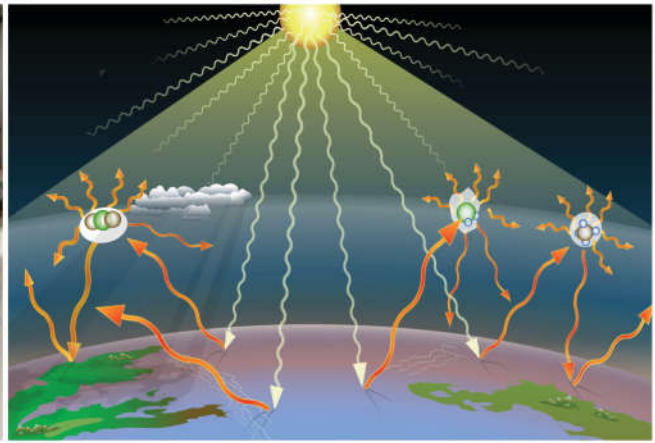
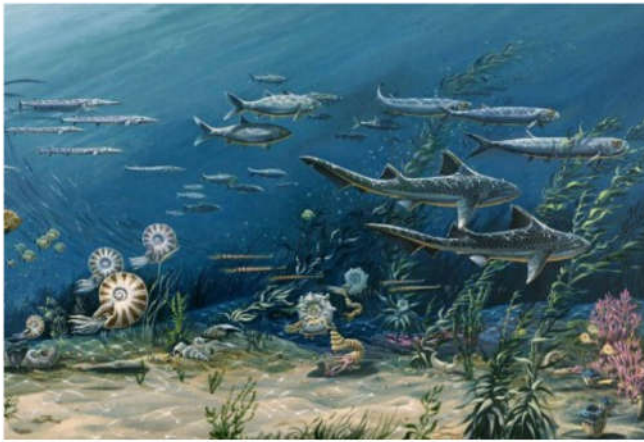


GEOGRAPHY

8

Based on Single National Curriculum 2022



Punjab Curriculum and Textbook Board, Lahore

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

(In the Name of Allah, the Most Compassionate, the Most Merciful.)

GEOGRAPHY

8

Based on Single National Curriculum 2022

ONE NATION, ONE CURRICULUM



**PUNJAB CURRICULUM AND
TEXTBOOK BOARD, LAHORE**

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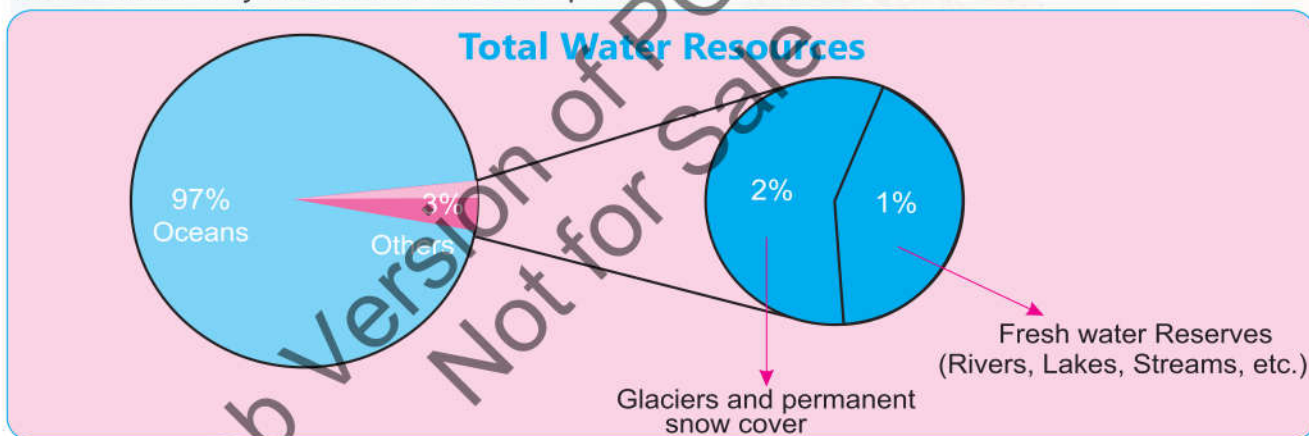
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OCEANS AND SEAS

Students' Learning Outcomes:

- Differentiate between oceans and seas.
- Describe the location, total area, temperature and marine life of major oceans of the world.
- Describe and differentiate between various sea features such as peninsula, isthmus, gulf, bay, strait.
- Explain the movements of ocean water.
- Explain the importance of oceans in our lives.
- Identify ways in which ocean acts as a source of food for the world.
- Identify the role of marine biodiversity on our environment.
- List down all possible threats the oceans are facing nowadays.

Water covers **71%** of the Earth surface, **97%** of all the water on the Earth is in oceans and remaining **3%** is fresh water. Oceans have a significant influence over the Earth's weather and climate. They also stabilize the temperature on land.



Oceans and Seas

Ocean is a huge body of salt water on the Earth's surface whereas sea is the part of ocean partly enclosed by land. The largest body of water on the surface of the Earth is called ocean and an adjacent smaller body of water located on the margins of the ocean is called sea. There are five oceans in the world. The details are given below:

(i) Pacific Ocean

It is the largest ocean of the world. Its area is about 166 million square kilometres. Its average depth is about 4280 metres. Pacific ocean is located between four continents, Asia and Australia in the west, north and south America in the east. Starting from equator, it extends beyond both arctic and antarctic circles in the north and south respectively. It is the largely tropical ocean. Panama Canal which links Pacific Ocean with the Atlantic Ocean is among the important trade routes in the world.

(ii) Atlantic Ocean

It is the second largest ocean. Its area is about 82 million square kilometres and average depth is about 3900 metres. It is also the most important and busiest trade route of the world. Atlantic Ocean is also located between four continents, north and south America in the west, Europe and Africa in the east. Starting from equator, it extends beyond both arctic and antarctic circles in the north and south respectively. Mid-oceanic ridge, which is the result of eruption of magma at the divergent plate boundary is the significant feature of this ocean.

Do you know?



Mariana Trench is the deepest point of the Earth surface which is located in the Pacific Ocean. Its depth is about 36,201 feet.



(iii) Indian Ocean

It is the third largest ocean. Its area is about 73 million square kilometres and its average depth is 3900 metres. It is located between Africa in the west, Asia on the north, Australia on the east, and Antarctic Ocean in the south.

It has become an important trade route between western and eastern hemispheres due to the construction of Suez Canal which links Red Sea with the Mediterranean Sea through Indian Ocean. The Indian Ocean is home to several unique types of animals, including sea turtles, sharks, sea snakes, dugongs, and whales.

(iv) Antarctic Ocean/Southern Ocean

It is the fourth largest ocean in the world. It is located across the Antarctic circle and extends up to the Antarctica continent. It covers an area of about 22 million square kilometres and with average depth of about 3200 metres. It has no distinct boundary with the Pacific, Atlantic and Indian Oceans. Extreme cold water and huge icebergs are main features of this ocean.

(v) Arctic Ocean

Arctic Ocean is situated around the North Pole. It has an area of about 15 million square kilometres with average depth of about 1200 metres. Shallow waters, low salinity and frozen surface are main features of this ocean.



Marine Biodiversity

Arctic Ocean

Life in the oceans shows patterns of both similarities and diversity. These oceans are the habitat of lot of species of fish, seals, walruses, sea lions, corals and mollusks, etc. Antarctica and Arctic oceans have their maximum stretch beyond the arctic and antarctic circles. Almost 235 marine species are found in both Antarctica and the Arctic, ranging in size from whales and birds to small marine, snails and sea cucumbers etc. There are twelve species of marine mammals that regularly inhabit in the Arctic. Four species of whales, the polar bear, the walrus, and six species of ice-associated seals. Several additional species like whales, blue whales and fin whales etc. are also there.

Sr. No	Name of Ocean	Area (Million sq.km)	% of All Water
1	Pacific	166	46
2	Atlantic	82	23
3	Indian	73	20
4	Antarctic	22	7
5	Arctic	15	4

Temperature of the Ocean Water

Temperature of the ocean water is not only the prime factor controlling the abundance and variety of marine life but also maintains the temperature of the coastal areas.

Temperature of the ocean water decreases with increase in depth. Like atmosphere oceans have a layered structure with respect to variations in the temperature. These layers are:

1. Warm Surface Layer, which has an average temperature of 20° to 25°C .
2. Middle Layer, which has an average temperature of 5° to 20°C . It is also called Thermocline.
3. Cold Deep Layer, which has an average temperature of 0° to -5°C .

In Arctic and Antarctic oceans, this three layered structure is replaced by single layer of cold water.

Different Features Associated with Sea

There are number of major features associated with sea like:

(i) Peninsula

An area of land which is surrounded by ocean water from three sides except for an isthmus which connects it with the mainland on one side is called peninsula i.e., Arabian and Indian Peninsula.

(ii) Isthmus

A narrow strip of land which connects two large masses of land and separates two water bodies is called an isthmus, i.e. Isthmus of Panama which connects north and south American continents and the isthmus of Suez which connects Asia with Africa.



Peninsula



Isthmus

(iii) Gulf

A large but narrow part of ocean which invades farther inland is called gulf, i.e., Persian Gulf and Gulf of Mexico, etc.

(iv) Bay

Contrary to gulf, large and vast part of ocean which invades farther inland is called bay, i.e., Bay of Bengal and Hudson Bay etc.



Gulf



Bay

(v) Strait

A narrow channel of water which connects two large bodies of water i.e. oceans or seas is called strait i.e. Strait of Gibraltar which connects Atlantic Ocean with Mediterranean Sea.

(vi) Island

An area of land surrounded by water from all sides is called an island, i.e., Srilanka, and Greenland.



Strait



Island



Activity Corner!

Use available sources such as maps, GIS and Google Maps to identify different seas and oceans of the world.

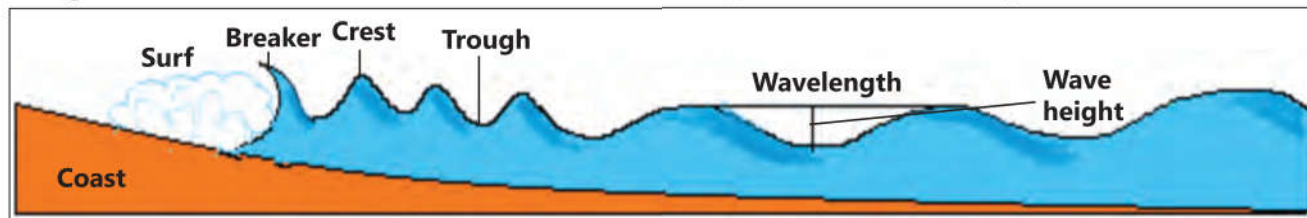
Sr. No	Name of Sea	Area (Million Sq. km)
1	South China Sea	2.9
2	Caribbean Sea	2.5
3	Mediterranean Sea	2.5
4	Black Sea	0.5
5	Arabian Sea	0.4

Movement of Oceanic Water

Ocean water never remains stagnant. It tends to move. Main types of this movement are waves, currents and tides. Let us have a look on its nature and causes of these movements.

(i) Waves

The movement of surface water due to winds is called wave. Waves in an ocean are generated due to different natural factors. Actually, it is the movement of energy which is transferred in water particles from one to another. The top of the wave is called crest and the bottom is called trough. The vertical distance between crest and trough is called wave height.

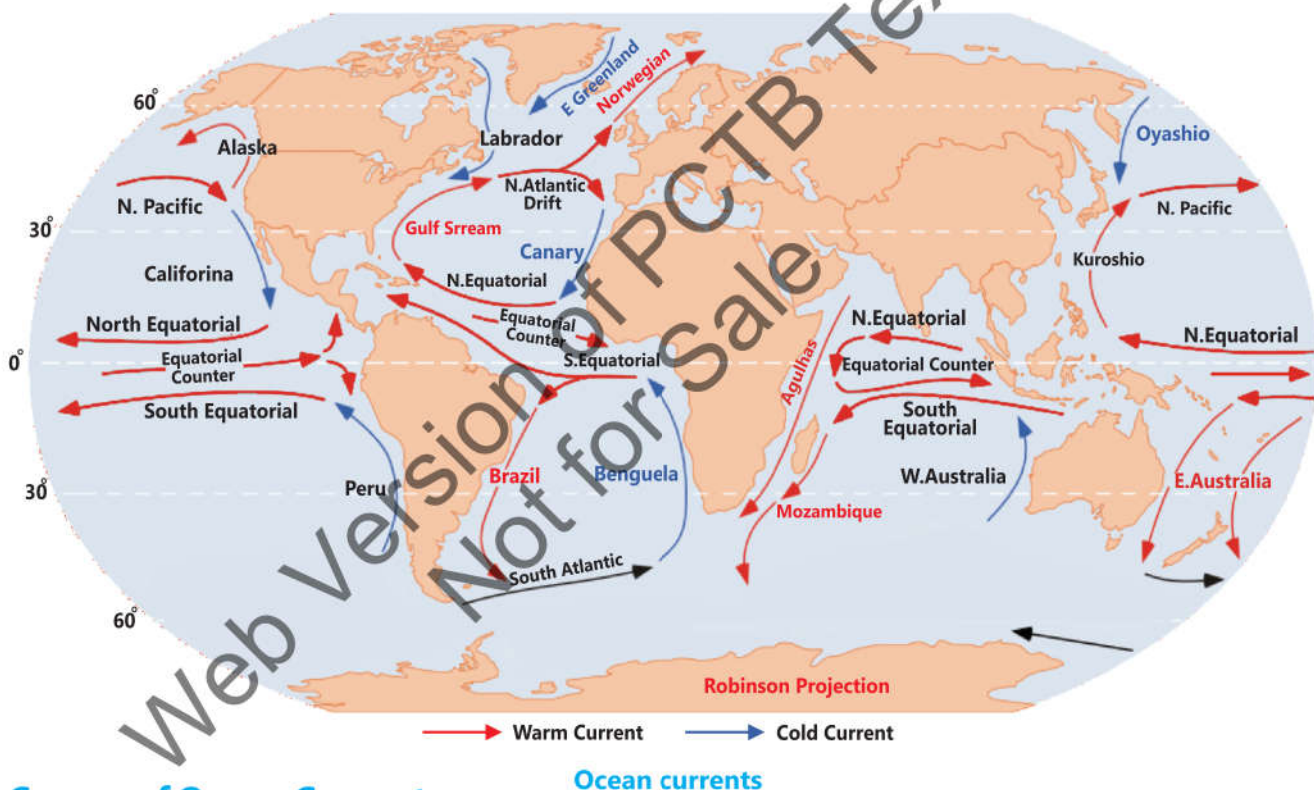


Wave

The horizontal distance between two crests or troughs is called wavelength. Winds are the main cause of generating waves. Cyclones and tornadoes which originate and travel across the oceans also create waves. An earthquake near coastal areas or beneath the ocean floor can also generate huge waves.

(ii) Currents

Permanent flow of Ocean water in a specific direction (like river flow on land) is called current. The currents which flow from equator to polar areas are called warm currents. They increase the temperature of coastal areas e.g. Gulf stream along the eastern coast of North America in the Atlantic Ocean is a warm current. The currents which flow from polar areas to equator are called cold currents e.g. Labrador current in Atlantic and Kamchatka current in the Pacific Ocean are cold currents. Currents move clockwise in the northern hemisphere and anti-clockwise in the southern hemisphere. A larger current formed by joining of two currents is called drift.



Causes of Ocean Currents

Following are the major causes of current circulation:

(a) Permanent Winds

The most important cause of current circulation are permanent winds. Winds force the ocean water to circulate in their general direction e.g. trade winds blow from east to west, while western winds blow from west to east. So the currents move eastwards under trade winds and vice versa under western winds.

(b) Salinity of Oceanic Water

Salinity variation also causes the ocean water to circulate. Water of inland seas is more

saline than the water of open seas and oceans. So more saline water due to its higher density sinks downwards while less saline water moves upwards. This variation of salinity causes current circulation.

(c) Temperature of the Oceanic Water

Temperature difference is another cause of current circulation. Warmer water of equatorial regions moves upwards, while colder water of polar regions sinks downwards due to greater density.



Do you know?

When earthquake originates beneath the ocean floor, it generates huge waves called Tsunamis.

(iii) Tides

There is a continuous rise and fall in the sea level. Twice a day, the sea level rises and falls as well. This is called tides. The basic cause of tides is the gravitation of Moon. This reality was presented by Newton in his "Theory of Gravitation" in the 17th century. According to this theory, every two celestial bodies attract each other. So, the Moon, which is nearest to the Earth, creates tides on the Earth. So, the effect of Sun's gravitation is 46% of the Moon's gravity on the Earth.

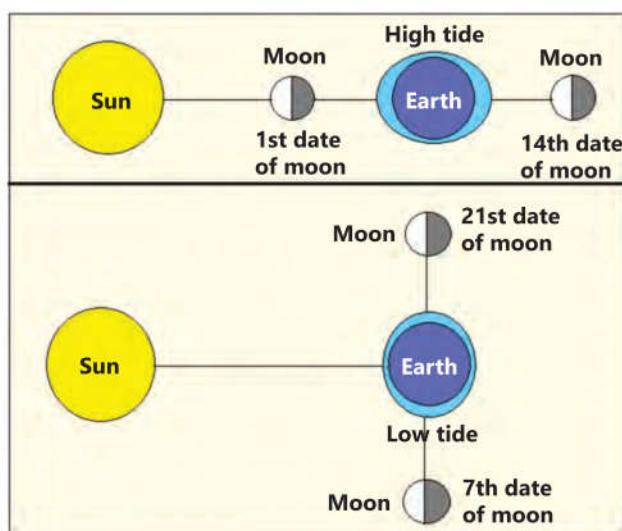
According to nature, there are two types of tides, daily and monthly tides. Daily tides occur twice with the interval of 12 hours and 25 minutes. The effect of gravitation is maximum on the portion of the Earth which is in front of the Moon and is minimum on the other side. But the centrifugal forces of the Earth maintain balance of tides on the other side too. So, the effect of gravitation is equal on both sides of the Earth. Monthly tides are of two types

(a) Spring Tides

The Earth revolves around the Sun and the Moon revolves around the Earth. During this revolution it happens twice on the 1st and 14th date in a lunar month that the Moon, Earth and Sun are in the same plane. The combined gravitation of Sun and Moon creates very high tides in the sea. These are called spring tides.

(b) Neap Tides

Twice in a lunar month on the 7th and 21st date, it happens that the Moon and Sun are perpendicular to each other with reference to the Earth. Gravitation of both bodies counter act each other resulting in the creation of low tides in the seas. These are called neap tides.



Spring and Neap Tides



Activity Corner!

Explore the relationship of moon with Spring and neap Tides.

Importance of Ocean's Water in our Lives

Earth is a water world. Life owes its existence on the Earth because of presence of a huge reservoir of water. This makes the Earth unique from other planets of the solar system. The importance of oceans can be summarized in following points :

- Oceans have a great potential for wave and tidal power.
- Oceans have vital economic importance due to tourism, particularly island-countries like Sri Lanka.
- Oceans are a source of minerals like oil, gas and salt.
- Oceans are rich source of fishes.
- Oceans are the world highways. Transportation of oil, minerals, consumer goods and food are transported through oceans.
- Phytoplankton is a microscopic plant. Basically, these tiny little organisms act in the same way as tree leaves do on land. Phytoplankton absorbs carbon dioxide and releases oxygen.
- Many creatures depend and live in the oceans.
- The oceans are home for the abundance of organisms on our planet.



Sea Port

Oceans as Source of Food

The oceans have always been a source of food for human. But until now only about one percent of mankind's food comes from the sea and much of it is fish. Oceans have always been an important and reliable source of food.

The importance of seafood in the human diet varies greatly around the world. One of the main services provided by the oceans to human societies is the service of food. So, the utilization of fish and aquaculture resources should be made sustainable in order to safeguard future benefits.



Source of food



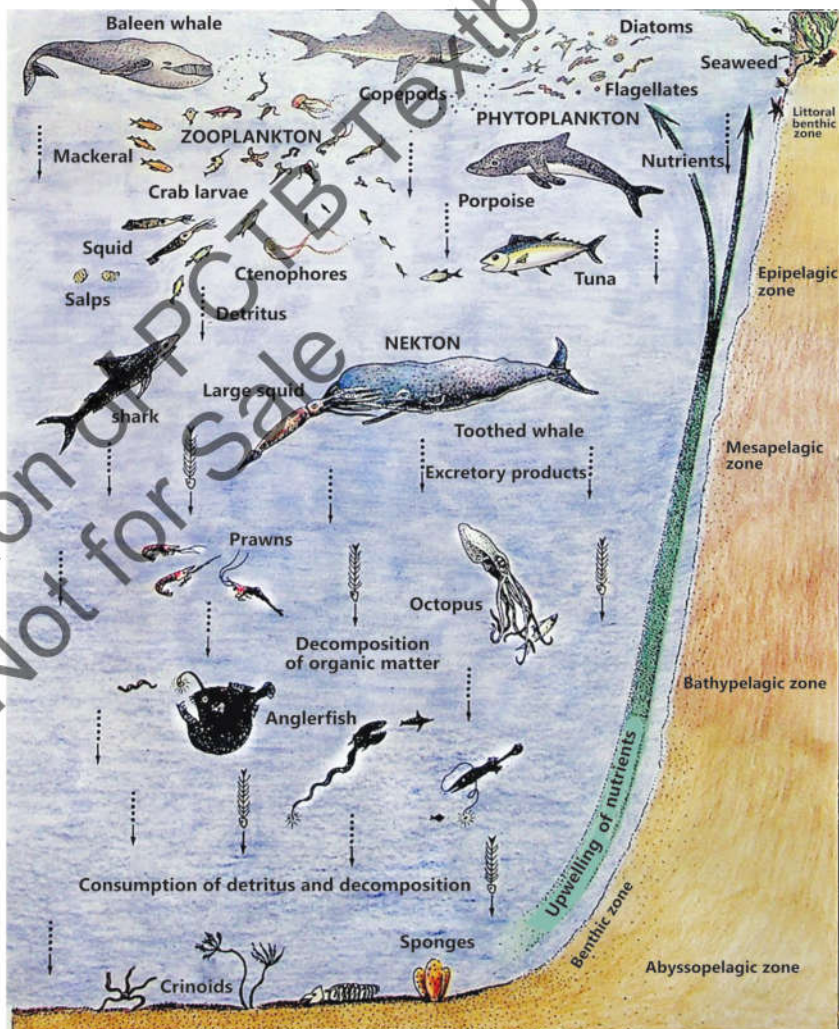
Do you know?

There are about 20,000 kinds of fishes living in the sea. We eat only a few kinds.

Role of Marine Biodiversity on Our Environment.

Marine biodiversity may be determined as because the variety of life found in the ocean and seas. It has great importance for the three fundamental pillars (economic, social and environmental) of sustainable development. The role of marine biodiversity in our environment can be discussed in following points:

- The ocean is one of the main bank/reservoirs of the world's biodiversity. It constitutes over 90% of the habitable space on the planet and contains some 250,000 known species.
- The ocean, and the life therein, are critical to the healthy functioning of the planet, supplying half of the oxygen we breathe and absorbing annually about 20% of the anthropogenic carbon dioxide (CO₂) emitted into the atmosphere.
- The fishery and aquaculture sectors are a source of income for hundreds of millions of people, especially in low-income families.
- It is contributing directly and indirectly in the food security.
- Marine ecosystems provide many services for coastal communities around the world such as livelihoods, clean water, forest products etc.



Ocean's Biodiversity

Therefore, no body can deny that oceans and biodiversity therein is contributing a large in our environment.



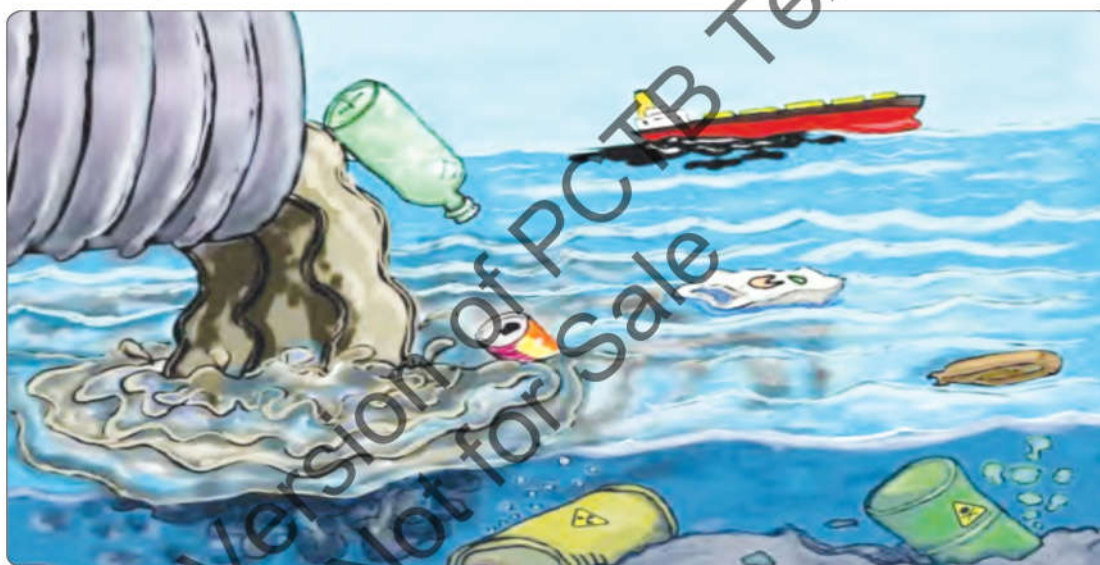
Activity Corner!

Divide class into two groups and compare the Indian Ocean with the Pacific Ocean.

Threats That Oceans are Facing Now-a-Days

Human activities are threatening the health of Earth's oceans. Due to these activities, marine ecosystems are changing very rapidly. Some of the rapidly increasing threats are :

- (i) The rapid urban growth and municipal waste water is polluting the marine water. This pollution adversely affects the marine biodiversity.
- (ii) More than 80% of marine pollution comes from land-based activities. Due to this, entire marine ecosystems are changing rapidly.
- (iii) Global warming is causing alterations in ocean composition which is threatening many species of marine animals.
- (iv) Factories and industrial plants discharge sewage and other run off into the oceans which are harmful for fishing and to marine diversity.
- (v) Spilling of oil from the ships is polluting the oceans.
- (vi) Overfishing is also a threat to marine species.



Ocean's Threats

How We Can Minimize the Threats

There are some measures to reduce the threats which oceans are facing.

- (i) Establish marine parks to protect biodiversity.
- (ii) Reduce destructive fishing practices such as trawling.
- (iii) Minimize the use of military sonar that can harm or kill whales and other marine mammals.
- (iv) Help fishers to maintain their livelihoods by incorporating conservation efforts.
- (v) Promote sustainable fishing harvest.
- (vi) Raise public awareness to keep the coasts clean.

Teacher Guide

Discuss and formulate questions about the use of ocean water as a source of food. Evaluate some sustainable ways of that use.

Key Points

- Oceans are largest bodies of salt water on the surface of the Earth.
- Marine biodiversity includes sea otters, fishes as salmon, tuna, cod, halibut, marlin etc.
- Deep trenches are also present in oceans.
- A narrow strip of land which connects two large masses of land is called an isthmus.
- Ocean water never remains stagnant. It tends to move. Main causes of this movement are waves, currents and tides.
- The ocean produces more oxygen than a rainforest.
- The ocean has always been a source of food for man. But until now only about 1% of mankind's food comes from the sea and much of it is fish.
- Human activities are threatening the health of world's oceans.

Exercise

1. Tick (✓) the correct answer:

i. One of the largest oceans of the world:

- | | |
|-------------------|--------------------|
| a. Pacific ocean | b. Indian ocean |
| c. Atlantic ocean | d. Antarctic ocean |

ii. The largest salt water body on the surface of the Earth is called:

- | | |
|-----------|--------|
| a. ocean | b. sea |
| c. strait | d. bay |

iii. Connects Atlantic Ocean to Mediterranean Sea:

- | | |
|-------------------|---------------------|
| a. Malacca Strait | b. English Channel |
| c. Baring Strait | d. Gibraltar Strait |

iv. Moon, Earth and Sun are in same plane on:

- | | |
|---|---|
| a. 1 st date of lunar month | b. 7 th date of lunar month |
| c. 21 st date of lunar month | d. 29 th date of lunar month |

v. The continuous rise and fall of sea level is called:

- | | |
|-------------|----------|
| a. currents | b. tides |
| c. surf | d. waves |

2. Write short answer to the following questions:

- Define gulf.
- Differentiate between spring and neap tides.
- Differentiate between ocean and sea.
- What is the difference between strait and isthmus?

- (v) What is meant by ocean current?
- (vi) Give two major threats that oceans are facing now a days.
- (vii) Differentiate between Bay and Gulf.

3. Write detailed answer to the following questions:

- (i) Discuss characteristics of some important oceans.
- (ii) Evaluate the importance of oceans.
- (iii) How ocean act as a source of food?
- (iv) Explain the role of marine biodiversity on our environment.
- (v) What are the causes of ocean currents?

Learning Activities:

The Teacher will:

- Inquire how climate change is affecting oceans.
- Inquire and gather data about various seas and oceans around the world.
- Evaluate the consequences of the rising of sea level.

Critical Thinking Questions:

- Suggest some ways to reduce marine pollution.
- Why do we care our water resoures?
- What can we do to save marine biodiversity?
- How can we use oceans to generate electricity?

Project For Students:

- Draw a model of spring and neap tides and present in your classroom.