

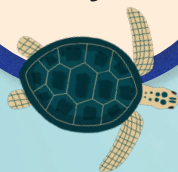


Discovering the Ocean  
with Little Mermaid



unique  
mix of the  
**ENCYCLOPEDIA**

& fairy tale



# Discovering the Ocean

with  
**Little Mermaid**

B4U Publishing





**A**t the bottom of the ocean lay the great kingdom from which the Mer-King and his daughters ruled the oceans and seas. All living creatures in the waters of the kingdom, from the smallest fish to the largest whale, were their subjects. The Mer-King's first daughter was Princess of the Atlantic Ocean, his second Princess of the Indian, his third Princess of the Antarctic, his fourth Princess of the Arctic. The Pacific Ocean, the world's largest, was in the care of the Mer-King himself. He had one more daughter. This girl, called Merina, was too young to rule anywhere.



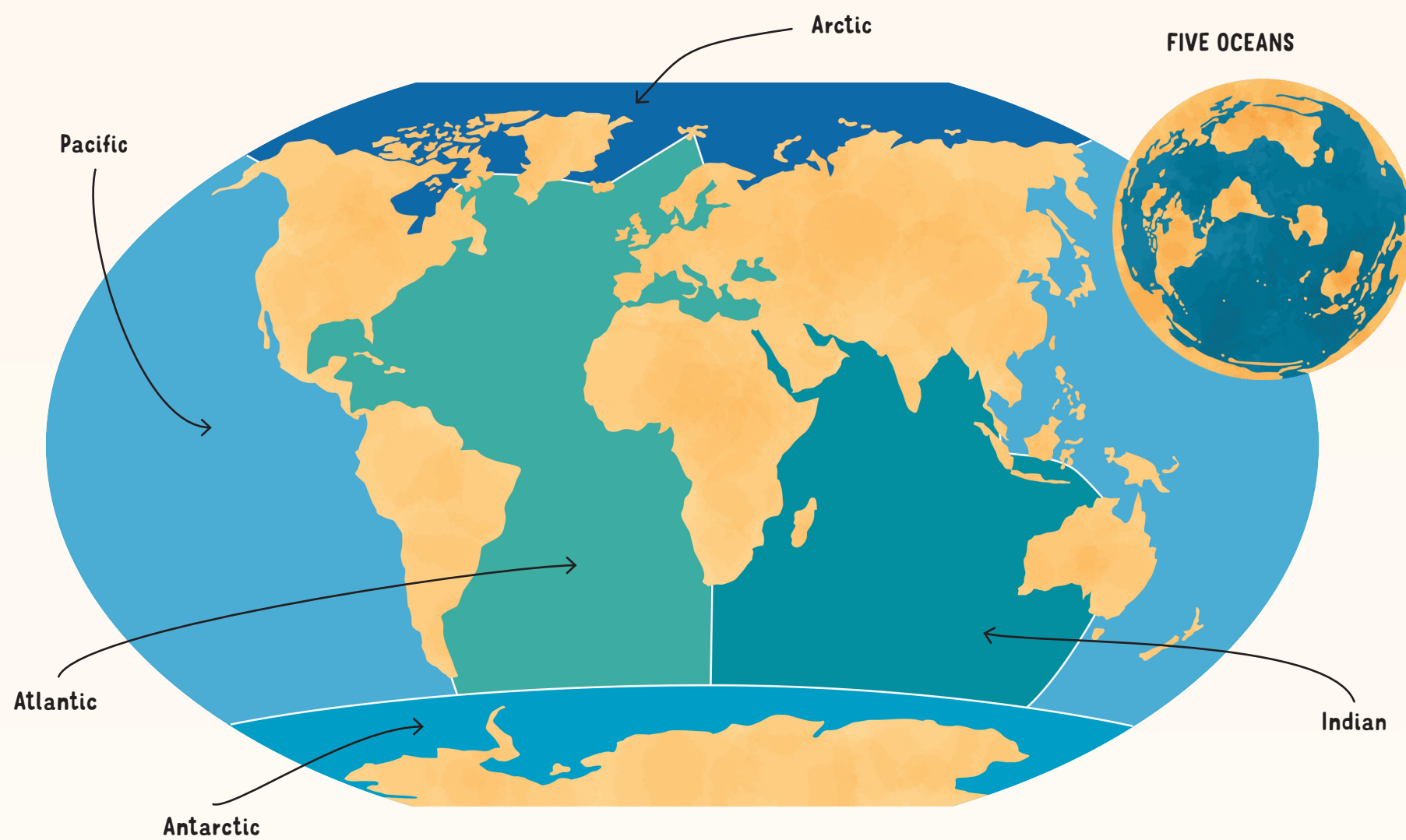


# OCEANS AND SEAS

**F**ive realms of the kingdom of the sea folk is represented by five oceans with imaginary frontiers. In the real world, the oceans and seas are a seamless area that covers 71% of Planet Earth. Home to a great many creatures, it is an integral part of our world and the lives we live on it.

## What is the difference between an ocean and a sea?

An **ocean** is a very large stretch of sea **unbounded by land**. A **sea** is a mass of water **bounded by land** on one side and ocean on the other. Many of the animals we refer to as sea creatures actually live in the ocean.



## Pacific

The largest, deepest ocean washes the shores of **America, Asia and Australia**.

## Atlantic

The second-largest ocean is situated between **America, Europe and Africa**.

## Indian

The third-largest ocean comes together with the Atlantic below **Africa**. It also washes against the shores of **Asia and Australia**.

## Antarctic

This is the ocean around **Antarctica**, and part of it is covered in ice.

## Arctic

The world's smallest ocean is situated at the **North Pole**. In the west, it washes against the shores of North America; in the east, it reaches Siberia. Greenland and Iceland are in the Arctic Ocean.

## Structure of Earth

The ocean is a continuous cover of water on the Oceanic crust — the **uppermost layer** of our planet, composed of lithospheric plates whose constant motion affects the activity of the oceans. Earth's crust conceals the **upper mantle**, the **lower mantle**, the liquid **outer core** and the firm **inner core**.



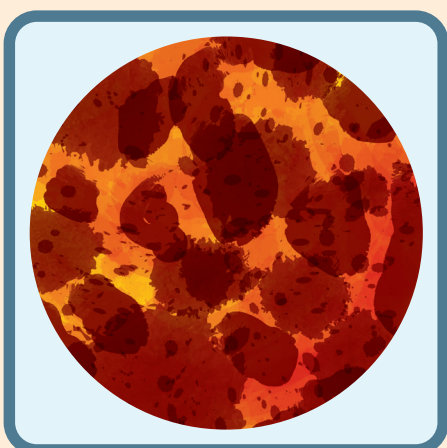
## Oxygen in the ocean

By producing life-giving oxygen, **aquatic plants** have played a vital role in the expansion of life on Earth. Aquatic vegetation and **plankton** share in the production of **oxygen**; like trees, they have the ability to photosynthesize. **Photosynthesis** is a process by which organic compounds use light energy to convert substances into oxygen, so creating the **underwater forests** which provide **50%-70%** of Earth's total oxygen.

## Evolution of Earth

### Hot planet

Earth originated around **4.5 billion years ago**. For the first billion of these, it was but a **hot mass** formed by repeated collisions with other celestial bodies, which contributed a lot of new **chemical elements**. The heaviest of these elements — iron, for instance — sank to the **centre of the planet**, where they formed Earth's core.



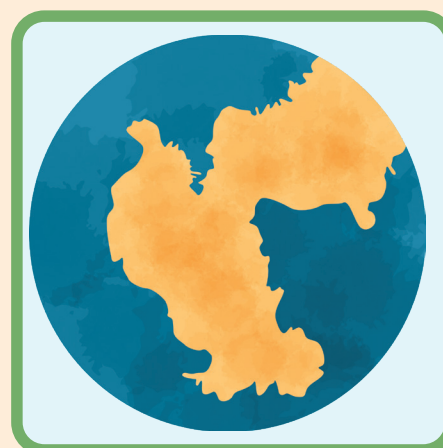
### The first continents

Lighter elements rose upwards from the centre, where they formed Earth's **mantle** and **crust** and large amounts of different gases, came together with vapours produced by falling comets to form the **first rains**. As Earth cooled, the **first ocean** came into being, as did the **first continent** and the **first germs** of life.



### Pangea

The **supercontinent Pangea** began to form around **300 million years ago**, surrounded by the **superocean Panthalassa**. It was assembled from earlier supercontinents which had repeatedly disintegrated and reformed. As Pangea was a single land mass, the **animals** of the time were able to move northwards or southwards; the interior was too dry for them.



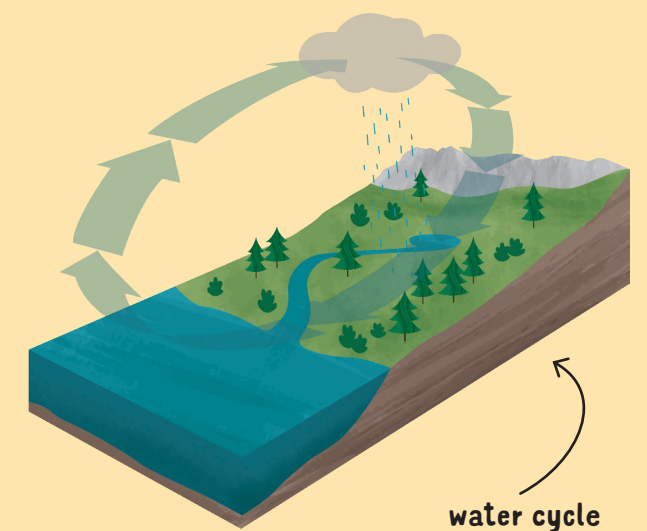
### The present day

The contours of the east coast of **South America** and the west coast of **Africa** may remind us of pieces of a jigsaw puzzle. Following the disintegration of Pangea, **terrestrial life** spread throughout the planet. This migration brought about considerable **climate change**. Today, too, the climate of Earth still changing.



## Why the ocean is salty

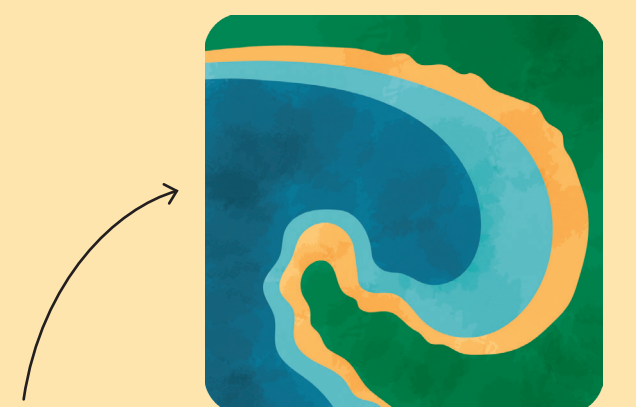
Water on Earth is in **constant circulation**. Ocean water **evaporates into clouds**, from where it rains down on the planet, flowing from the mountains into the **rivers**, so taking it back to the ocean. Water **filtered through soil and rock** is a bearer of vital minerals. These **minerals** collect not in rivers but in the constant waters of the ocean. That is why the ocean is salty.



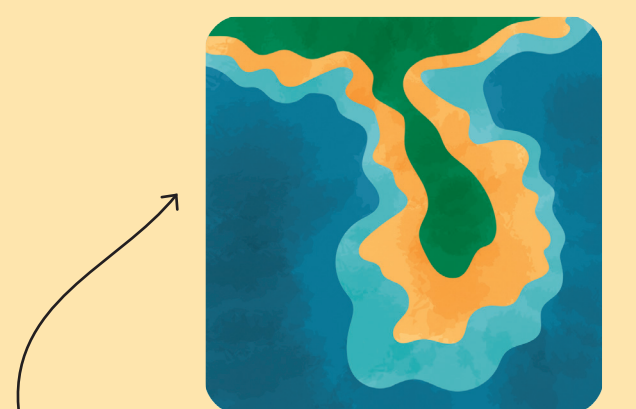
## Land and the sea

As we distinguish between what is **sea** and what is **ocean**, so we make distinctions in the land which the sea touches.

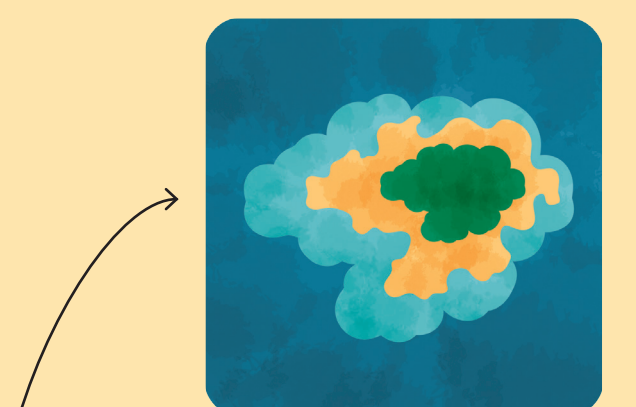
### THREE TYPES OF LAND SURROUNDED BY THE SEA:



Where the sea reaches land, a **bay** is formed.



A strip of land projecting into the sea from the mainland is called a **peninsula**.



Land surrounded by water on all sides is called an **island**.



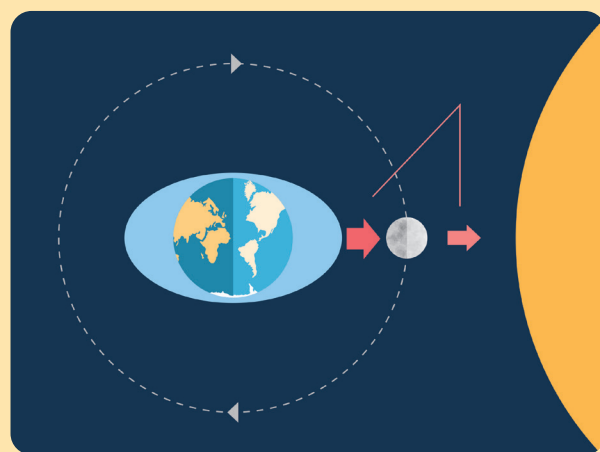
**S**inging of the sailor so captivated Merina that she lost track of time. So it happened that the little mermaid's father caught her in the act and flew into a rage. It was not advisable to upset the Mer-King. His rage whipped up the sea and summoned from the heavens dark clouds, lightning and high winds that tore the sails from the ship. Such a terrible storm can last several days, until the Mer-King calms down. Afraid for the jolly sailors, the little mermaid pleaded with her father to stop the storm. "They weren't doing anything wrong, Father," she said. "They were just having fun. I was only listening to their songs. Please let them be." Though very proud, the Mer-King was wise. He stopped the storm.





## High tide and low tide

### Scheme of tides



Earth and the Moon exert gravitational forces on each other. In combination with the rotation of Earth, this brings about the **rise and fall** of sea levels. This explains why we sometimes find the beach flooded with water, while at others the beach is completely dry.



low tide



high tide

**High tide comes** when the sea level rises. **Low tide comes** when the sea level falls. Taken together, this phenomenon is known as the tidal range. When the **Moon, Earth and the Sun form a line**, a spring tide occurs. Now the tide's range is at its maximum. When the **Moon and Earth are at right angles to the Sun**, a neap tide occurs. Now the tide's range is at its minimum. Movements of bodies of water create waves, some of which are very high.

## Shining ocean



### Glowing jellyfish

Jellyfish deter hungry predators with their **purple-blue light**. Some jellyfish release a chain of lights reminiscent of glowing plankton, confusing their attackers. Occasionally, a truly **amazing spectacle** occurs when so many jellyfish are washed ashore that the shore is covered with them.

# OCEAN PHENOMENA

**E**normous storms, devastating winds and terrible waves unleashed the king on the crew of the ship. Sailors in fairy tales are not the only ones who experience these things, of course. People who live on the coast and real-life sailors encounter many weird and wonderful phenomena, not all of which are destructive. Some are quite ordinary, while others are breathtaking.

### Climate

Ocean currents help **cool and warm** Earth's surface. In simple terms, currents heading north and south from the **equator** are warming, while currents from the North Pole and the South Pole are **cooling**. The most notorious are Gulf stream and Peru Current.

### Gulf Stream

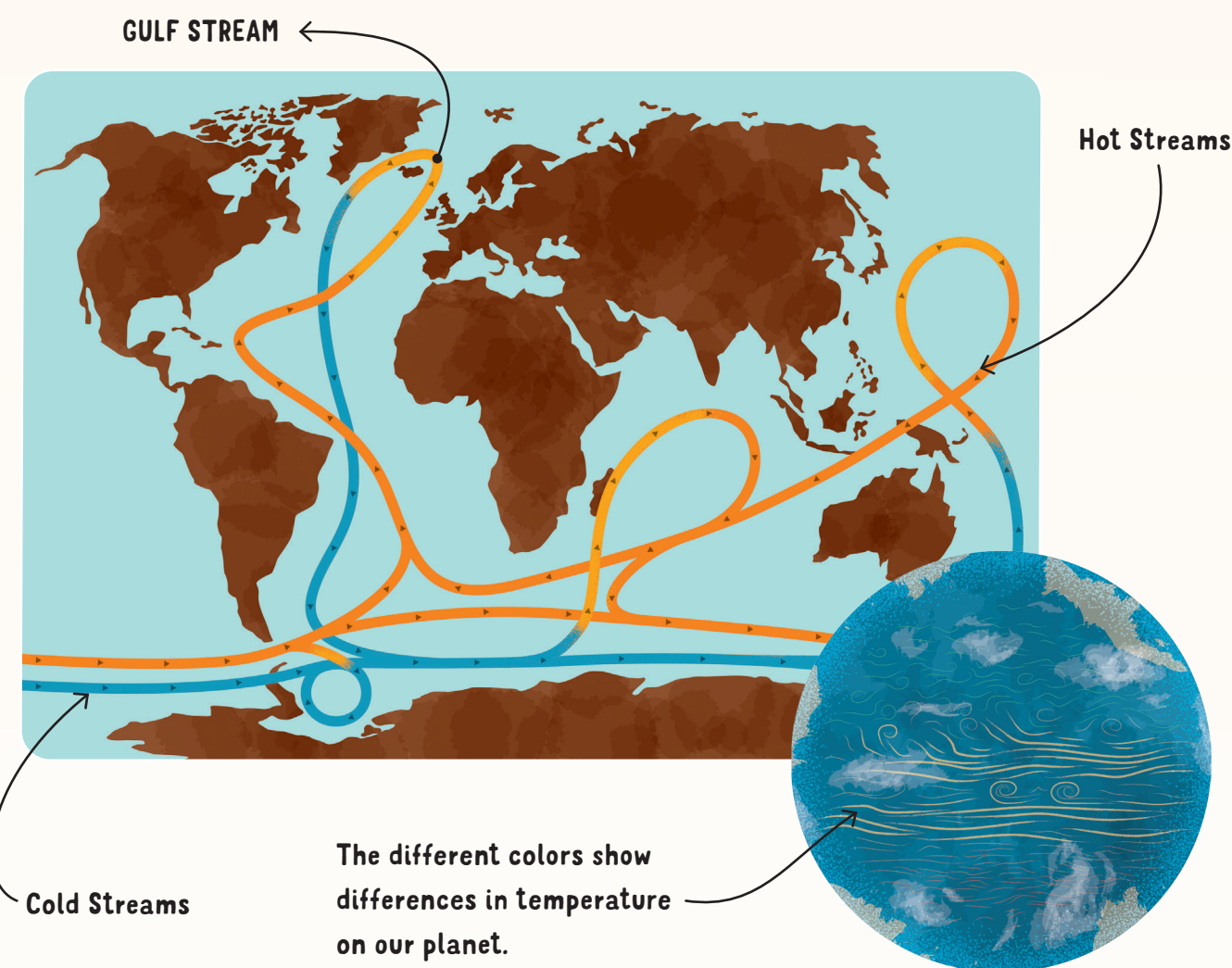
A warm, swift Atlantic Ocean current.

### Peru Current

A cold current that cools the waters west of South America.

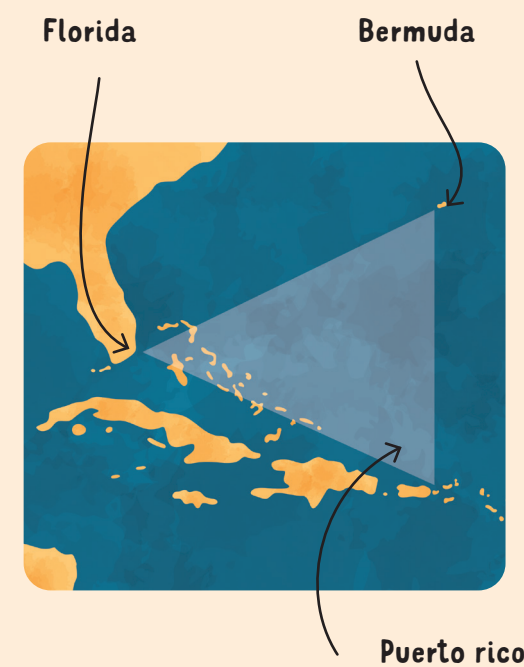
### Currents

For humans, the **constant motions of Earth** are so insignificant that we notice them only when the weather changes. Changes in weather are greatly influenced by **ocean currents**. Flowing like boundless rivers, they cause cooling and warming and the natural phenomena that go with them. Earth is **warmest at the equator**, and it is from there that warm currents flow, so warming Earth's surface towards the poles. **On reaching the poles, they cool**, travelling from the poles towards the equator, they cool Earth's surface. Some currents are **variable and unstable**.



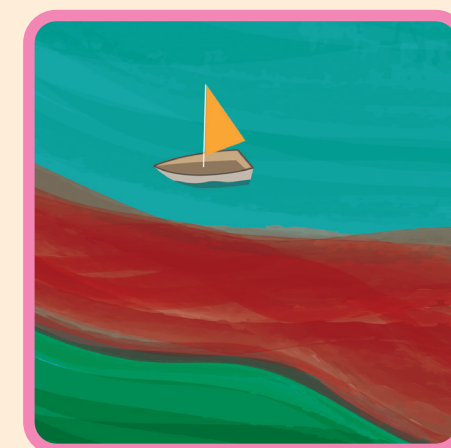
### Bermuda Triangle

The region known as the Bermuda Triangle, which is between **Miami in Florida, Puerto Rico and the islands of Bermuda**, is shrouded in legend. Many stories are told about boats and aeroplanes **lost there forever** in mysterious circumstances, although there are **no records and statistics** to support these stories. This is a region with heavy traffic, changeable terrain and frequent hurricanes, so perhaps it follows that in this place there are **more accidents at sea and in the air** than in many other places. Then again, some say that there is truth in every rumour...



### Bioluminescence

Certain animals glow because of a **chemical reaction** in the body. This phenomenon is called **bioluminescence**. Some animals use it for orientation, others use it to **attract prey** or to **repel predators**. The shores of Puerto Rico are home to plankton whose characteristic blue glow repels fish but attracts inquisitive tourists. The **glow increases in intensity with every movement** the plankton make, making this a spectacle not to be missed.



### Red tide

A phenomenon known as red tide sometimes occurs in the **Pacific Ocean**. It is caused by large concentrations of **algae releasing toxins**. Although the red bloom in the water looks scary, its effect on **humans** is no more serious than **itching of the skin**. For **other creatures**, however, it is very dangerous. These **toxins** are responsible for the **death** of hundreds of manatees off the coast of Florida, for instance.

### Phenomena

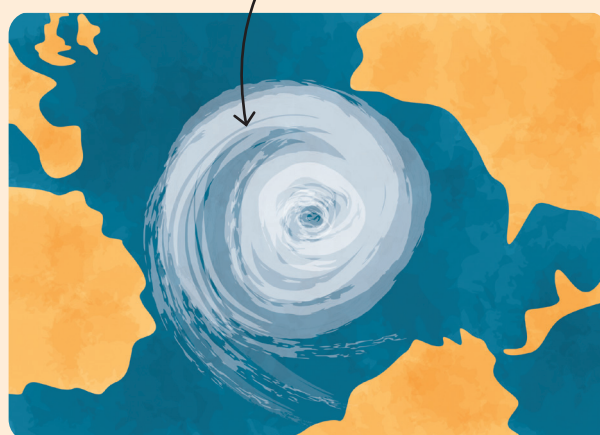
Tsunami came often unexpected



### Tsunami

Earth revolves **around the Sun** and **around its own axis**. Also in constant motion are **tectonic plates** in Earth's crust. Although this motion is very slow, sometimes it makes itself known by **causing an earthquake** or **shifting a large amount of water**. By creating great waves, this shifting of water can wreak **havoc in coastal areas**. The largest-ever tsunami, with waves up to **520 metres** high, was measured in **Alaska**.

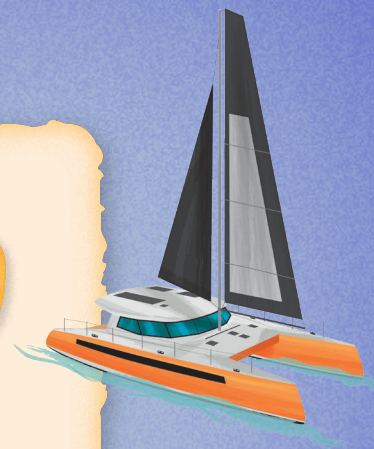
Huge vortex of air



### Tropical cyclone

One of the most destructive phenomena. The **cyclone**, a rotating air mass with **very low atmospheric pressure**. Cyclones are generated in **tropical regions**, where water heats up to a certain temperature at a certain depth. They are accompanied by **violent storms**, winds and rain. Although they lose force as they rise, they wreak havoc on coastal states and sometimes go **further inland**. They have different names in different parts of the world; the term '**cyclone**' is used in regions of the **Indian Ocean**, while the term '**hurricane**' is more common in the **Atlantic** and the **North and South Pacific**. In **Southeast Asia**, people refer to this phenomenon as a '**typhoon**'.





## Discovering the Ocean with Little Mermaid

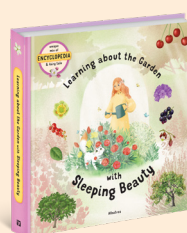
Text by Tom Velčovský

Illustrations by Jakub Cenkl & Tomáš Pernický

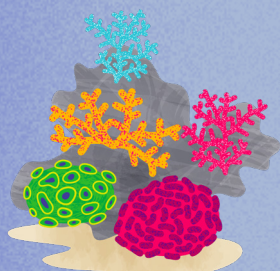
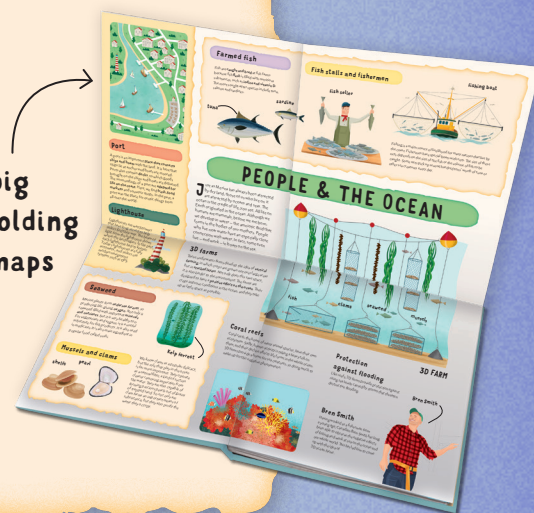
**T**he Mer-King is a just guardian of peace and tranquillity in the ocean, a cradle of life that knows no end. But this calmness is a bother to his inquisitive daughter Merina, the little mermaid. Her fascination for the human world is a great worry to her father: in his eyes, humans are enemies of the sea. Merina believes humans to be merry creatures who love to play. So what do we know about humankind's relationship with the ocean? How do humans and sea creatures interact, and how do sea creatures interact among themselves? Dive into the pages of Discovering the Ocean with Little Mermaid to learn about all this and much, much more.



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WARNING:  
Choking hazard.  
Not suitable for children  
under 36 months.

