roosevelt
- B) Berkner
- *C) Ross

The date is January, 1912. A team of explorers have made the trip to the South Pole and are the return trip back to their base camp. Unfortunately, not a single one of them makes it back to camp. They all die during the journey. Which leader is responsible for this disaster?

- A) Roald Amundsen
- *B) Robert Scott
- C) Ernest Shackleton

It is December 30, 1902. Robert Scott, Ernest Shackleton, and Edward Wilson have just used dog sleds to reach a point further south than any other humans have ever gone. They are at about 82 degrees South latitude. They must turn around here, however, and head back to their base on McMurdo Island. How many more degrees south would they have to have gone to make it to the South Pole?

- *A) 8
- B) 18
- C) 98

The date is the 1840's. Three explorers from three different countries have set out to map out the coasts of Antarctica. James Ross is sailing for Britain, Jules Dumont d'Urville is sailing for France. Who is sailing for the United States?

- A) Robert Scott
- B) Theodore Roosevelt
- *C) Charles Wilkes

The date is January, 1840. A French explorer has become the first person to set foot on the continent of Antarctica. He is greeted by little penguins, whom he decides to name after his wife, Adelie. Who is this explorer?

- *A) Jules Dumont d'Urville
- B) James Ross
- C) Richard Byrd

The year is 1773. A famous navigator has become the first person in history to cross the imaginary latitude line we call the Antarctic Circle. Even though he was so close to Antarctica, he did not see it and it remained undiscovered. Who was he?

- *A) Captain James Cook
- B) Ferdinand Magellan
- C) Sir Francis Drake

The year is 1578. A famous navigator has crossed the horrible, perilous passage between the tip of South America and the tip of the Antarctic Peninsula. These treacherous waters now bear his name. Who was he?

- *A) Sir Francis Drake
- B) Robert Scott
- C) James Cook

The date is New Year's Day, 1916. A member of Shackleton's shipwrecked crew is out skiing on the ice. Suddenly an animal lunges up out of the water and nearly takes the man back down with him. This animal is one of the dangers for humans in Antarctica. What is this animal?

- A) a whale
- *B) a leopard seal
- C) a polar bear

The year is 1773. A famous navigator has become the first person in history to cross the imaginary latitude line we call the Antarctic Circle. Even though he was so close to Antarctica, he did not see it and it remained undiscovered. Who was he?

- *A) Captain James Cook
- B) Ferdinand Magellan
- C) Sir Francis Drake

The date is April 24, 1916. Ernest Shackleton has just left most of his crew on an island at the tip of the Antarctic Peninsula, while he and a few of his hardest sailors make a dangerous journey to South Georgia Island to get a large rescue ship. On which island has Shackleton left his crew?

- A) Roosevelt Island
- *B) Elephant Island
- C) Alexander Island

The date is some time in the very distant past (as in thousands of years ago). Antarctica does not look at all like it does today. What is different about it?

- *A) It is green and living, not frozen and cold.
- B) It is much smaller.
- C) It is covered with water.

The date is January 19, 1915. Ernest Shackleton's ship, the *Endurance*, has just become permanently stuck in the ice on the Weddell Sea, preventing him from achieving his goal. What was Shackleton's goal?

- *A) Be the first person to hike all the way across Antarctica
- B) Be the first person to reach the South Pole
- C) Be the first person to discover oil in Antarctica

The date is the 1840's. Three explorers from three different countries have set out to map out the coasts of Antarctica. James Ross is sailing for Britain, Jules Dumont d'Urville is sailing for France. Who is sailing for the United States?

- A) Robert Scott
- B) Theodore Roosevelt
- *C) Charles Wilkes

The year is 1961. The Antarctic Treaty has just been signed by members of an international council. What does this treaty say?

- A) That Antarctic will be divided up between the nations that first discovered it.
- *B) That Antarctica doesn't really belong to any country and that it will only be used for scientific research, never for industry or military purposes.
- C) That Antarctica will become its own nation and the scientists that visit it will be given temporary citizenship.

The date is January, 1912. A team of explorers have made the trip to the South Pole and are the return trip back to their base camp. Unfortunately, not a single one of them makes it back to camp. They all die during the journey. Which leader is responsible for this disaster?

- A) Roald Amundsen
- *B) Robert Scott
- C) Ernest Shackleton

We are in the 1840's. Ships are approaching the shores of Antarctica for the first time. They encounter flat-topped icebergs floating in the frigid ocean. Where do these icebergs come from?

- *A) They are broken-off pieces of the ice shelf that surrounds the continent.
- B) They are the remains of the large winter snowfall.
- C) They have come up from the bottom of the Antarctic waters.

The date is December 14, 1911. An exploration team traveling by skis and dog sleds has just reached the South Pole, making history. They are the first humans in history to make it all the way to the South Pole. The leader of the team has just planted the flag of his home country, Norway. Who is this leader?

- A) Robert Scott
- B) James Ross
- *C) Roald Amundsen

It is January, 1909. Douglas Mawson and some other explorer/scientists have just discovered something in the interior of the continent (not near any coast). What is it?

- *A) the south magnetic pole
- B) the south geographical pole
- C) a glacier

It is February, 1823. An English sailor has just sailed to 74 degrees south latitude, the farthest south anyone has yet reached. His ship is able to penetrate a sea that now bears his name. Who is this English sailor?

- *A) James Weddell
- B) Thaddeus von Bellinghausen
- C) Sir Francis Drake

It is May 1934. Richard Byrd is all alone in the Antarctic. It is dark all day and all night. The sun set back in April and hasn't been seen since. When will Richard Byrd see the sun again?

- A) in June
- B) in July
- *C) in August

It is December 1821. A young British sailor named Nathaniel Palmer is sailing further and further south, looking for good places to hunt seals. He accidentally discovers a small group of islands and decides to name them after some islands near his home country. What are these newly discovered islands?

- A) the Alexander Islands
- *B) the South Orkney Islands
- C) the South Sandwich Islands

You will notice as you play this game that almost all of the dates are either in November, December, January, or February. Why?

- A) Because sailors are superstitious and only sail during certain "good luck" months.
- B) Because during the other months of the year the sailors had to accomplish their money-making trips to places like the Spice Islands.
- *C) Because these months are the summer months in Antarctica.

It is January 26, 1820. Fabian Gottlieb von Bellinghausen is the captain of a Russian Antarctic expedition. As far as he knows, he is the first human to see the area of Antarctica west of the peninsula. He assumes everything is unnamed and he starts naming things as he sees them. One of the features he named is Alexander Island. Who is this island named after?

- A) his son
- B) the first mate on his ship
- *C) his king, Czar Alexander

The year is 1904. Carl Larsen lands on South Georgia Island, which is just a little north of the South Orkney Islands, just slightly off our map. Soon many people will come to South Georgia to help out in a booming business. What is this business?

- A) drilling for oil
- *B) killing and processing whales
- C) building ships

It is the year 1957. The United Nations has establish this to be an "International Geophysical Year," a time during which many nations will participate in making great strides in mapping and visiting many isolated areas of the globe, including Antarctica. As part of this International Geophysical Year, an airfield is built at McMurdo Base. What kind of a runway will the planes land on?

- A) asphalt made from local Antarctic rock
- B) wood brought from Australia
- *C) ice

It is November 1892. Captain Carl Larsen lands on the Antarctic Peninsula on Seymour Island. He discovers some amazing scientific evidence. What is it?

- A) He discovers an abandoned camp, proving that someone had been there before him.
- B) He discovered a flock of penguins, proving that birds could survive the Antarctic climate.
- *C) He discovered fossils of warm climate creatures, proving that Antarctica used to have a warmer climate.

It is January, 1947. The United States Navy has organized an expedition that they call Operation Highjump. They plan to send a small army of men to Antarctica to do extensive mapping. How many men are sent?

- A) 47
- B) 470
- *C) 4700



MARINE BIOLOGIST



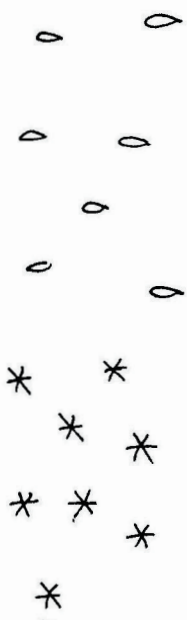
BIOLOGIST



BIOLOGIST



METEOROLOGIST



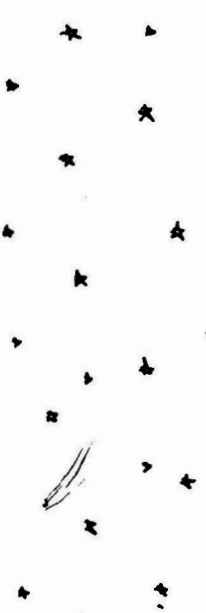
GEOLOGIST



GEOLOGIST



ASTRONOMER



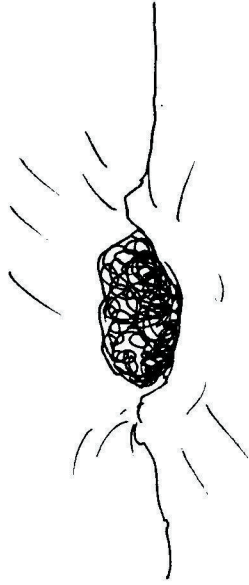
ZOOLOGIST



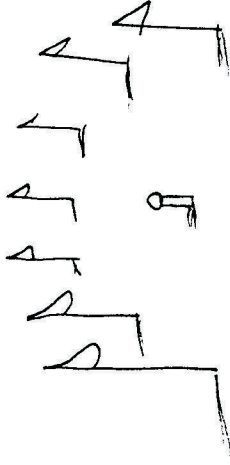
ZOOLOGIST



You are studying meteorites that have fallen onto Antarctica. There is a great specimen you must see right at the geomagnetic South Pole. (This is where all compasses will take you if you follow "South" all the way.)




You are studying the ozone layer of the atmosphere. Every year the ozone layer over Antarctica drops, and you are trying to discover why this is. You need to run your tests right at the South Pole.

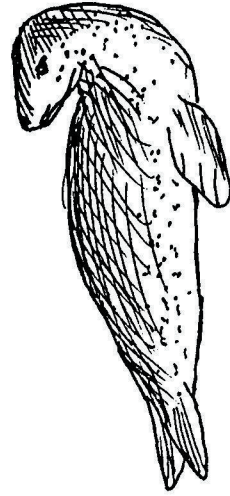



There is a gold ball on a pedestal marking the exact pole. It is surrounded by flags of many nations.

You are studying the elephant seal. Your destination is Elephant Island.



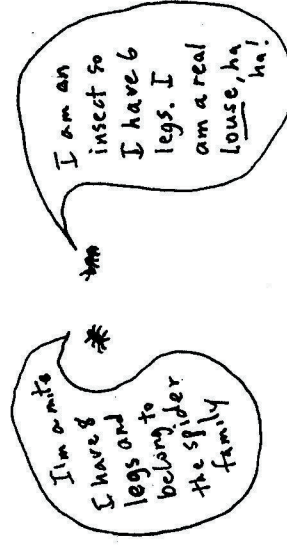
You are studying leopard seals. (Watch out they don't snatch you, though!) Your can find leopard seals at any of the seal symbols: 



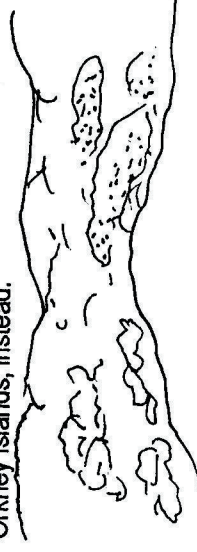
You are studying the orca, or killer whale." They cruise the waters all around Antarctica. You can accomplish your research goal at any site marked with the killer whale symbol: 



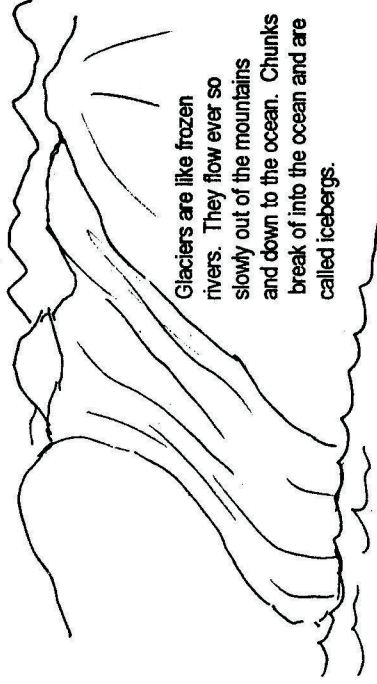
You are studying these Antarctic animals: mites and lice. The only place they are found is on the Antarctic Peninsula. You will need to use the facilities of one of the research stations on the peninsula.



You are studying Antarctic lichens. A lichen is a fungus living in symbiosis (cooperation) with some type of algae. These two organisms are so inseparable that we know them simple by one name: a lichen. The only place habitable enough for plants is the tip of the Antarctic Peninsula. There are a couple of research stations there that can assist you. Or, you may choose to go to the South Orkney Islands, instead.



You are studying the minerals that glaciers carry down out of the mountains and into the sea. Go to any glacier to do your research.

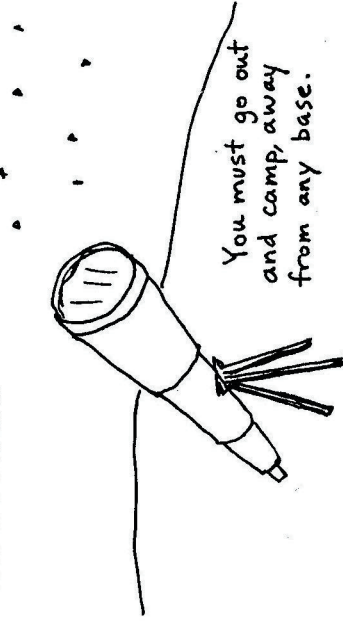



Glaciers are like frozen rivers. They flow ever so slowly out of the mountains and down to the ocean. Chunks break off into the ocean and are called icebergs.

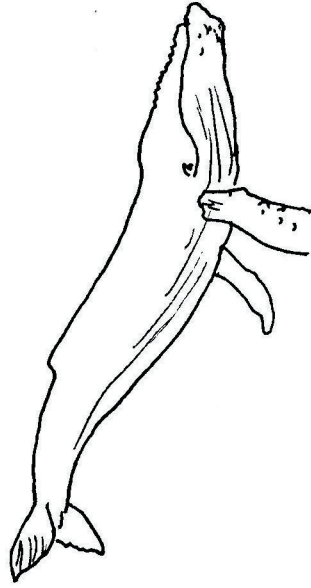
You are studying the fine ash that covers much of the dry valley region of the Transantarctic Mountains. The ash is from ancient volcanoes.



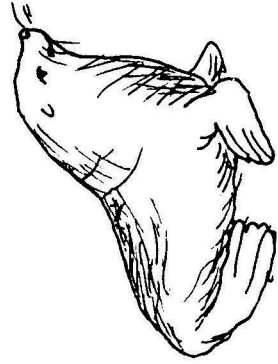
You are studying distant galaxies. You have come to Antarctica to study the Southern sky. You hope to discover galaxies that have never been seen before.



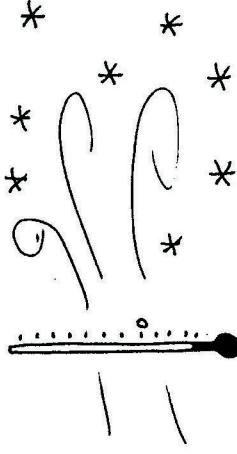
You are studying humpback whales. These whales are noted for their "songs." You may find great specimens at any whale symbol: 



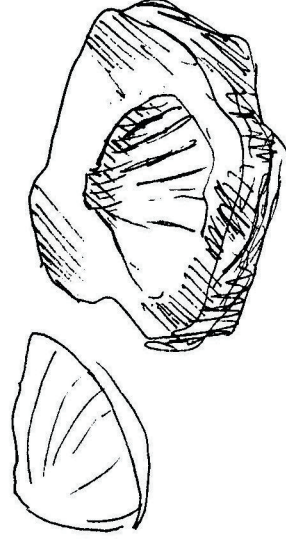
You are studying the Antarctic fur seal. You will find excellent specimens on the Ronne Ice Shelf, near the Weddell Sea.



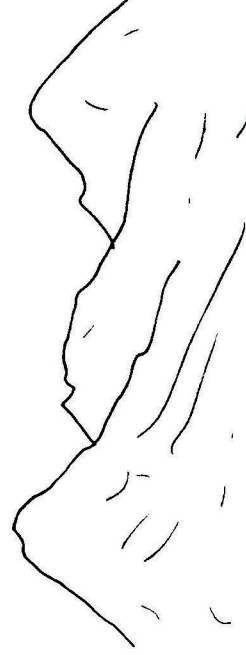
You are in Antarctica as part of a team that predicts the weather. The scientists here need to have up-to-the-hour forecasts so that they don't get caught out in the terrible Antarctic storms. (Your job will be accomplished when you roll "Storm.")



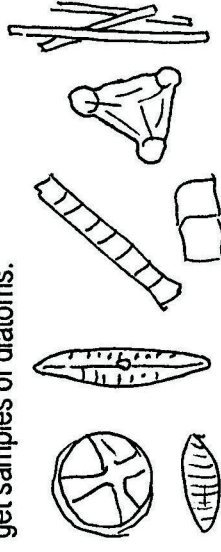
You are studying shell fossils found in the dry valley region of the Transantarctic Mountains.



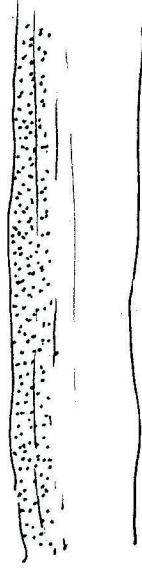
You are studying the low-grade coal deposits in the Transantarctic Mountains, right near Mount McClintock.




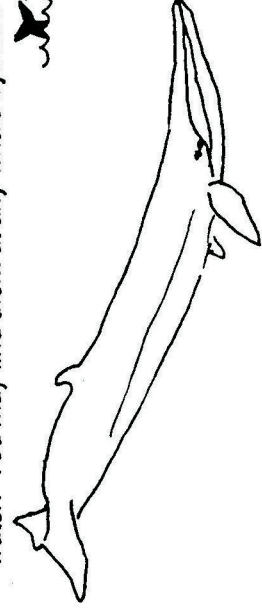
You are studying diatoms, a type of single-celled algae that has a glass-like shell. Diatoms are one of the few kinds of algae that can survive in the 30°F water of Antarctica. They use the sun to make their own food, just like green plants do. You must use a boat to get samples of diatoms.



You are studying a fascinating ecosystem that consists of only three species of microscopic organisms: a bacteria, an algae and a fungus. These three organism live together in the top layer of porous rocks. They can be found in the dry valleys region of the Transantarctic Mountains (which is a short distance from Ross Island).



You are studying fin whales. These whales are baleen-type whales, which use a big filter in their mouth to catch very small, even microscopic, plants and animals in the ocean water. You may find them at any whale symbol: 



You are studying the cosmic radiation background in the universe. Studying and measuring the amount of this radiation might give you clues about the history of the universe. Antarctica is an excellent place for astronomical observation. Your research should be set up just a short snow-mobile ride away from a base.




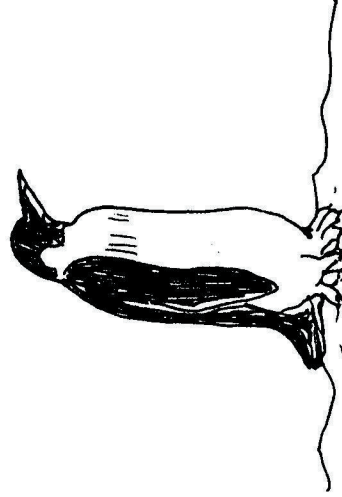
You are studying wind speeds and accumulated snowfall in Antarctica. You will need to set up a data collection station right at your own base (no need to travel at all), plus one other base on the other side of Antarctica.



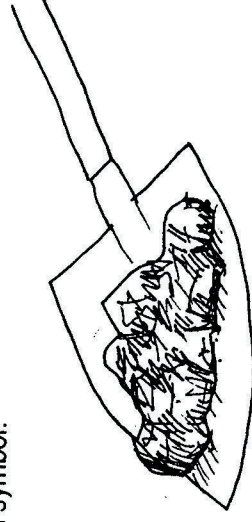
You are studying krill, a very small crustacean that is eaten by many larger ocean creatures. Since baleen whales eat krill, go to one of the whale symbols to find a supply of krill.



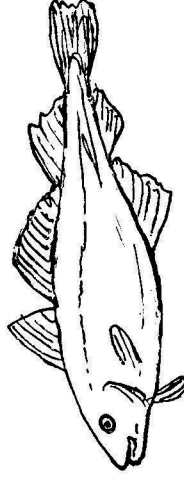
You have come to study Emperor penguins. The Emperor penguin sites are marked with a penguin symbol:  (but not the Adelia coast)




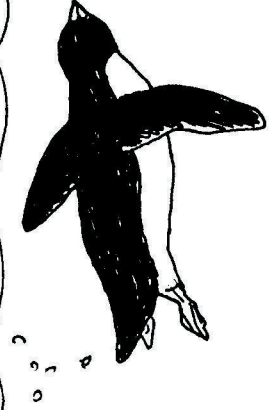
You are studying mineral deposits found in different parts of Antarctica. You may collect minerals at any of the sites marked with a mineral symbol:



You are studying a type of fish called the cod. They are one of the few species of fish that can thrive in waters that are below 32°F. Their bodies make natural anti-freeze to keep them from freezing. You will need to go out in a boat to catch some cod.



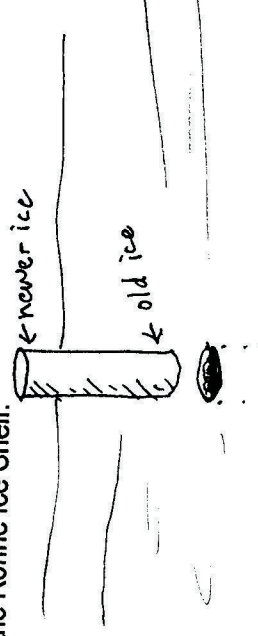
You have come to study Adelle penguins. You must go to the penguin symbol  on the Adelle Coast.



You are a biologist, but you are on vacation! You have come to visit a friend who is a vulcanologist (someone who studies volcanoes). You go out with your friend to see a volcanic mountain, Mount Erebus.



You are studying ice. You are drilling down deep into the ice pack to take out a long core sample to study. It may give you clues about the Earth's history. You will need to establish an ice camp out on either the Ross Ice Shelf or the Ronne Ice Shelf.



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