

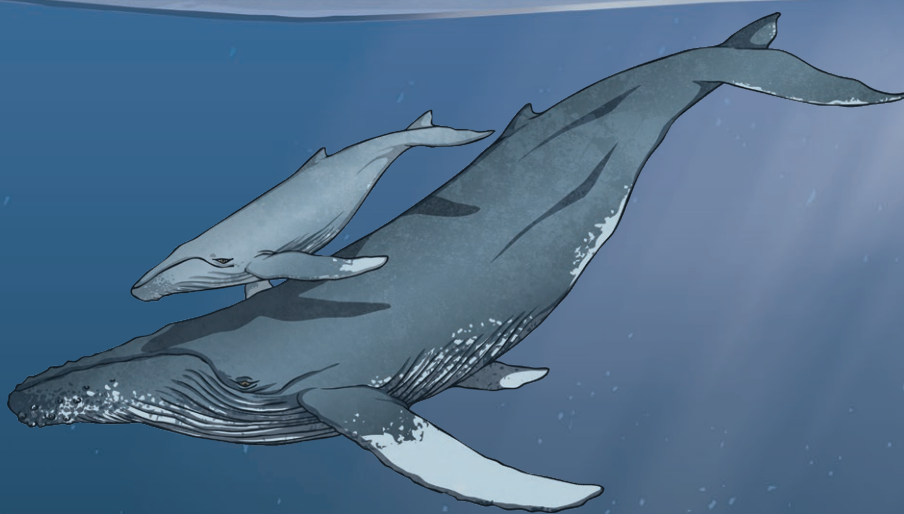
# The Mystery of Migration

## Problem-Solving Game

Hannah felt excited when she heard that Louisa from Project Jonah was coming to visit her class. She had always loved the ocean and was eager to learn more about the marine mammals that lived in it. Louisa arrived, introduced herself and started sharing some fantastic stories about whale rescues and the species of whales that live in the oceans around New Zealand. Hannah felt particularly excited when Louisa mentioned humpback whales because she had once seen one in real life while on a boat trip with her dad!

Louisa then told the class that something very strange had happened recently; everyone leaned in closer to hear what she had to say. "A group of scientists have gone out looking for humpbacks in the South Pacific Ocean, but not a single one has been found. About two weeks ago, a fisherman spotted a humpback whale off the coast of Tonga."

Louisa explained there were some clues that scientists had shared with them, which might help everybody find out where all the whales went and why. She showed the class all six clues and then said, "Can you use these clues to help us find out where all the humpback whales have gone?"



## Data Collected by the Scientists

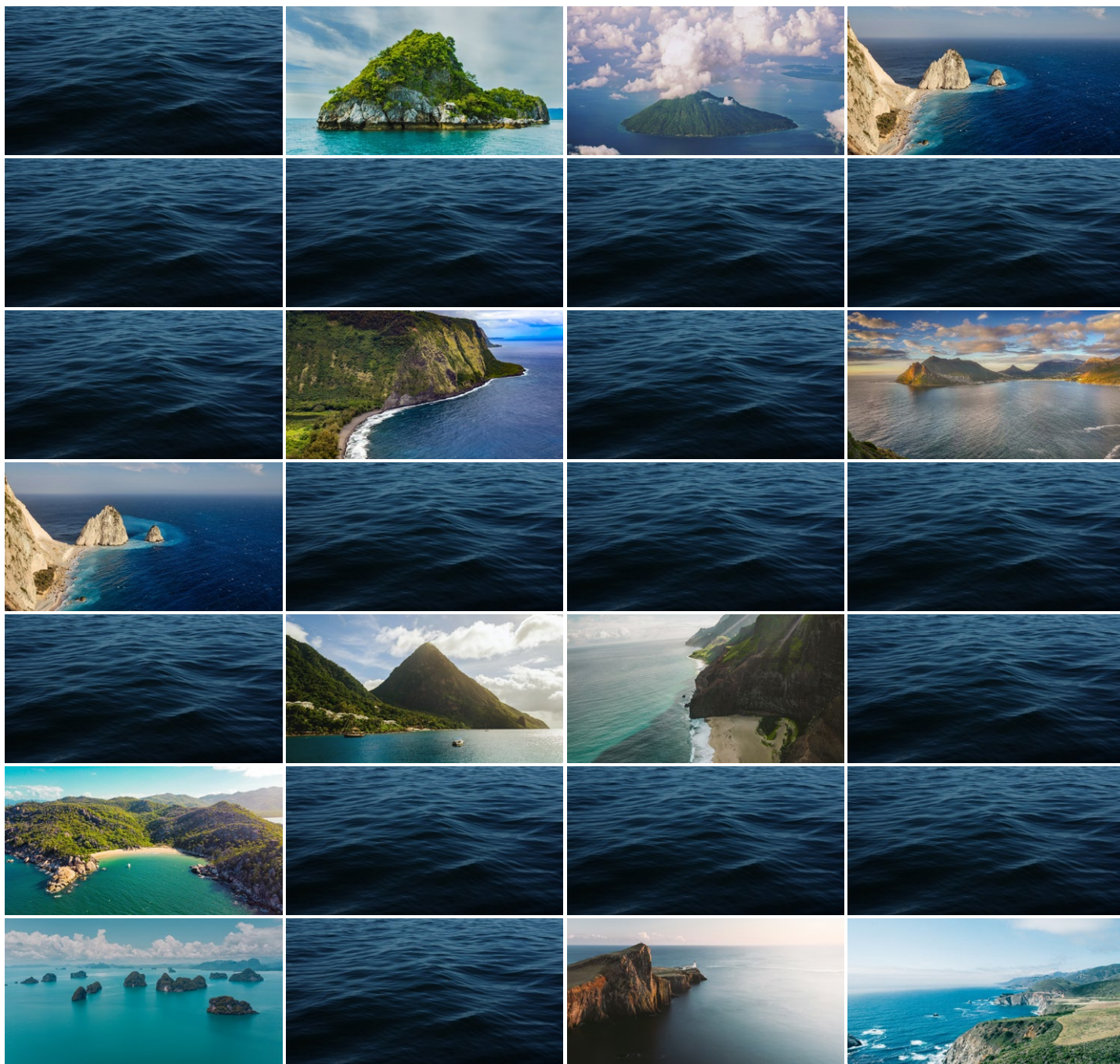
Compass Direction	Season	Coastline	Kilometres Travelled	Where Did They Go?
south	winter	New Zealand	approximately 4000km	Australia
east	summer	Solomon Islands	approximately 2000km	Tonga
south	spring	New Zealand	approximately 6000km	New Zealand
north	winter	Easter Island	approximately 9000km	Stewart Island
east	autumn	Papua New Guinea	approximately 4000km	Antarctica
west	summer	Solomon Islands	approximately 2000km	Tonga
north	summer	Easter Island	approximately 6000km	Antarctica
south	summer	Papua New Guinea	approximately 4000km	Tonga
south	spring	New Zealand	approximately 2000km	Australia
west	winter	New Zealand	approximately 2000km	New Zealand
north	autumn	Solomon Islands	approximately 6000km	Stewart Island
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south	spring	New Zealand	approximately 6000km	Antarctica
north	summer	Solomon Islands	approximately 2000km	Stewart Island
south	spring	Papua New Guinea	approximately 6000km	New Zealand
south	spring	New Zealand	approximately 6000km	Tonga
west	winter	Easter Island	approximately 6000km	Antarctica

## Clue 1

The man who last spotted a humpback whale was fishing off Tonga, an island in the south Pacific Ocean. Create an algorithm to find out which compass direction the whale was moving in.

Cut out the coding cards below and use them to create your ocean pathway, starting in the square on the top row.

Start here



East	West	West	South <sup>x2</sup>
South	East	North	East
South <sup>x2</sup>	West	South	South

The compass direction you used the most is the direction the whale was heading.

Answer to Clue 1: \_\_\_\_\_



## Clue 2

Use the combinations and the grid below to find the missing words. Once you have your words, unscramble them to make a sentence and discover which season it was.

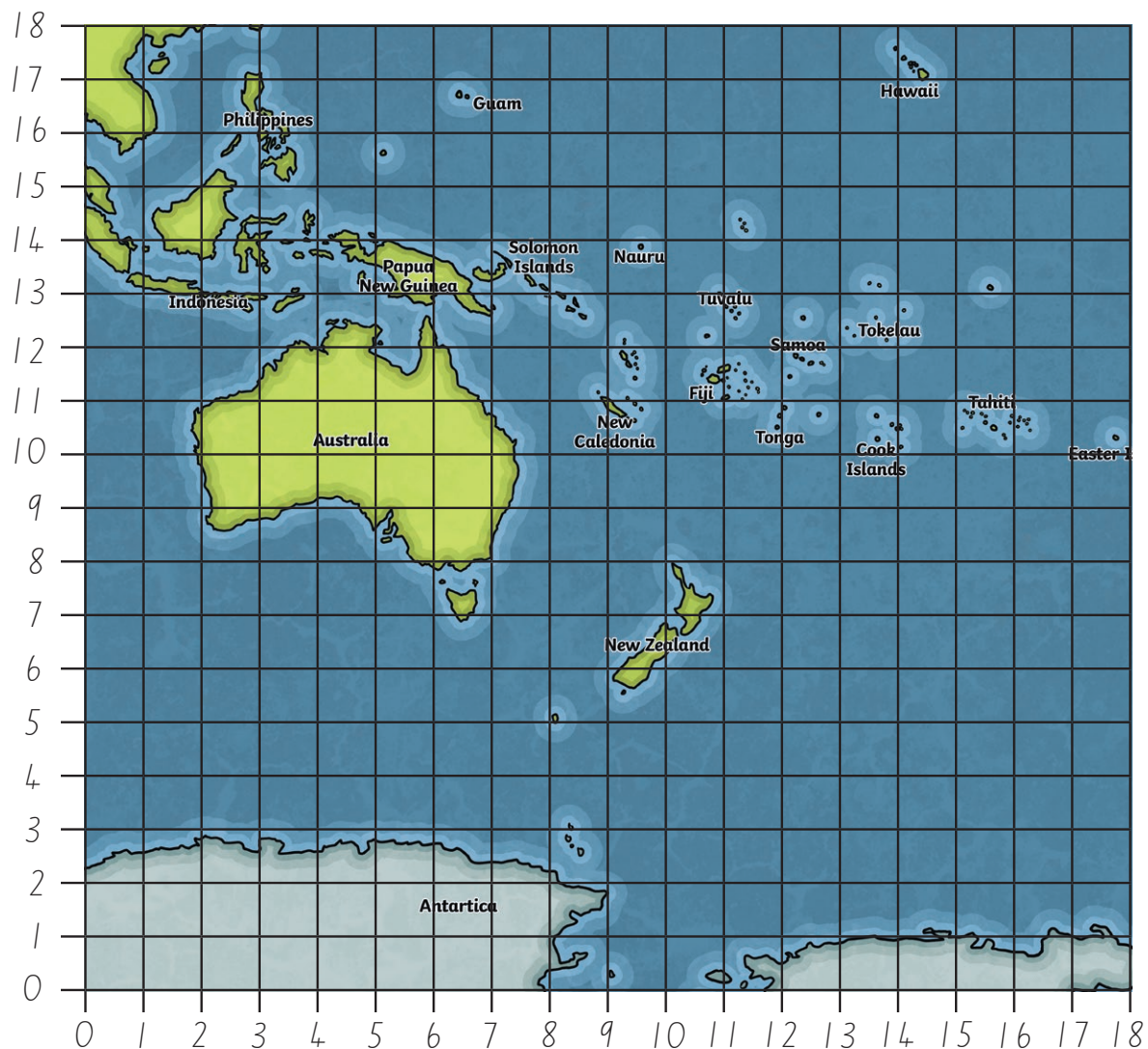
	North	East	South	West
1	latitude	winter	pacific	whale
2	whales	predator	north	cold
3	north east	compass	dolphins	a
4	warm	during	longitude	south
5	marine	calf	they	mammal
6	south-west	ocean	humpback	hot
7	autumn	east	springtime	sea
8	go	coordinates	prey	south-east
9	when	migrate	direction	summer
10	west	down	where	mother

East, 4 \_\_\_\_\_ North, 2 \_\_\_\_\_ West, 4 \_\_\_\_\_  
 South, 6 \_\_\_\_\_ East, 9 \_\_\_\_\_ South, 7 \_\_\_\_\_

Answer to Clue 2: \_\_\_\_\_ .

# Clue 3

Write down the closest landmark to each coordinate, then count the most common landmark in your answers to find out which coastline the humpback whales navigated past.



(10, 7) = \_\_\_\_\_

(9, 7) = \_\_\_\_\_

(4, 12) = \_\_\_\_\_

(7, 1) = \_\_\_\_\_

(10, 12) = \_\_\_\_\_

(12, 8) = \_\_\_\_\_

(16, 12) = \_\_\_\_\_

(4, 17) = \_\_\_\_\_

(11, 9) = \_\_\_\_\_

(12, 12) = \_\_\_\_\_

Answer to Clue 3: The most common landmark is \_\_\_\_\_.

# Clue 4

Use the next clue to help you find out how far the humpback whales travelled in total during this migration. Solve the maths calculations below and then use the words to create a sentence.

a	b	c	d	e	f	g	h	i	j	k	l	m
65	22	81	12	24	94	101	95	54	3	35	36	99
n	o	p	q	r	s	t	u	v	w	x	y	z
48	20	30	41	8	73	15	62	72	98	40	84	34

	Answer	Letter
$\frac{1}{2}$ of 130		
$3 \times 10$		
$100 - 70$		
$72 \div 9$		
$100 - 80$		
8, 16, 24, 32, __, 48		
$9 \times 6$		
$9 \times 11$		
$30 \times 2 + 5$		
$30 - 15$		
$6 \times 4$		
$\_ \div 9 = 4$		
$12 \times 7$		

	Answer	Letter
33, 43, 53, 63, __, 83		
$162 - 108$		
$\frac{1}{2}$ of 80		

	Answer	Letter
$\frac{1}{4}$ of 60		
$5 \times 19$		
$60 \div 3$		
$31 \times 2$		
$121 - 48$		
45, 55, __, 75, 85		
$\_\_ \div 12 = 4$		
$72 \div 6$		

	Answer	Letter
$\frac{1}{2}$ of 70		
$100 - 46$		
$3 \times 12$		
$80 \div 4$		
$3 \times 33$		
$6 \times 4$		
$132 - 117$		
$\frac{1}{3}$ of 24		
$12 \times 2$		
$10 \times 8 - 7$		

Answer to Clue 4:

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## Clue 5

So far, we know that the humpback whales are travelling south during spring, that they navigated past New Zealand and that the approximate total distance travelled was 6000 kilometres. Use the map below to find out which landmark is 6000 kilometres south of Tonga. This will tell you where the humpback whales are now.



Answer to Clue 5: Where did all the humpback whales go? \_\_\_\_

**Bonus question**

Why did all the humpback whales disappear to Antarctica? Using a device, library books or other sources, find out why humpbacks migrate south to Antarctica during spring to complete the mystery!