



OCEAN FUN PACK - POLAR REGIONS

This lesson plan developed by:



Overview:

Areas surrounding the Earth's North and South Poles are known as polar regions. They are dominated by the Earth's polar ice caps with the northern resting on the Arctic Ocean and the southern on the continent of Antarctica. Despite being extremely cold and windy, polar habitats are home to a rich diversity of wildlife, both on the land and within in the water.

What are the differences between the Arctic and Antarctic?

While these polar regions have many similarities, both are also very different in a number of ways. Located at the northernmost part of our planet, the Arctic consists of the Arctic Ocean, surrounding seas and parts of Alaska (United States), Canada, Finland, Greenland, Iceland, Norway, Russia and Sweden. The Arctic is sea surrounded by land. Conversely, the Antarctic is comprised of the southernmost continent, Antarctica, surrounding islands and the Southern Ocean. The Antarctic is land surrounded by sea. This fundamental distinction drives many of the other differences between the two regions.

Since Arctic sea ice is surrounded by land, it limits how far south the ice can expand in the winter months. However, this confinement also means that much of the ice can't move south in the summer, where it would more easily melt. This allows a large ice pack to remain in the Arctic year round. In the Southern Hemisphere, sea ice forms in the winter around the edges of the continent and is free to expand, so is much larger than the Arctic's. However, in the summer, the sea ice surrounding Antarctica nearly disappears because the ice can drift away and melt more quickly.



Credit: Woods Hole Oceanographic Institution

Polar Regions (cont.)

The climate of both polar regions consists of long cold winters and short cool summers. However, for a few reasons, the Antarctic is much cooler than the North Pole. In the Arctic, the ocean (which doesn't fall below -2°C) keeps the region relatively warm even though the sea is covered by ice. Secondly, Antarctica has the highest average elevation of all the continents, and temperature decreases as the altitude increases. On average, Antarctica is the coldest, driest and windiest continent – a frozen desert with very little precipitation.

The presence of humans is another one of the biggest differences between the North and South Poles. Many indigenous peoples live in and around the Arctic including the Inuit, Chukchi, Sami, Yupik, Inupiat and others. In the Arctic, the permanent population is about 4 million. Antarctica has never had an indigenous population. In 1959, a treaty was established to protect Antarctica, so that the continent is a place only to be used for peace and science. Several thousand scientists and support staff periodically inhabit Antarctica in pursuit of research, however there is no permanent population.

What types of animals live in polar regions?

Not surprisingly, the diversity of wildlife found in the two polar regions is also quite different. The Arctic is home to many large land animals including polar bears, reindeer, musk ox, arctic hares, snowy owls and arctic terns. Since the Arctic is part of the land masses of Europe, North America and Asia, these animals can migrate south in the winter and head north during the more productive, warmer months. There are also many large marine mammals such as walrus, seals (bearded, harp, ringed, spotted and hooded) and several species of cetaceans including narwhals, bowheads, gray whales, blue whales, fin whales, minke whales, orcas and belugas.

In the Antarctic, the largest fully terrestrial animal is an insect, a wingless midge, Belgica Antarctica. However, there are many animals that feed in the seas and come onto land for part or most of their lives including many birds such as albatrosses, petrels, skuas, and adélie, chinstrap, emperor and gentoo penguins. Large marine mammals include seals (elephant, Antarctic fur, crabeater, Weddell, leopard and Ross), blue whales, right whales, sei whales, humpback whales, minke whales, fin whales, sperm whales and orcas. Many species depend directly or indirectly on Antarctic krill as an important food source in the Southern Ocean.

How do they survive the harsh conditions?

Some animals have evolved to survive life in the deep cold by developing a thick layer of fat (AKA blubber), growing thick fur or a thick layer of feathers to keep themselves insulated. In the Southern Ocean, the Antarctic toothfish has antifreeze proteins in its blood and tissues to prevent them from freezing in the frigid waters. Other species are drawn to the abundant food supply or nesting grounds in the warmer months, but migrate long distances during the winter. Despite the harsh conditions, both the Arctic and Antarctic are home to a variety of species that have adapted to surviving a cold and windy habitat.



Crossword Puzzle

Complete the crossword puzzle on the next page with the clues listed below to learn more about polar regions and their inhabitants.



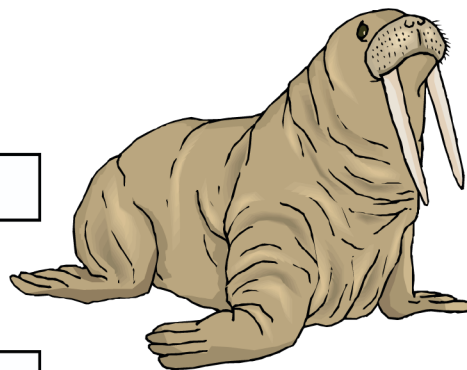
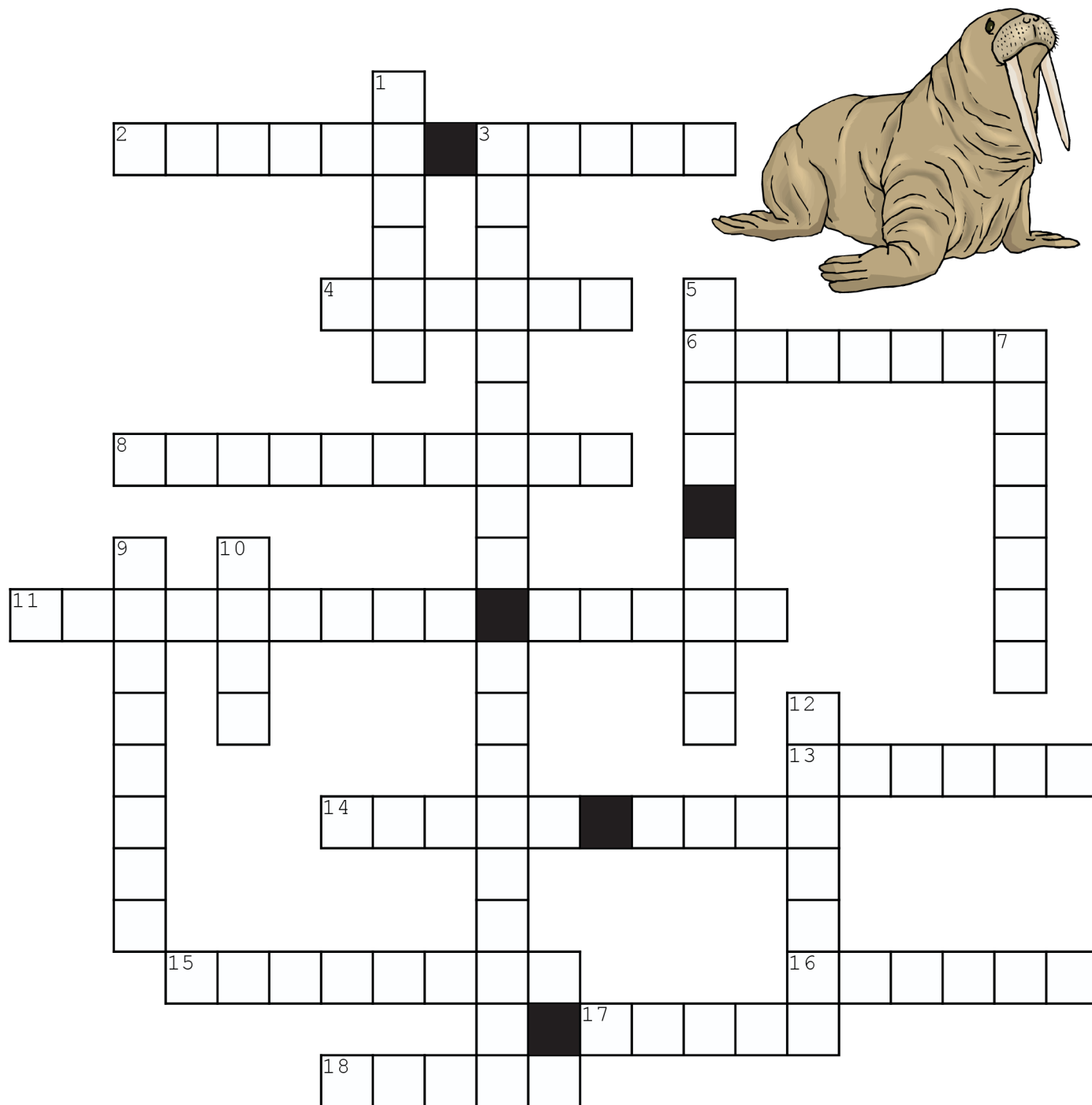
Across:

2. Living in the Arctic Ocean, this all-white marine mammal has a protruding forehead called the “melon” and is missing a dorsal fin, which allows it to move freely under ice.
4. Among Earth’s harshest biomes, this treeless ecosystem has a cold, windy climate with very little rainfall.
6. Large piece of freshwater ice that has detached from a glacier or ice sheet, and is floating in open water.
8. Known as the coldest, driest and windiest continent.
11. One of the largest species of shark that also has the longest known lifespan of all vertebrates.
13. Sometimes referred to as a polar light, this phenomenon is a natural light display in the sky that is seen in the high latitude, polar regions.
14. Considered a marine mammal because they spend most of their lives on the sea ice of the Arctic Ocean, this carnivorous bear has a thick layer of body fat and a water-repellant coat that insulates them from the cold air and water.
15. An annual long-distance sled dog race that takes place in Alaska.
16. Polar region located at the northernmost part of the Earth.
17. An abundant, small crustacean that is prey to whales, seals, penguins, squid and fish.
18. A layer of small, white ice crystals that form on the ground or other surfaces when the temperature falls below freezing.

Down:

1. Large Arctic marine mammal that has flippers, tusks and whiskers.
3. These feathered giants have the largest wingspan of any bird and are found soaring around the Southern Ocean.
5. Primarily found in cold seas, this large crustacean is widely caught and sold as food.
7. A slowly moving mass of ice originating from accumulation and compaction of snow on mountains or near the poles.
9. A group of aquatic, flightless birds that live almost exclusively in the Southern Hemisphere.
10. Soft, white pieces of frozen water that fall to the ground from the sky in cold weather.
12. Known as the unicorn of the sea, this toothed whale possesses a large “tusk” protruding from its head.

Crossword Puzzle (cont.)



Polar Location Game

Where am I found?

Label **A** for Arctic, **N** for Antarctic
or **B** for both?

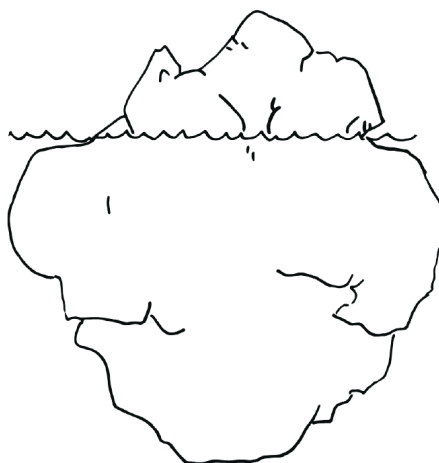
After you choose, color me in!



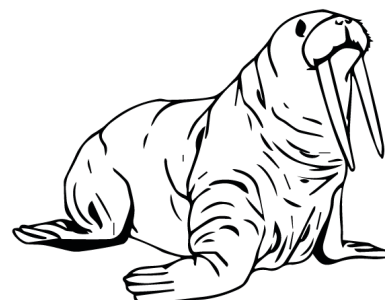
1. Adélie
Penguin _____



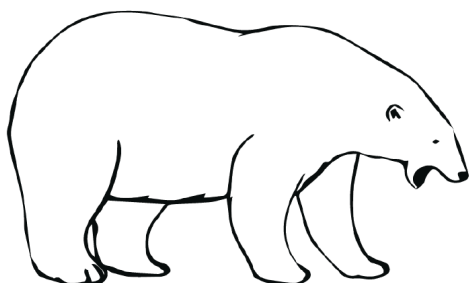
2. Wandering
Albatross _____



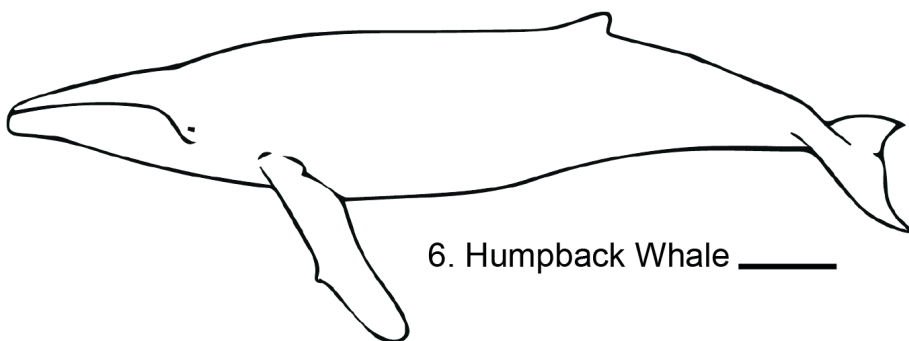
3. Iceberg _____



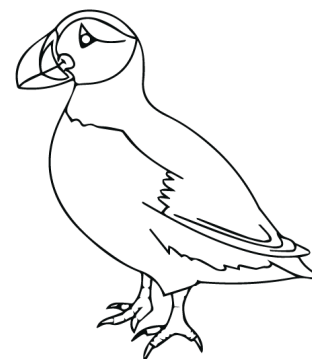
4. Walrus _____



5. Polar Bear _____



6. Humpback Whale _____



7. Puffin _____

Arctic Word Search

Can you find who lives in and around the Arctic? The words will be hidden horizontally, vertically, diagonally, or backwards.

Word List:

Puffins
Bowhead whale
Orca
Musk Ox
Lemmings
Arctic tern

Caribou
Harp seal
Arctic fox
Walrus
Inupiat
Sculpin

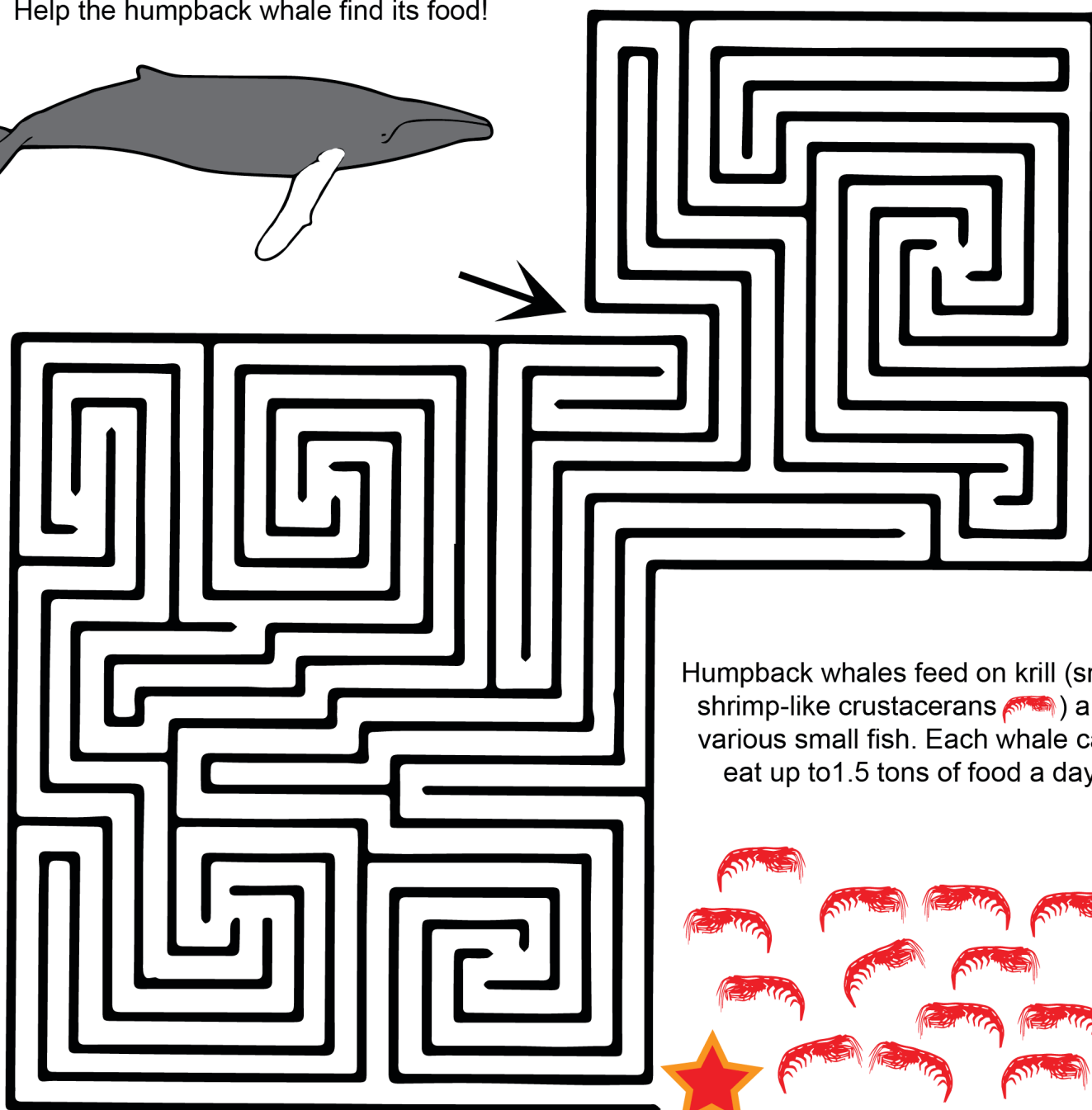
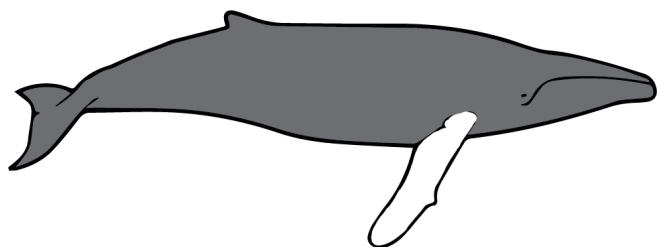
Beluga
King Crab
Ptarmigan
Brittle star
Cod
Polar bear




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

Humpback Whale Maze

Help the humpback whale find its food!

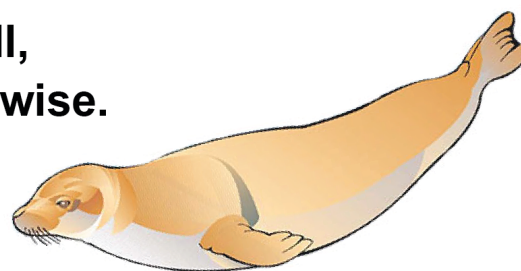


Humpback whales feed on krill (small shrimp-like crustaceans ) and various small fish. Each whale can eat up to 1.5 tons of food a day.



Decoding Game

This marine animal mostly feeds on krill, although its name would suggest otherwise. Follow the lines to decode who it is.



A E C L E E B R A T S A R



Antarctic Word Search

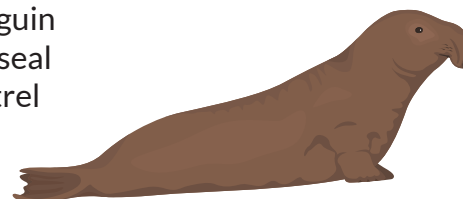
Can you find who lives in and around the Antarctic? The words will be hidden horizontally, vertically, diagonally, or backwards.

Word List:

Humpback whale
Skua
Elephant seal
Albatross
Leopard seal

Crabeater seal
Minke whale
Blue whale
Adelie penguin
Emperor penguin

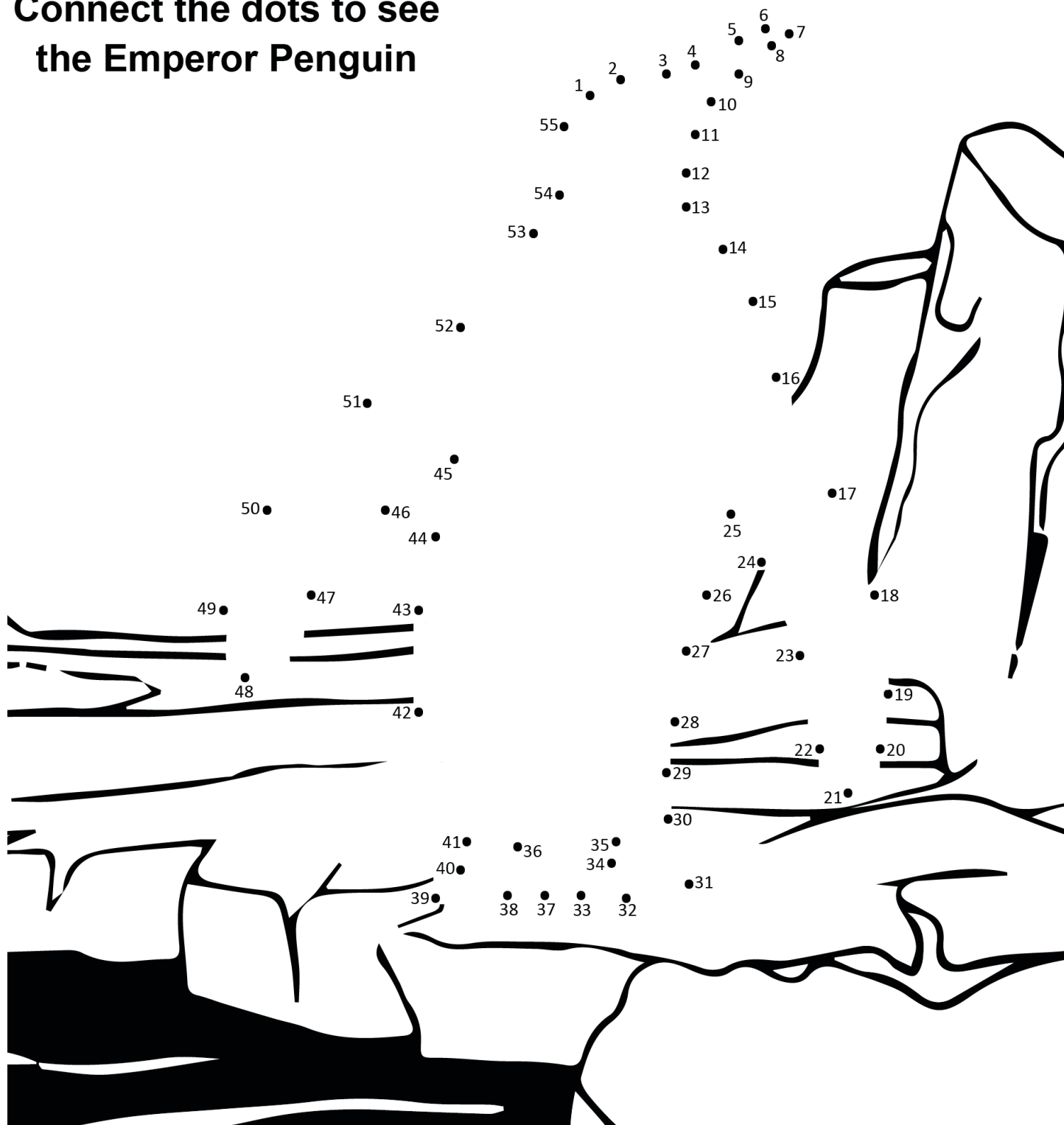
King penguin
Weddell seal
Snow petrel
Ross seal
Krill



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

Connect the Dots

Connect the dots to see the Emperor Penguin



Word in a Word

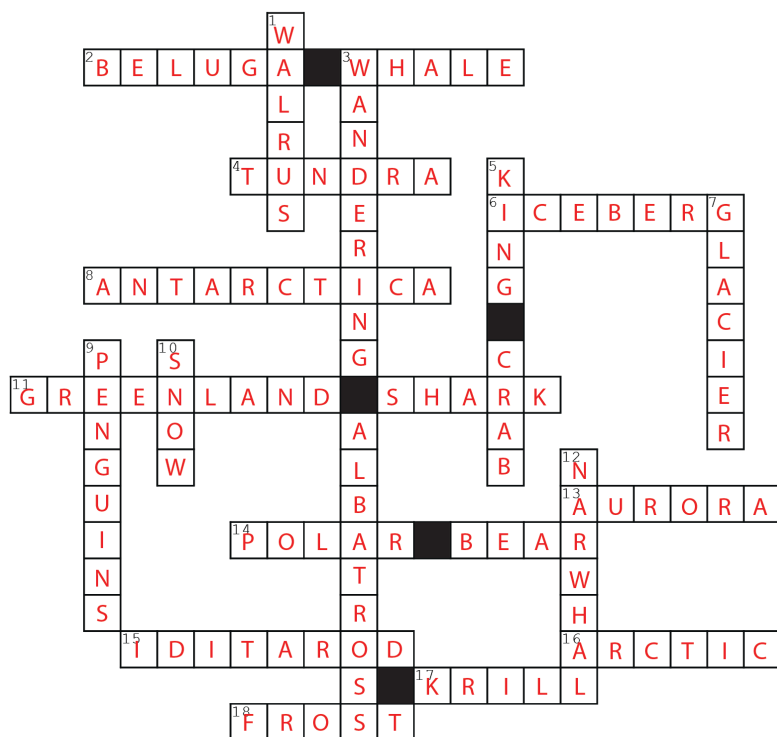
What words can you find in the word NARWHALS?



_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
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_____	_____	_____
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_____	_____	_____
_____	_____	_____
_____	_____	_____
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_____	_____	_____
_____	_____	_____

Answer Key

Crossword Puzzle

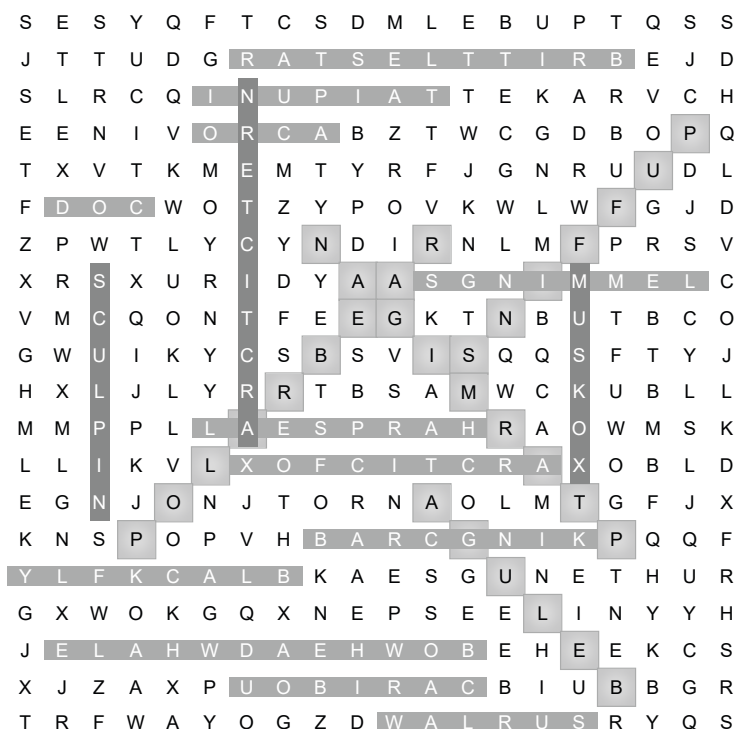


Location Game

1. N 5. A
2. N 6. B
3. B 7. A
4. A

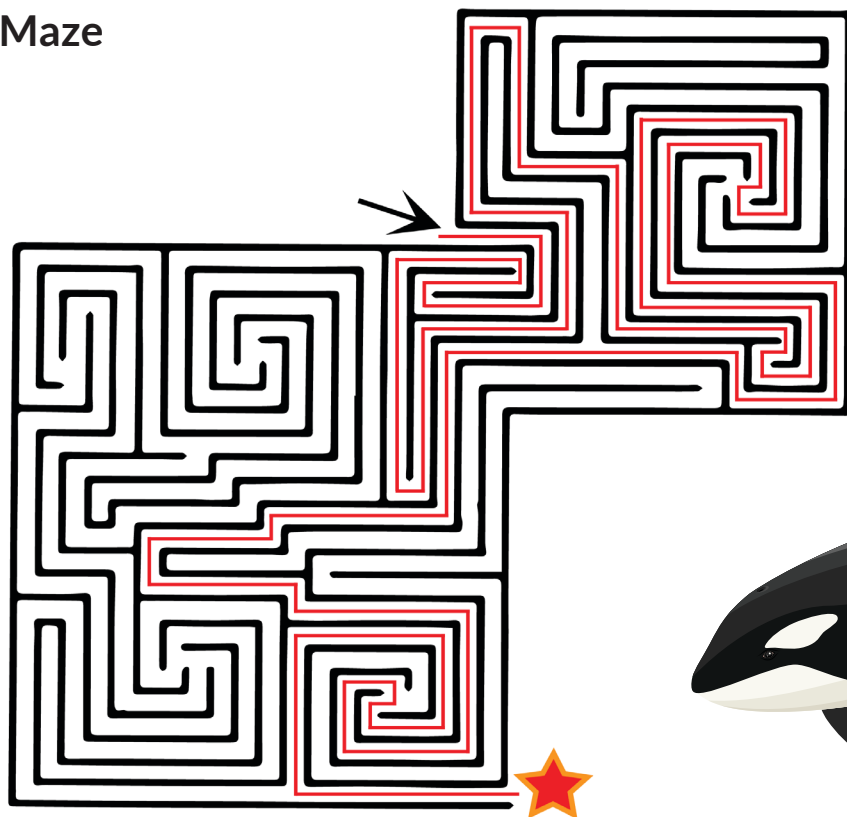


Arctic Word Search



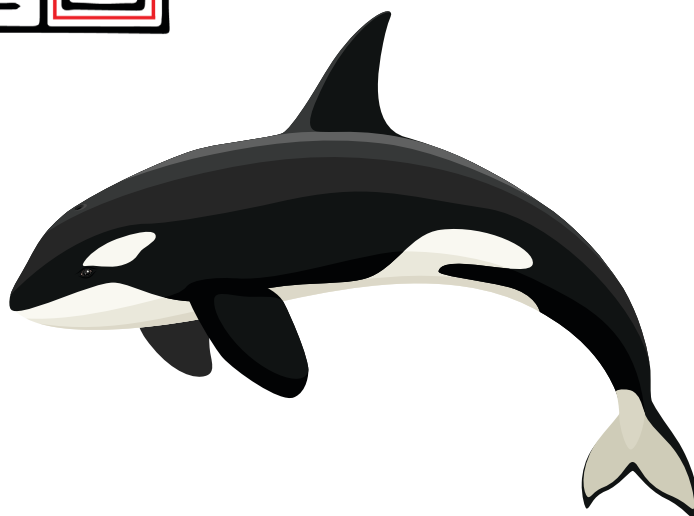
Answer Key (cont.)

Maze



Decoder Game

CRABEATER SEAL



Antarctic Word Search

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

Answer Key (cont.)

Word in a Word Game

a
aa
aah
ah
aha
ala
alar
alas
an
ana
anal
anas
ar
as
ash
ashlar
awash
awl
awls

awn
ha
has
haw
la
lar
lash
law
lawn
lawns
laws
nah
narwal
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About Us

Sailors for the Sea Powered by Oceana is a global conservation organization that engages, educates, inspires and activates the sailing and boating community toward protecting our oceans and waterways. We are a movement and a pragmatic voice for action that offers boaters tangible opportunities to create a legacy and make a difference.

Sailors for the Sea wants our youth to flourish, to truly become empowered as the next generation of ocean stewards. Through our KELP (Kids Environmental Lesson Plans) program and our Ocean Fun Packs we hope to inspire children to know and love the ocean.



Do you want to learn more about polar regions?

Check out these KELP activities:

Global Climate Change and Sea Level Rise

With some containers, clay and ice, determine what type of ice (glaciers, icebergs, etc.) cause sea level rise.



Whale Blubber

Create a “blubber glove” to see how whales stay insulated and warm in frigid cold waters.

