

Australian Antarctic Division's

ANTARCTIC NEWS

Written and Illustrated by **Coral Tulloch**

Antarctica is a continent of immense power and beauty. It is the only place on Earth that belongs to everyone and we are all responsible for its future.

An island continent isolated from other lands by the stormiest ocean on Earth, Antarctica's cold, salty waters are home to some of the world's smallest and largest creatures. Its massive ice sheet, under continuous movement, covers all but a few mountain peaks. Here, fierce winds form and make their rapid descent back to the ocean.

In the summer, when the nights are as light as the days, all the colours of the Earth can be seen reflected in the ocean, ice and sky. In winter, when it is always dark and the temperature drops to the lowest on Earth, the waters around Antarctica freeze and often the sky dances with the light of the aurora australis.

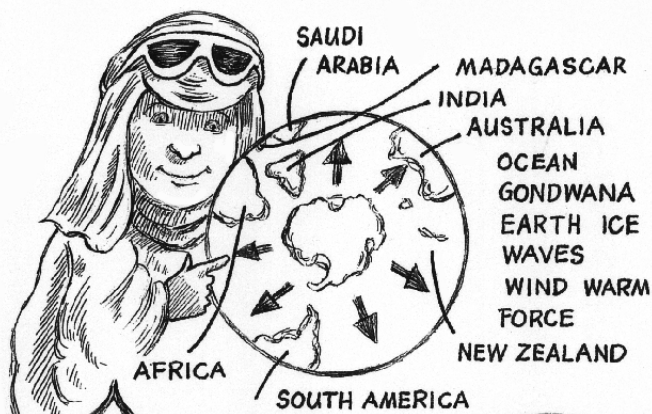


It is not just a frozen land at the end of our world, but a powerful force for our climate on Earth. By studying Antarctica, we have learnt and are learning so much more about our planet and its systems.

Nations have come together to protect Antarctica's great wilderness and have declared it a natural reserve devoted to peace and science. All nations in Antarctica work cooperatively and exchange knowledge. Exploitation of its resources is banned and no military activity is allowed.

Find out more about Antarctica by reading this publication and taking part in the activities.

Have fun!



In the word puzzle opposite you can find all the words listed above.

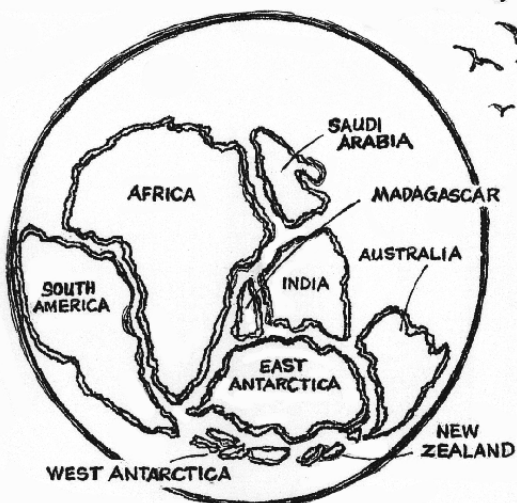
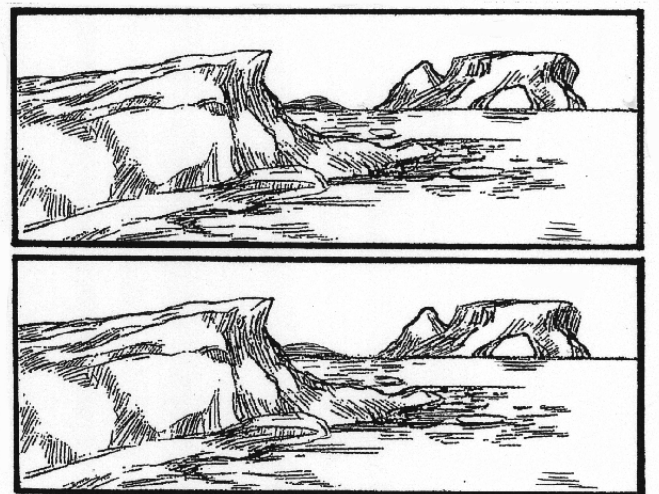
I'm a geologist, a scientist who studies the physical composition, structure and the processes occurring within the Earth.

Antarctica was once the centre of a large mass of land (made up of all the continents and countries above) called Gondwana.

Forces within the Earth caused Gondwana to break apart. Land masses drifted north and left Antarctica where it is today. See below (fossils) for more information.

N	G	O	N	D	W	A	N	A	S
E	K	P	L	M	S	V	O	E	A
W	I	N	D	S	O	U	C	M	U
Z	A	N	B	C	U	I	N	A	D
E	I	V	D	A	T	P	I	D	I
A	K	F	E	I	H	L	K	A	A
L	C	Z	T	S	A	B	Z	G	R
A	P	W	A	R	M	O	H	A	A
N	S	R	T	F	E	T	F	S	B
D	C	S	F	O	R	C	E	C	I
B	U	I	L	A	I	I	O	A	A
A	V	O	E	R	C	A	C	R	F
F	T	O	C	E	A	N	O	A	P

Antarctica experiences two main seasons, winter and summer. This is because of its global position and the angle that the Earth rotates around the sun. During winter Antarctica faces away from the sun and experiences dark days and nights. In summer it faces the sun, so is bathed in light. The further south, the more the extreme. In summer much of the heat is not absorbed but is reflected back into space by the ice. You can colour in the landscapes below to make a dark winter and a light summer.



GONDWANA

The land masses are only what we see above the ocean surface. (Look up the tectonic plates of Earth). You can enlarge this map of Gondwana, paste to cardboard and float on a tray with some water to move the pieces of land apart.



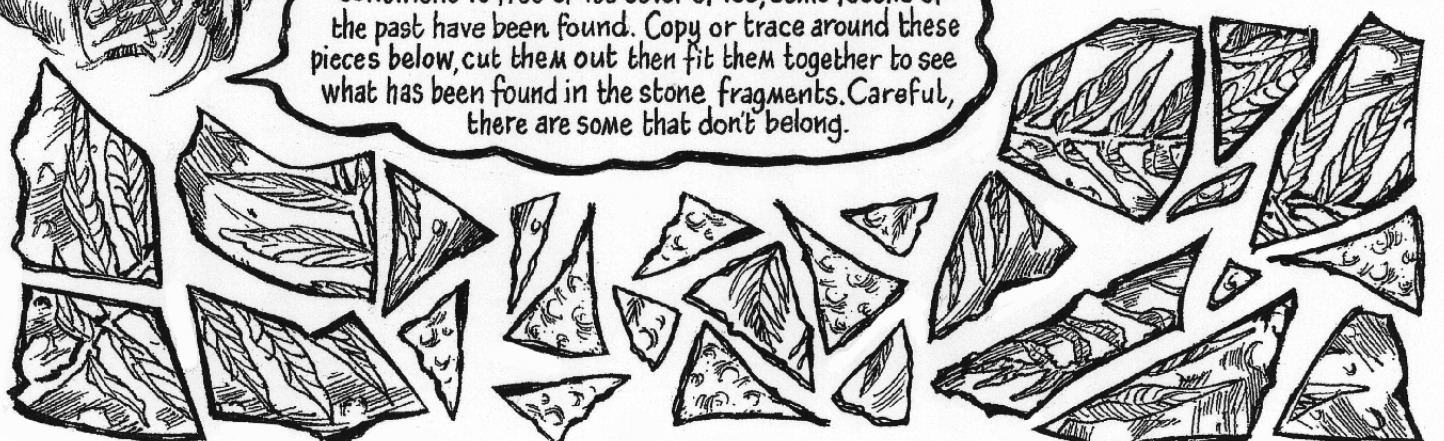
When Antarctica was a part of Gondwana it enjoyed a much warmer climate and was covered by forests, supporting varied animal life. The land masses of east and west Antarctica were isolated and cooled by the surrounding ocean. Snow began to fall and became solid ice, covering the land and forests.

Although so little of the continent is free of its cover of ice, some fossils of the past have been found. Copy or trace around these pieces below, cut them out then fit them together to see what has been found in the stone fragments. Careful, there are some that don't belong.

S I E F L O S D S I

R E F N

Unjumble the letters above to reveal your find.





I'm a glaciologist. I study the ice sheet, the formation and movement of ice and glaciers. This is a core of ice taken from the ice sheet. We drill to release a core of ice. The layers of snow, compacted to ice is like the rings of growth, of time in a tree. The falling snow traps time. Information stored in the ice tells us about past conditions and atmosphere of the Earth. There is more information below. You can also find the underlined words in the puzzle below.

As SNOW falls its WEIGHT, over time, compresses it into compacted snow called FIRN. The snow eventually compresses to ICE. The ice that covers Antarctica is called the ICE SHEET. The weight of ice is so heavy it has forced some of Antarctica's LAND, including some MOUNTAINS, below SEA LEVEL. Some mountain peaks are visible above the ice. These are called NUNATAKS. The ice pushes down and moves across Antarctica, spreading out to the COAST. A great RIVER of moving ice is called a GLACIER. Some glaciers end as a high CLIFF of ice. Some FLOW out and FLOAT on the OCEAN, still attached to the land. This is called an ICE SHELF. The ice connects the large land MASS of East Antarctica with some smaller groups of islands, now ISLANDS covered in ice, known as West Antarctica - creating one large continent.

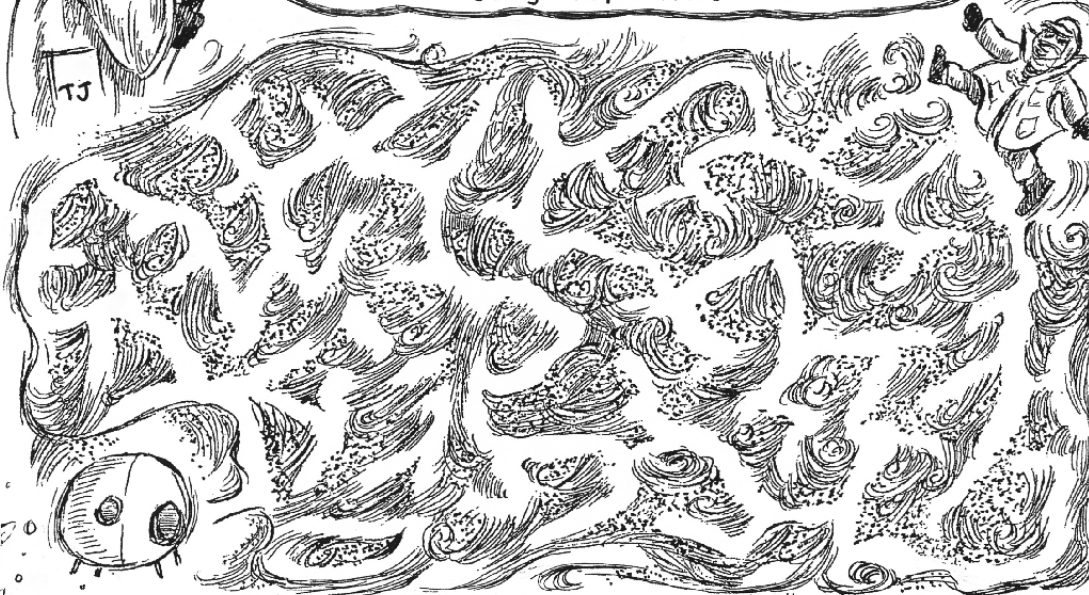
Every snowflake is different. Look up magnified snowflakes to see their intricate patterns and shapes as well as how snow falls.

I	P	E	N	F	L	O	A	T	N	O
P	C	K	O	R	I	V	E	R	U	L
I	R	E	I	I	S	N	O	W	N	I
M	S	F	B	C	O	A	S	T	A	S
O	E	I	C	E	S	H	E	E	T	L
U	A	R	P	S	R	O	H	B	A	A
N	L	N	K	H	I	G	U	N	K	N
T	E	O	C	E	A	N	S	E	S	D
A	V	I	G	L	A	C	I	E	R	S
I	E	P	O	F	I	L	A	N	D	H
N	L	M	A	S	S	F	L	O	W	L
S	W	E	I	G	H	T	F	B	D	C



Weather Watchers

I'm a meteorologist. I study the effects of our atmosphere, the weather and trends in temperature and wind. We also release weather balloons that carry electronics which collect information. The balloons are full of hydrogen, a flammable gas. To protect against an accidental spark, we wear hooded suits and look a little like wizards. The person below is in a blizzard (a fierce wind, blowing snow). Can you help them to the shelter?



the A factor

When the weather is extreme, the ocean can turn wild, winds tumble snow and blow furiously; it can be impossible to do anything. Antarctica's weather and isolation controls everything. It is referred to as the 'A factor'. Keep a record for a week to compare the weather where you live to an Antarctic station's weather.

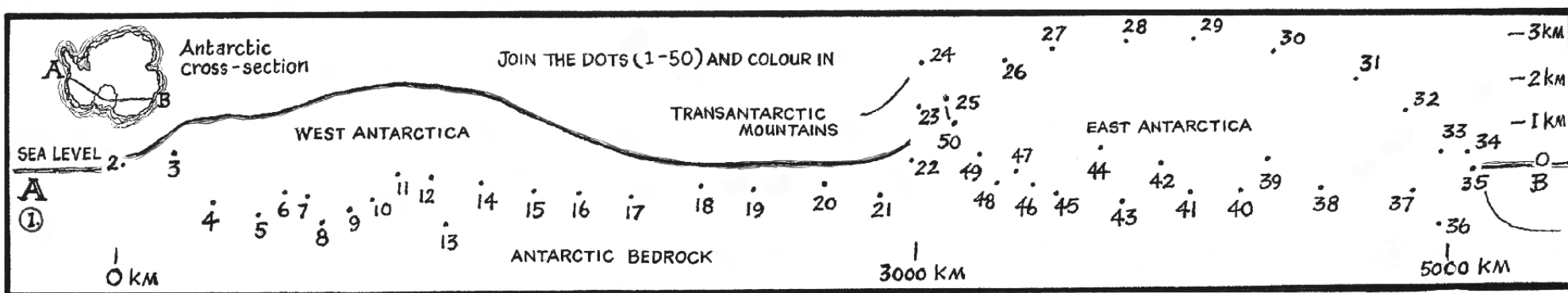


ANTARCTIC FACTS

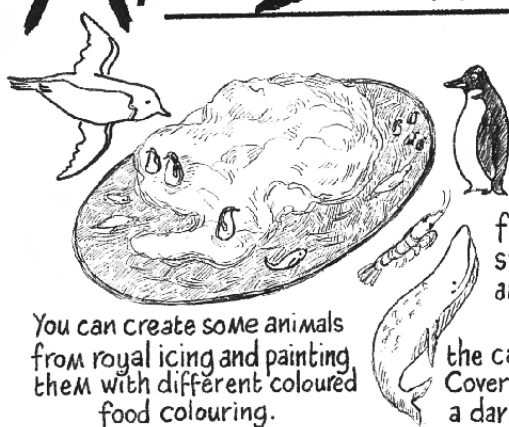
The area of Antarctica is _____ million km². (J+C)
In winter the area of sea ice that surrounds the continent reaches _____ million km². (J+J)
The Antarctic ice sheet holds _____ % of the total ice in the world. (I×J)
The Antarctic ice sheet also holds _____ % of the total fresh water in the world. (GJ)
The average thickness of the ice sheet is _____ km. (B.D)
In East Antarctica, its thickest point is _____ km. (D.G)
The lowest temperature was recorded at the Russian station of Vostok in 1983. It was a reading of _____ °C. (H.I.F)
The strongest wind speed recorded was _____ km/h. (C×100+20)
Lakes occur in some areas, some _____ times saltier than seawater. (J+C)
Bottom waters in some lakes, warmed by the sun, can reach _____ °C. (J×C+E)



A	B	C	D	E	F	G	H	I	J
1	2	3	4	5	6	7	8	9	10



An Edible Antarctica



Imagine Antarctica is like a big chocolate cake with a little tail on its end. Then imagine pouring a big bowl of vanilla icing on top of the cake. Watching the icing flow across the cake and down its sides is like the ice moving across Antarctica.

You can make an edible Antarctica with some help from family and friends. All you need is a square chocolate cake, a map of Antarctica (to fit the size of the cake), whipped cream (or icing as above). Place the map over the cake and using a skewer, prick holes through the map to the cake to trace the outline.

Lift off the map and cut out a rough Antarctic shape. Transfer the cake to a large plate. Use the left over pieces to create the Antarctic peninsula. Cover the entire cake with cream or icing. You could cover the plate with foil to create a dark ocean and place on dots of cream to create sea ice or icebergs.

Classroom Antarctica

Curriculum aligned teaching resources for educators

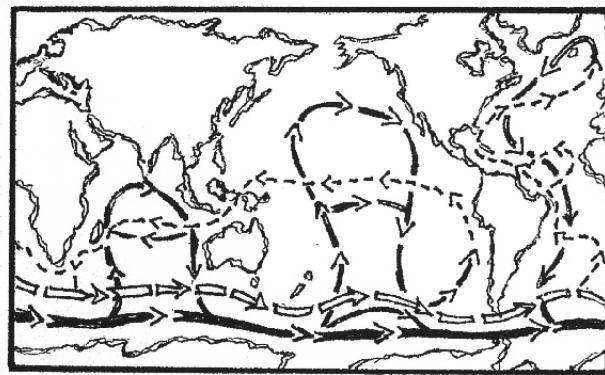


classroom.antarctica.gov.au



The Southern Ocean

I'm an oceanographer. I study the oceans, their global circulation and their importance to the world's climate. The Southern Ocean surrounding Antarctica, is the only ocean that circles the globe without being blocked by land. The warmer waters and the air above the world's great oceans, meet with the cold Antarctic water and air. This is called the Antarctic Polar Front. Can you unjumble the words below to name these oceans?



The Antarctic Circumpolar Current (ACC) is the largest ocean current in the world. It carries cold, salty, nutrient rich water from Antarctica through to other ocean basins on Earth. Circling from the west to the east, it is also driven by some of the strongest westerly winds on Earth. Water also circulates and moves in columns and in layers. See the diagram above of the ACC. You can also colour this and keep. For more information — antarctica.gov.au

① LAITTANC ② FICPIAC ③ ANDINI



Oceans influence our world's climate, storing heat, carrying it thousands of kilometers and eventually releasing it back into our atmosphere. They also carry moisture and store carbon dioxide. This storage, movement and release takes many, many years and are a major factor in the weather of Earth. The largest seasonal change in the world happens in the Southern Ocean. The surface water around Antarctica freezes in winter and a lot breaks up and melts in summer. You can draw and colour in your own ocean to ice panel below. Remember ice can reflect all colours.



→ → → → → Deep Current
→ - - - - - Upper Level Current



STORMY OCEAN

Wild seas and wild winds create enormous swells, waves and ocean spray.



GREASE

The first ice crystals form and the surface of the ocean looks oily, like grease.



PANCAKE ICE

Ice crystals bump and rub up against each other and form into pancake looking shapes.



LARGE FLOES

Pancake ice joins up, snow falls, water freezes to this and creates large floes of surface ice.



RAFTED ICE

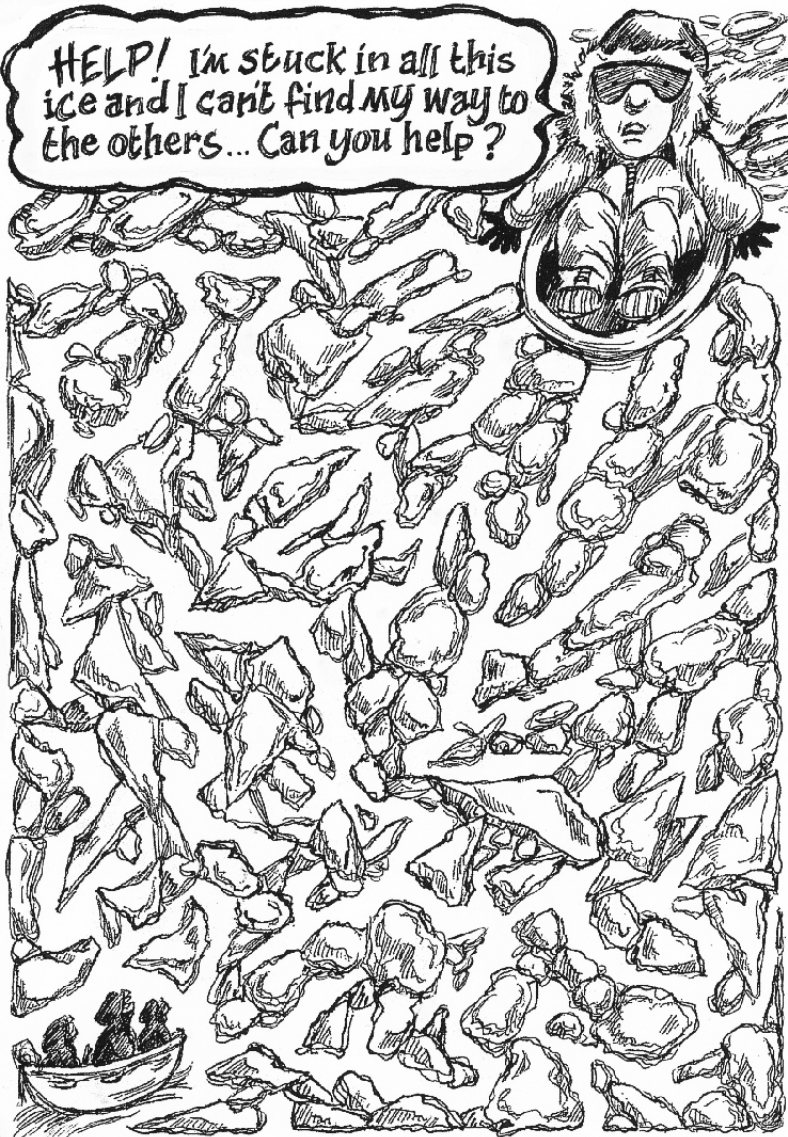
Floes thicken and the ocean swells under them can force them to rise up, as ice pushes against ice.



ICEBERGS

From the movement of the land ice and a pounding ocean, ice calves from the continent to form icebergs.

HELP! I'm stuck in all this ice and I can't find my way to the others... Can you help?



Science in the Freezer



Antarctica is not easy to get to. The first recorded history of the continent came from explorers heading south in search of new lands. The news of the abundance of animal life, such as whales and seals, led whalers and sealers to sail south. They hunted the animals for their blubber and skins (fur). Many voyages also made observations, maps, took records of the sea conditions, weather and the land they discovered. Eventually science became the main purpose for most expeditions to Antarctica. (For further information on this — log on to — antarctica.gov.au).

We now understand the enormous importance of Antarctica, its islands and the Southern Ocean to our global environment, and as indicators of climate change. So many scientists carry out extremely valuable research and data collection, from biology and ecology to the atmosphere and space.

A voyage across the Southern Ocean on research ships like Australia's RSV Nuyina allows for atmospheric and marine science projects to be undertaken.

What do you think you would like to study on a Southern Ocean voyage?

The words below are listed in the puzzle opposite. Can you find them?

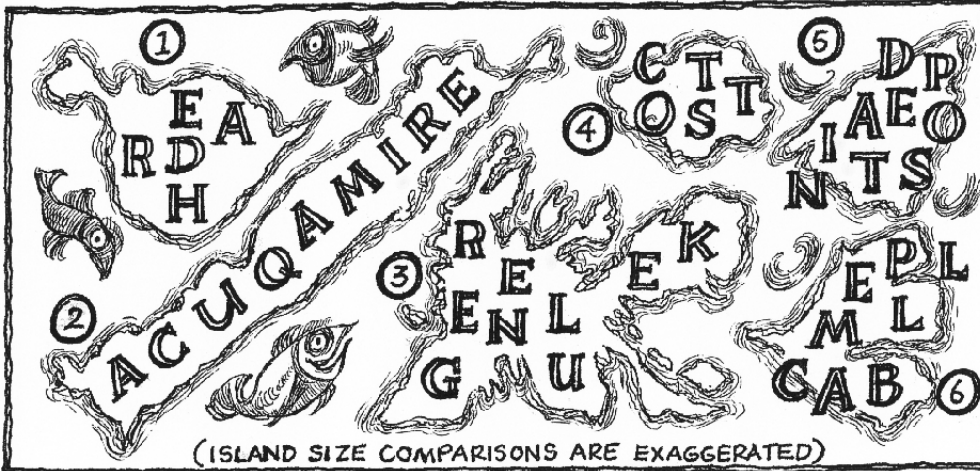
• weather • atmosphere • biology • medicine • space • ocean • ecology • physics • science • plants • animals • ice • cold • wind • aurora • air

A	U	R	O	R	A	K	P	I	O
N	T	P	H	Y	S	I	C	S	C
I	O	M	E	D	I	C	I	N	E
M	B	I	O	L	O	G	Y	D	A
A	A	L	P	S	S	C	W	I	N
L	W	I	N	D	P	P	O	G	Y
S	I	E	R	M	N	H	A	L	O
E	C	O	L	O	G	Y	E	C	D
I	P	W	E	A	T	H	E	R	E
Y	A	I	S	C	I	E	N	C	E
P	L	A	N	T	S	O	C	I	K

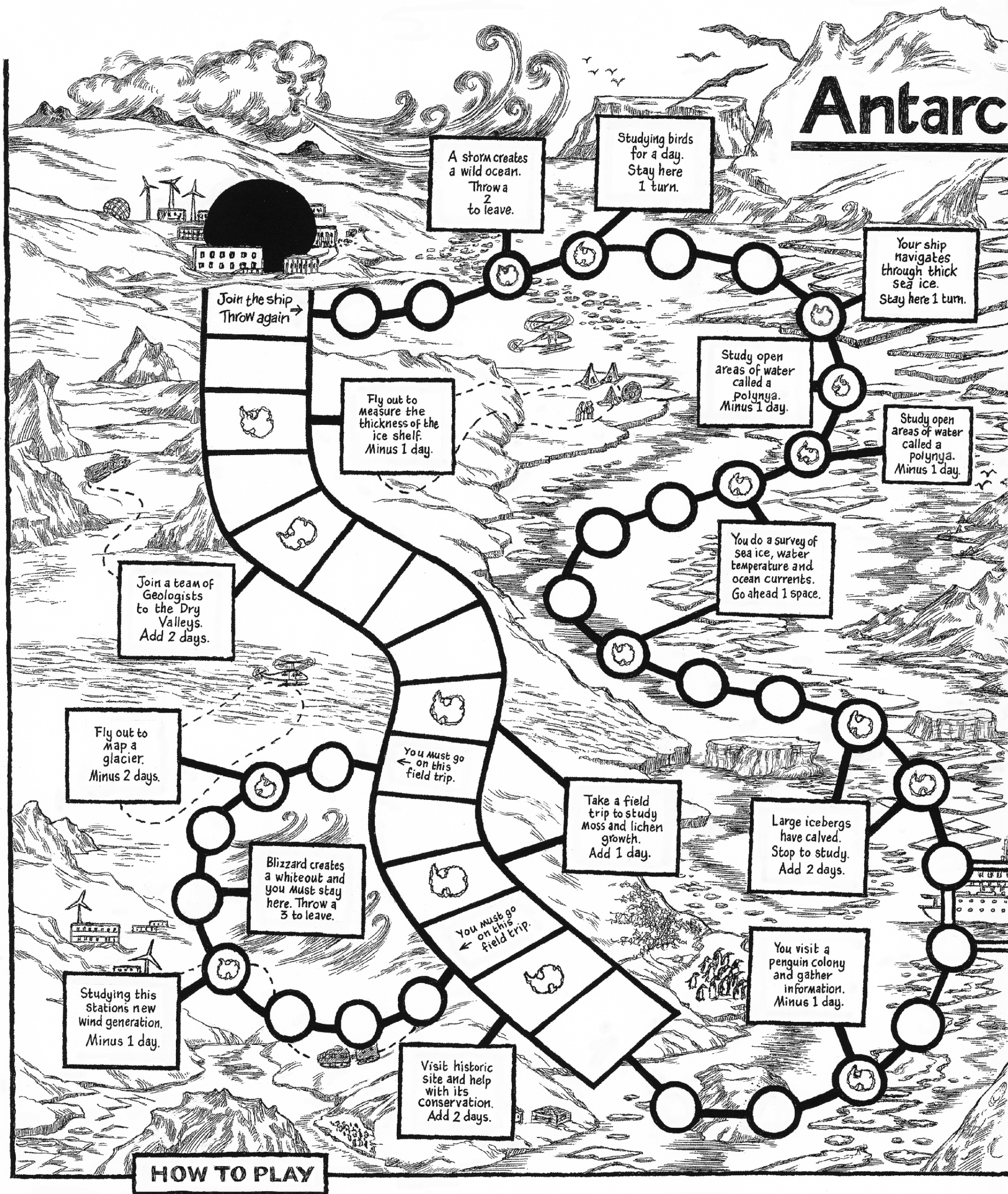
Working together



Many science projects can rely on the exchange of information and cooperation between scientists of varying nations. Over the years, through working together, some incredibly important consultative groups have been formed. The Special Committee on Antarctic Research (SCAR) and the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR) are two of these groups. You can research more about them at — antarctica.gov.au (Also see information on the Antarctic Treaty, page 8).



Imagine you are on a voyage to Antarctica. You also visit some sub-Antarctic islands. (You will need a map of Antarctica and the Southern Ocean to find them). Can you unjumble the letters to create the island names?



Antarctic Life is a game you can play with two or more players. You will need a die and each player will need something to use as a counter, a pencil and a piece of paper.

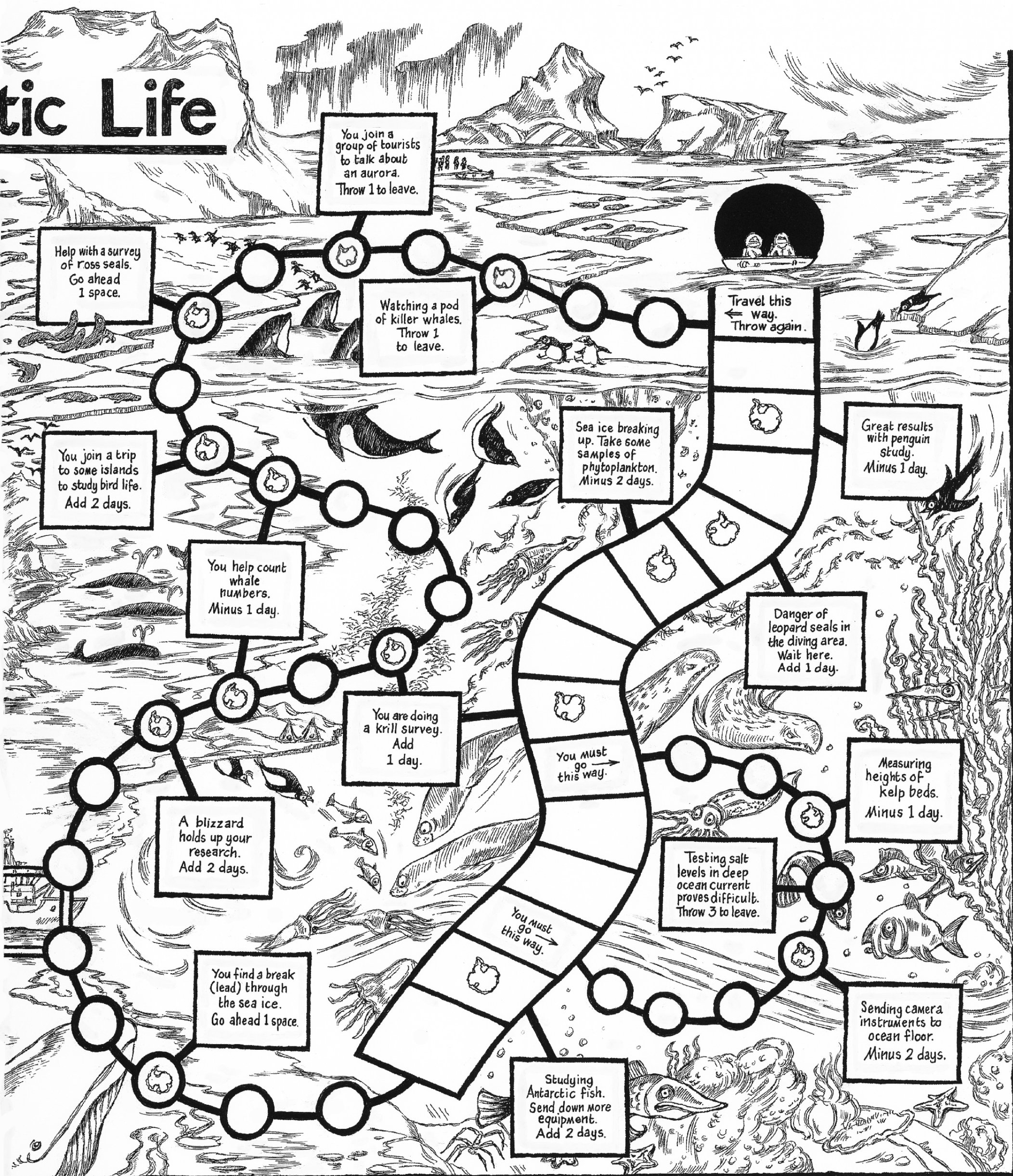
You are on an expedition, but the other players are also part of an expedition too, and you can share your information, as you would in Antarctica. This game is not about racing your opponents to the end, but a game of cooperation and exploration.

You have three choices for playing the game. Depending on how many players you have, this may change your plan for each game. With two players, you may choose to play opposite sides of the game, and use the same or create different expedition times for each side of the game. Or play the entire game with more players, following the same pathways, using the same expedition times.

You can choose to:

- Start on the left, at the station, move over the ice sheet, then on a ship through the ice and back to the station.
- Start at the small boat on the right, take a dive or send down instruments through the ocean, then travel back by boat to where you started.
- Start on the left, at the station, move either over the ice or through the ocean, then travel to the other side of the game, via the ship, and complete either route to the small boat at the top right.

Antarctic Life



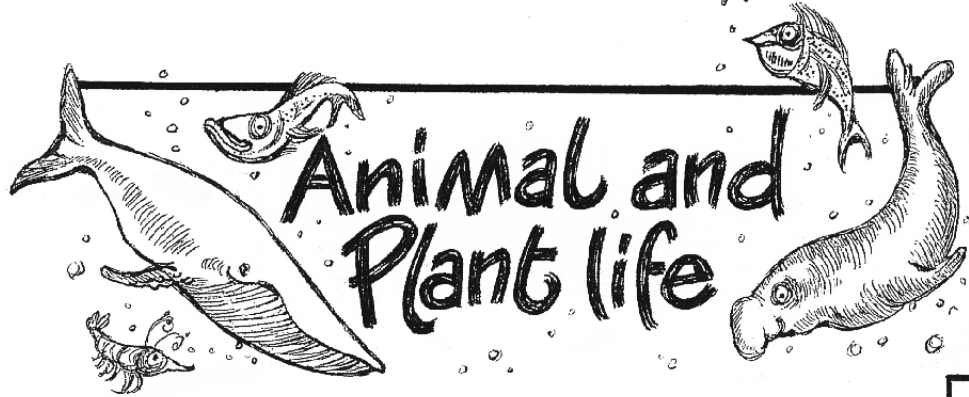
Whichever route you choose, you need to end at the same place to complete your expedition. Players can also move together along the same paths. As you travel through the game, you will need to follow any instructions and write down any information from the activities you land on.

Before starting, move your counter to your home station or boat. The order of play is determined by throwing the die. The player with the highest score goes first and also must throw the die three times (adding the numbers together) to determine the number of days your expedition should take. Double this number if you play the entire game. Write this number on top of each player's piece of paper.

Throw the die and in turn move the amount shown, following any instructions you land on. There is no penalty for landing on another player, but you must share one piece of information each, or create one, (looking at where you are in the game and what you may wish to do) and then add this to your lists. Write down any information you collect when you land on the Antarctic symbol.

To complete your expedition, you must wait till you can throw the correct number you need to land there. Add one day for each unsuccessful throw. Wait for other players to finish and compare notes.

How much information did you collect and share? How close were you to your original expedition schedule? Each time you play it will be different, just like every expedition.



Animal and Plant life

I'm a biologist and I study living organisms. I've been working at an Adélie penguin colony, studying how far they travel through the ocean to find food and what they are eating; how much krill the penguins eat and how much they feed their chicks. There are many other animals that also eat krill. From the list, can you find their names in the puzzle below?

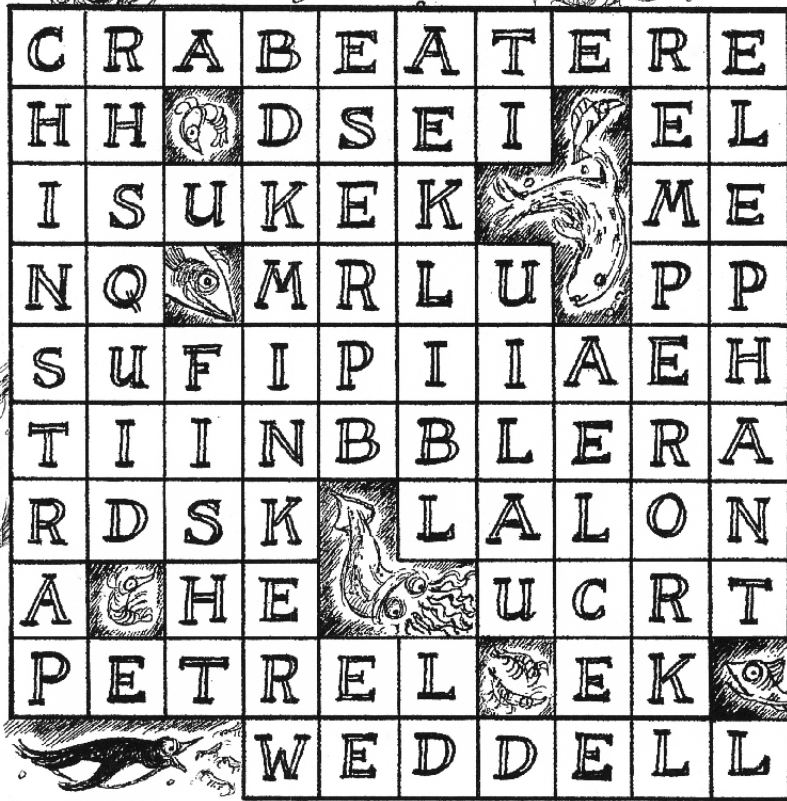
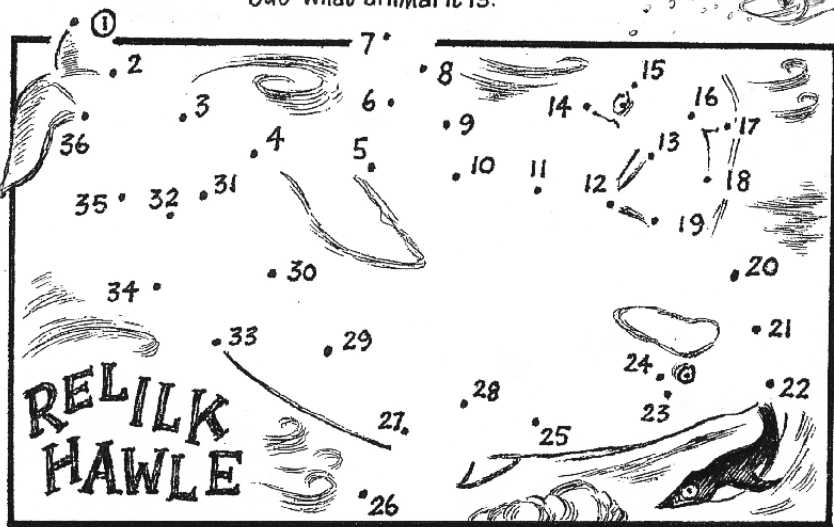


The ocean around Antarctica is full of life. Antarctic plants and animals live around the coastline of the continent and in the ocean.

All life forms have evolved to adapt to their environments, some staying through the cold, dark winters, while others migrate to warmer areas and warmer waters.

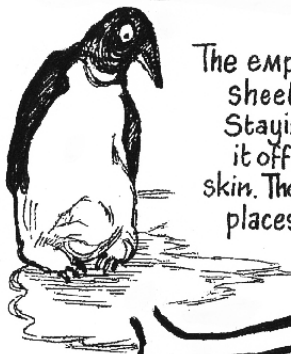
When the light returns and the temperature rises, the icy surface of the ocean begins to break apart. Microscopic plant and animal life grow rapidly and are food for krill and other small crustaceans. Krill are then eaten by larger animals such as fish, squid, seabirds, seals and whales.

From the tiniest plant and animal life in the ocean, to the giant sea sponges and the great blue whale, the temperature and health of the ocean is vitally important for their survival. (See page 2.) The animal below is chasing food. Join the dots and unjumble the letters to find out what animal it is.



- ~ WHALES ~
- BLUE • HUMPBAC • MINKE • SEI
- ~ SEALS ~
- WEDDELL • CRABEATER • ELEPHANT
- ~ PENGUINS ~
- EMPEROR • ADELIE • CHINSTRAP
- ~ OTHERS ~
- PETREL • SQUID • FISH • SKUA

There is a very important word left over...



The emperor penguins live in groups (colonies) on fast ice. This is a solid sheet of sea ice attached to the shore, either to land ice or to land. Staying on the continent during winter, the males incubate the egg, keeping it off the ice by carrying it on their feet. The egg is also covered by a flap of skin. The penguins also huddle together in winter against the cold, changing their places in rotation. Can you find a way through to the middle of the huddle for these penguins?



I'm an ecologist and I study plants. I've come to the Antarctic peninsula to look at what plants live in this area and what it takes for them to survive. Can you unjumble the letters inside each magnifying glass to see what I've found? I've also found something I wasn't looking for. Can you tell what it is?



As animal and plant life has evolved to live in the Antarctic environment it has created some amazing statistics. Can you name two different animals that live in Antarctica but not in the Arctic? You can colour in the panel below and find the answers to the questions by completing some simple maths. Write your answers in the spaces below.



The wingspan of the wandering albatross can measure up to...	Krill are one of the most abundant species on Earth. How many species are there?	The adult emperor penguin has an approximate height of...	The Patagonian toothfish can weigh over 100 kg and live for more than...	An adult male elephant seal can weigh up to...	The age of some lichens has been calculated to be...
78-75	80 + 20 - 15	1000 - 999	4 x 10	8 ÷ 2	10,000 x 70 %
= M approx.	= approx.	= M	= years	= tonnes	= years old



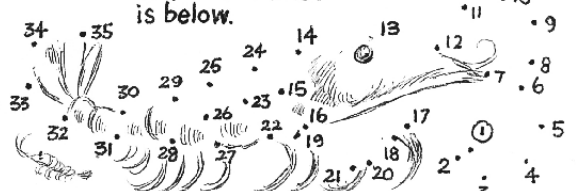
Euphausia superba

Scientists are learning more about Antarctica and the life that lives there and in the Southern Ocean.

Antarctic krill is not only a vital food for many animals but is an extraordinary little powerhouse. They can convert injected microplastics into smaller nanoplastics.

Krill also seem to be resistant to increasing ocean acidity and adult krill seem to absorb a wide range of carbon dioxide (CO₂) concentrations.

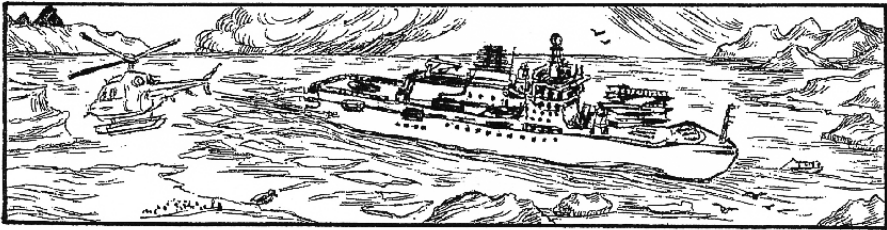
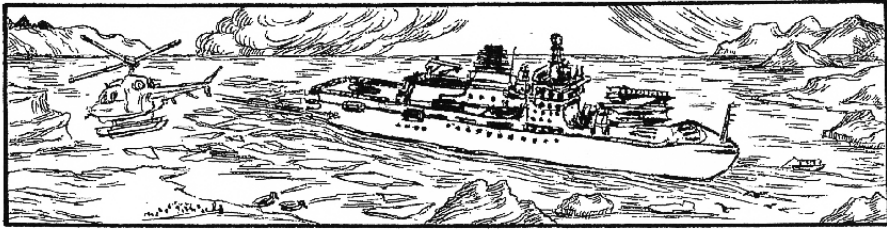
Join the dots from 1-35 to find out what is below.



LIFE ON ICE

Although relatively little time has passed between the first scientific expeditions to Antarctica and those of today, the challenges of survival for people have not changed in many ways. The weather conditions control everything. There are still the problems of getting to the continent. Today, if you fly or go by ship, the summer is the main time to travel. In spring and summer the light and temperature increases and the winter coverage of sea ice begins to break up. Even with modern technologies, the Antarctic environment causes many difficulties for organising transport, supplies, food and shelter. Everyone who visits Antarctica learns to respect this incredible environment and to be aware of the limitations and dangers.

Planes can transport people and some supplies quickly but are also limited by Antarctic weather conditions. Ships can carry large amounts of cargo and many people, visiting various places. Ships that visit Antarctica can also be research ships. Most Antarctic ships are also icebreakers. Australia's Antarctic icebreaker, the RSV Nuyina is an extraordinary research ship. It provides scientists incredible capabilities to research various projects and collect data while voyaging south. It gives scientists direct access to the ocean, climate, atmosphere, ice and life of Antarctica through using the most contemporary technologies.



Australia's scientific research and re-supply icebreaker ~ RSV Nuyina.

Can you spot the eight differences between the drawing above and below?

Everything you would ever need must be supplied to a station. Find the items listed below in the puzzle.

- curtains
- Machinery • medicine
- tyres • shampoo • soap
- computers • biscuits
- chairs • tents • pipes
- battery • vegetables
- oil • timber • fruit • pen
- cups • boats • eggs • pins
- rope • maps • meat

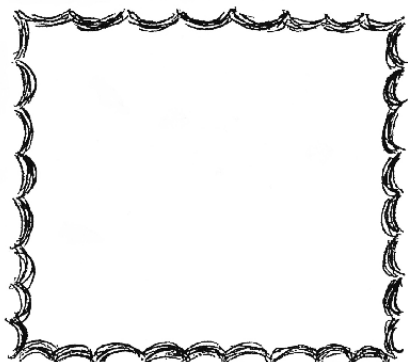
What else could you list here?



C	O	M	P	U	T	E	R	S	O	L	V
U	M	E	A	T	P	Y	R	O	P	E	E
R	I	D	G	C	L	I	R	N	K	B	G
T	O	I	L	G	H	L	P	E	N	A	E
A	I	C	U	P	S	I	S	E	S	T	T
I	T	I	M	B	E	R	N	S	S	T	A
N	E	N	O	P	I	S	P	E	I	E	B
S	N	E	V	A	T	A	S	I	R	R	L
O	T	S	H	A	M	P	O	O	N	Y	E
L	S	C	O	F	R	U	I	T	A	S	S
K	V	B	I	S	C	U	I	T	S	P	O

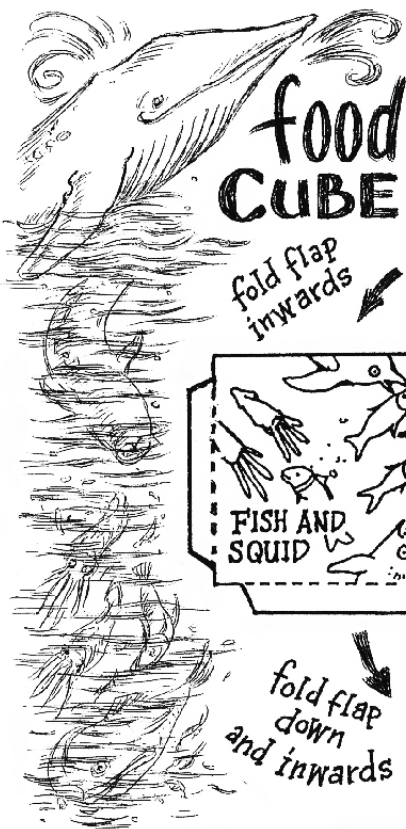


As Antarctic communities are so isolated and everyone misses things from their own lives, they often take something small with them from home. What would you miss? What would you take with you? Write this down below ~

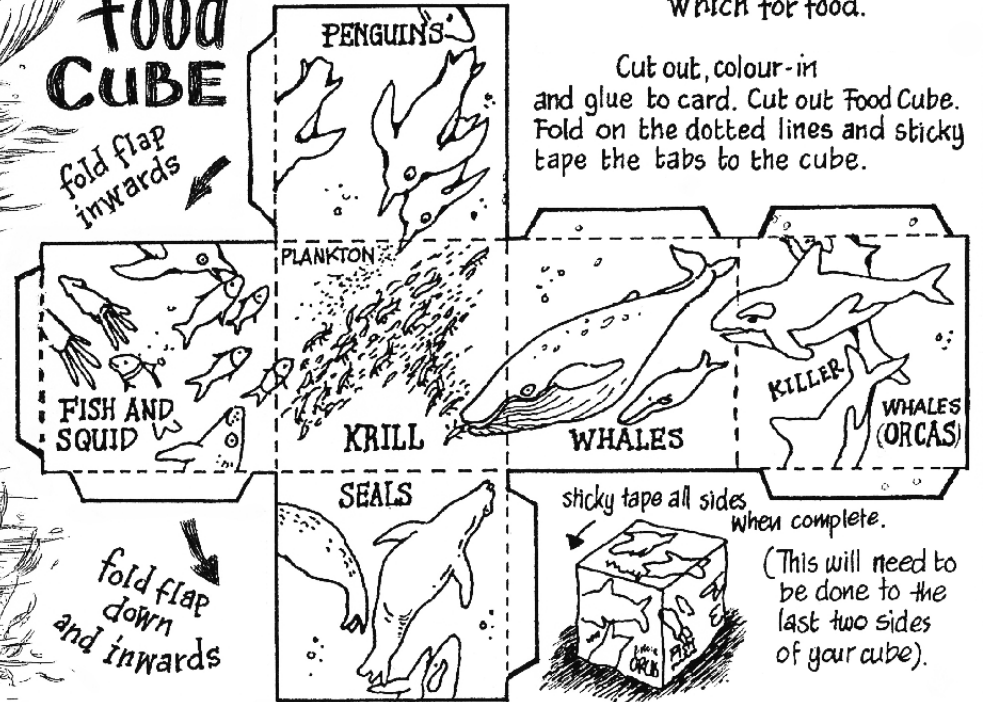


Many Antarctic stations have their own rubber stamps to place on to letters home. Some commemorate special events. The stamps vary in shape and size.

You can draw your own Antarctic stamp here and copy the shape to create more with your friends.



Under the ice there is a world full of life. There is a simple food cube below that you can create to find out which animal depends on which for food.



Cut out, colour-in and glue to card. Cut out Food Cube. Fold on the dotted lines and sticky tape the tabs to the cube.

(This will need to be done to the last two sides of your cube).

Nations involved in Antarctica have small communities there called stations. They are the home or base for all activity. Scientists leave from the station to go to their areas of study. This is called being in the field. There are many forms of transport that are used to travel away from a station. Everyone in the field must keep up communication with the station. This is done through the use of radio and satellite phones. This was once done through using a coded message system. You can use this panel below to create your own code, even just to write a message. (A and N have been done).

A	B	C	D	E	F	G	H	I	J	K	L	M
:	:	:	:	:	:	:	:	:	:	:	:	:
N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Δ	:	:	:	:	:	:	:	:	:	:	:	:

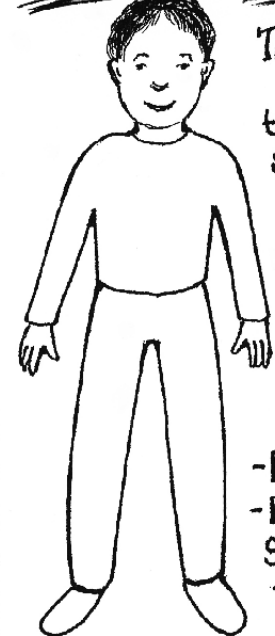


I'm a station leader and I help organise station life. A station is like a small town. Apart from the scientists that work in Antarctica, there are other people there who are so important, a station would not survive without them. Complete the sentences below to find out some of them. (There can be many other people there depending on the work or research undertaken each season.)

- A _____ looks after your health.
- You need a _____ to build houses and maintain structures.
- An _____ will install and maintain all electrical equipment.
- If pipes are broken you would need a _____.
- A _____ will fix and maintain machinery.
- If you want fabulous Meals to eat, you will need a _____.

Other very important people ~ Communications officer • Plant inspector (senior diesel mechanic) • Meteorological technical observer • Meteorological observer • Station leader

What's missing?



Trace around me, then use this to make me some Antarctic clothing.

I have thermal underwear on, but what else will I need?

- Big freezer suit?
- Don't forget my gloves and boots.
- What else do you think?

A DAY IN Antarctica

Imagine all the things you would need just for one day at a station in Antarctica.

Make a small diary or list of one day in your life. Write down as many things you can of everything you use in that one day, including food.



Compare your list to your friends.

ASK A FRIEND TO HELP



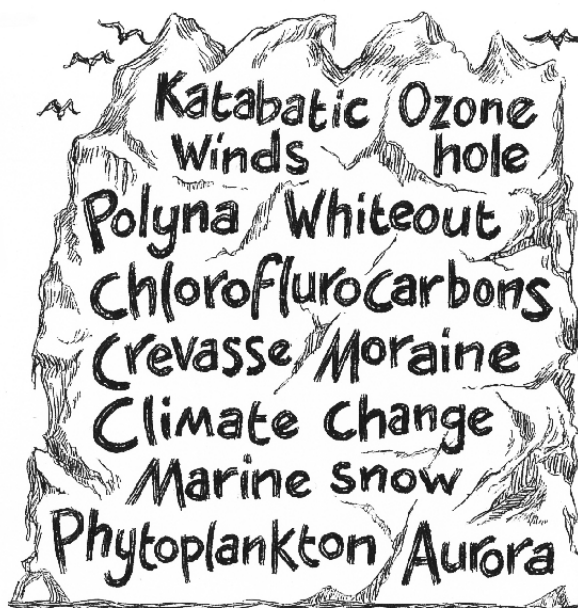
the Antarctic Treaty

Log on to antarctica.gov.au and type in The Antarctic Treaty in to search to find out further information.

Originally signed in 1959 by twelve nations the Antarctic Treaty is one of the most extraordinary agreements ever made between nations.

The Antarctic Treaty agreements protect Antarctica and declare it as a 'natural reserve devoted to peace and science'. The Treaty now includes over fifty nations, including all of those that are active in Antarctic science. Antarctica is the only place on Earth where all nations have agreed to work together openly on science and environmental protection.

As nations continue their cooperation under the Treaty agreements, working together and sharing knowledge and research, Antarctica will continue to be protected in the future. Protection of the Antarctic environment and its ecosystems is in the interest of the whole world.



the future

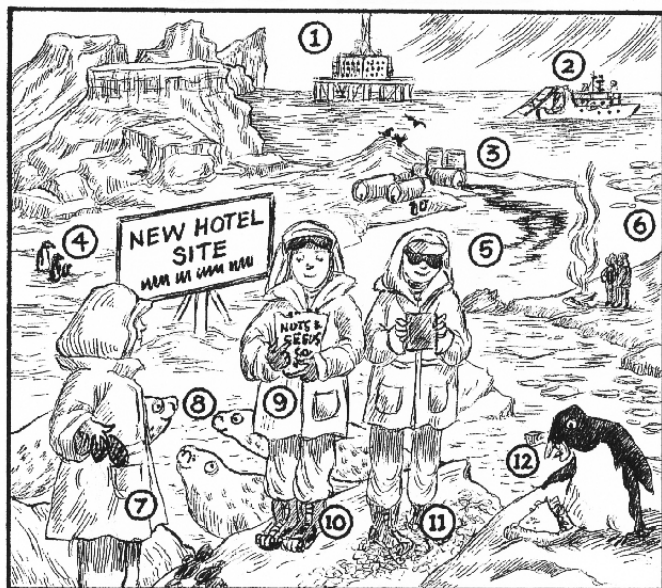
Antarctica is a continent protected from exploitation. There are no borders or fences as no one nation can claim Antarctica as their own. The responsibility and care for Antarctica and its future belongs with us all.

What would you like to see for the future of Antarctica and its surrounding areas? Ask your friends, or do this with your class and family.

tourism



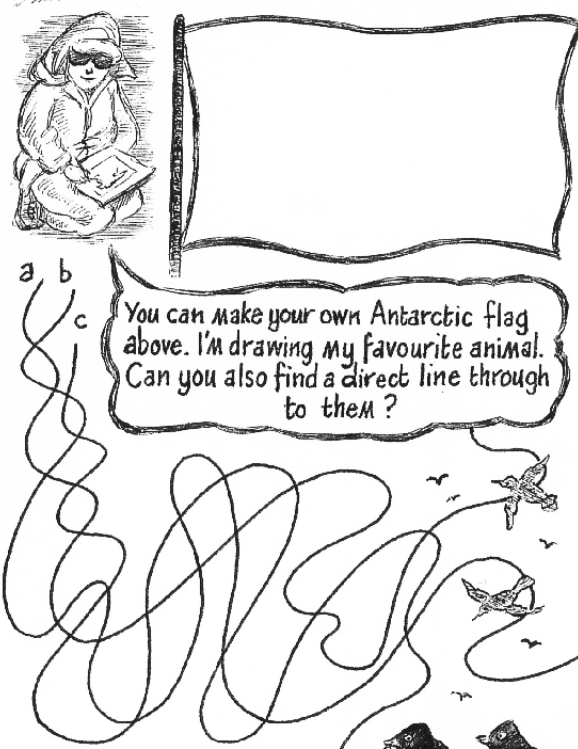
Tourists can also visit the continent. There are strict rules for anyone who visits Antarctica. Some of the things we see people do in our own country cannot be done in Antarctica.



Flying over Antarctica, a group of tourists are spotted. There are ten differences between these drawings. (Can you see them?)



Use a dictionary to find out the meanings of the words above or log on to - antarctica.gov.au to find out more. See how many new words you can find. Do this with your class too.



My ideas

Write your ideas -



CREDITS

Written and illustrated by Coral Tulloch
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Many thanks to the fabulous support of the staff at the Australian Antarctic Division, including Sachie Yasuda, Jessica Fitzpatrick, Wendy Pyper, Tiffany Brooks and Kerry Steinberner.

Diagrams:

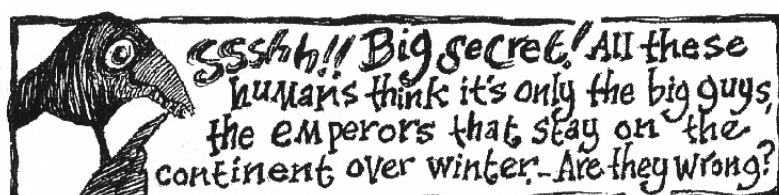
Page 1: Gondwana diagram adapted from LA Lawler, LM Gahagan and IWD Dalziel. Page 2: Antarctic cross section from Glaciological and Geophysical Folio, Professor DJ Drewry. Page 3: Circumpolar Current diagram from CSIRO.

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antarctica.gov.au



ANSWERS

Page 1 - Fossilised fern

Page 2 - 13 million km², 20 million km², 90%, 91%, 70%, 2.4 km, 4.7 km, -89.6°C, 320 km, 12, 35°C

Page 3 - 1. Atlantic, 2. Pacific, 3. Indian; 1. Heard, 2. Macquarie, 3. Kerguelen, 4. Scott, 5. Antipodes, 6. Campbell

Page 6 - Killer whale; moss, lichen, snow, algae, mite; 3M, 85 approx, 1 M, 40 years, 4 tonnes, 4000 years

Page 7 - Answer = C; doctor, carpenter, electrician, plumber, mechanic, chef; Spot the differences: bird missing, cloud changed, flag missing, extra box of supplies, husky's fur darker, husky's tail shorter

Page 8 - 1. Mining/oil exploration, 2. Illegal fishing, 3. Discarded material, 4. Commercial interests, 5. Pollution, 6. Burning materials, 7. Rubbish, 8. Too close to animals, 9. Introduced plants and seeds, 10. Not washing boots, cleaning clothes of foreign substances, 11. Walking on lichens/moss, 12. Introduction of foreign foods; Spot the differences: extra boat, added penguin, camera darkened, cloud added, extra ice in foreground, bird missing