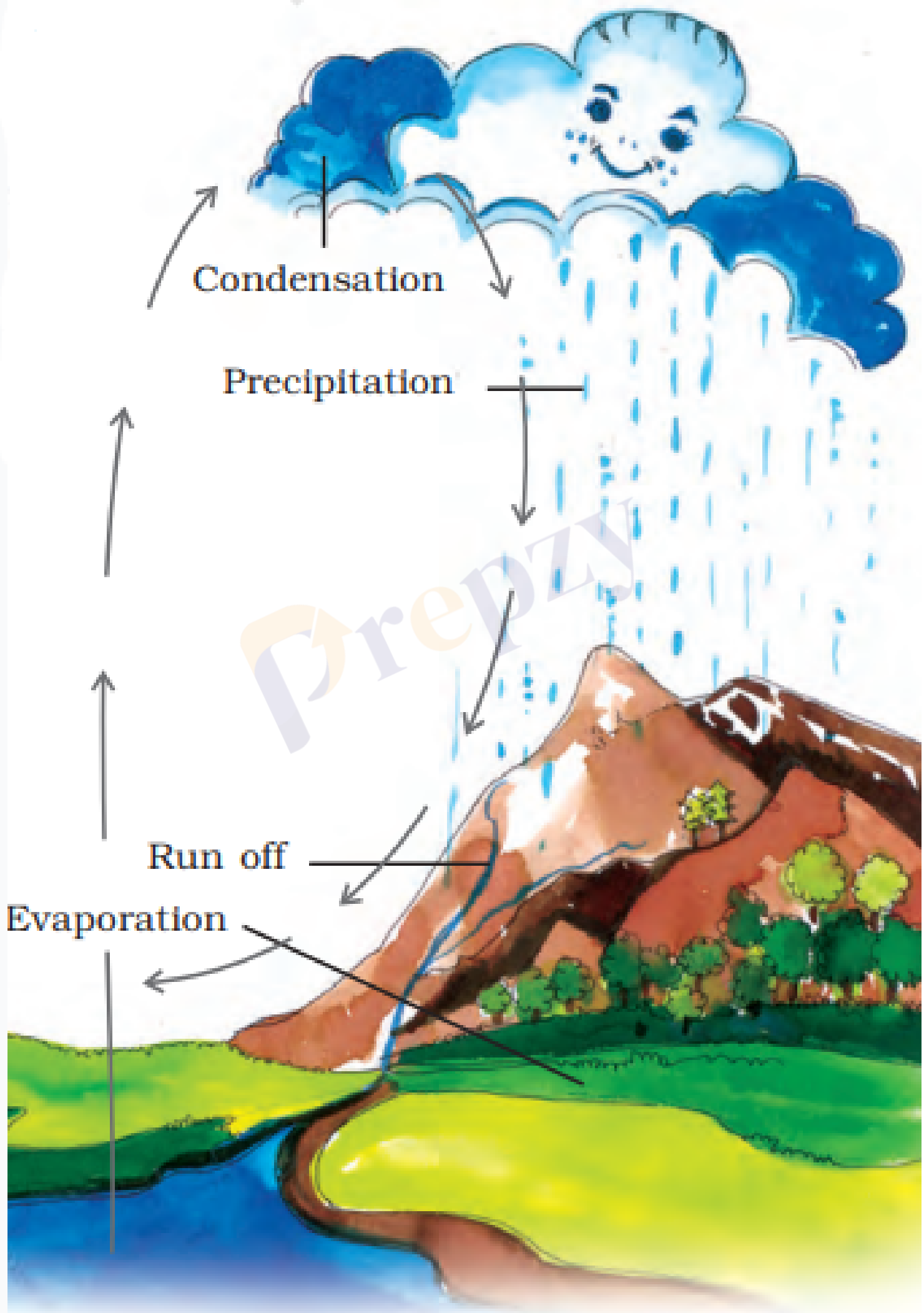


- Introduction to Water
- Distribution of Water Bodies
- Water Scarcity and Conservation
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- Ocean Circulation
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## Introduction to Water

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Water is essential for life and exists in various forms such as rivers, waterfalls, rain, and groundwater. The water cycle describes the continuous movement of water on, above, and below the Earth's surface through processes like evaporation, condensation, precipitation, and runoff.



# Fig. 5.1: Water Cycle

## Water Cycle Processes

**Evaporation:** Water from oceans, rivers, and soil turns into vapor due to the sun's heat.

**Condensation:** Water vapor cools and forms clouds.

**Precipitation:** Water falls as rain, snow, sleet, or hail.

**Runoff:** Water flows over land into rivers, lakes, and oceans.

## Exam Questions

**Q1:** What are the main stages of the water cycle?

**A1:** Evaporation, condensation, precipitation, and runoff.

**Q2:** Why is the water cycle important?

**A2:** It recycles water, maintaining life and ecosystems on Earth.

## Distribution of Water Bodies

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About three-fourths of the Earth's surface is covered by water, but most of it is saline and not suitable for drinking. Freshwater is found in icecaps, groundwater, lakes, rivers, and the atmosphere in varying proportions.

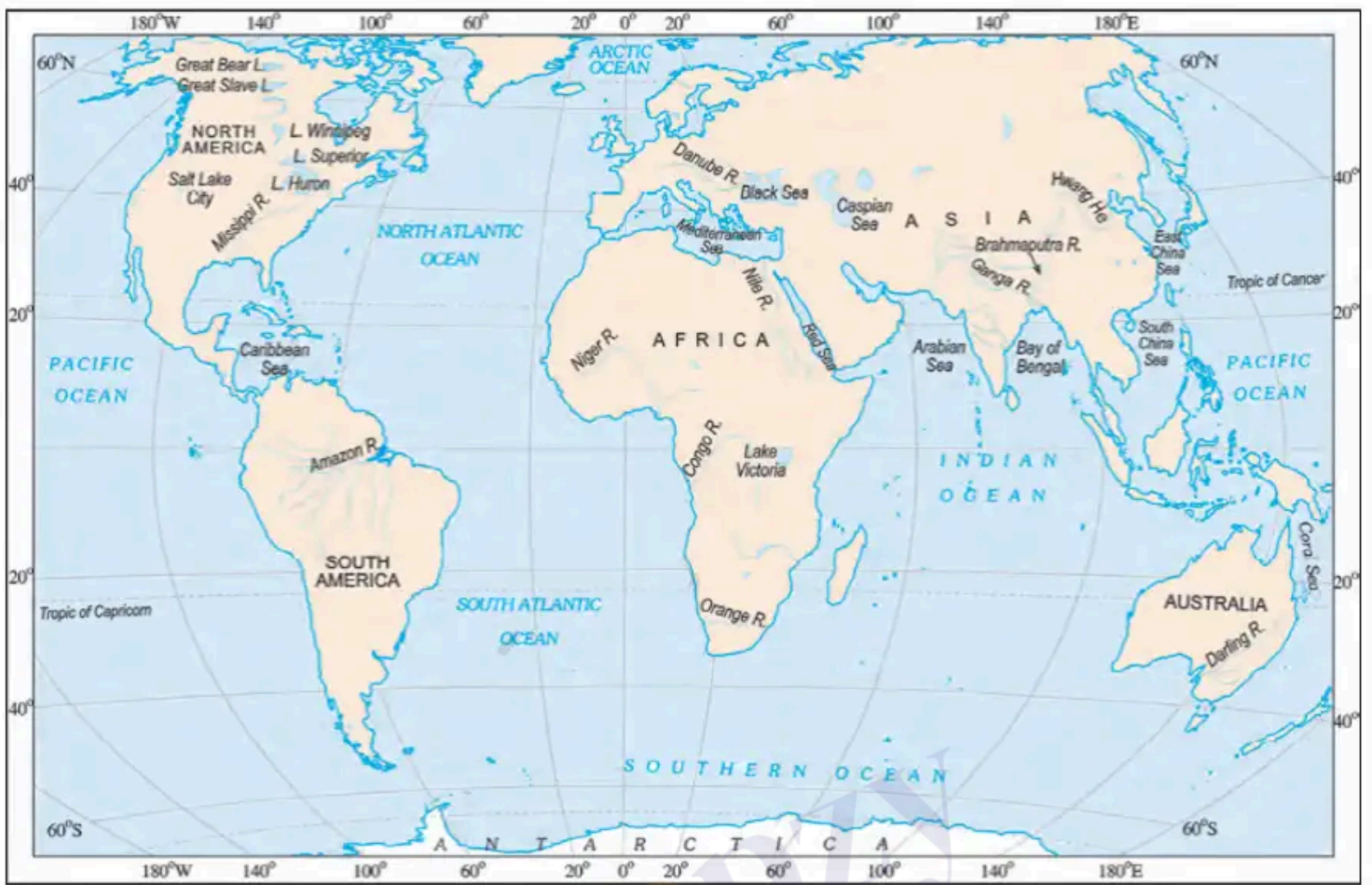
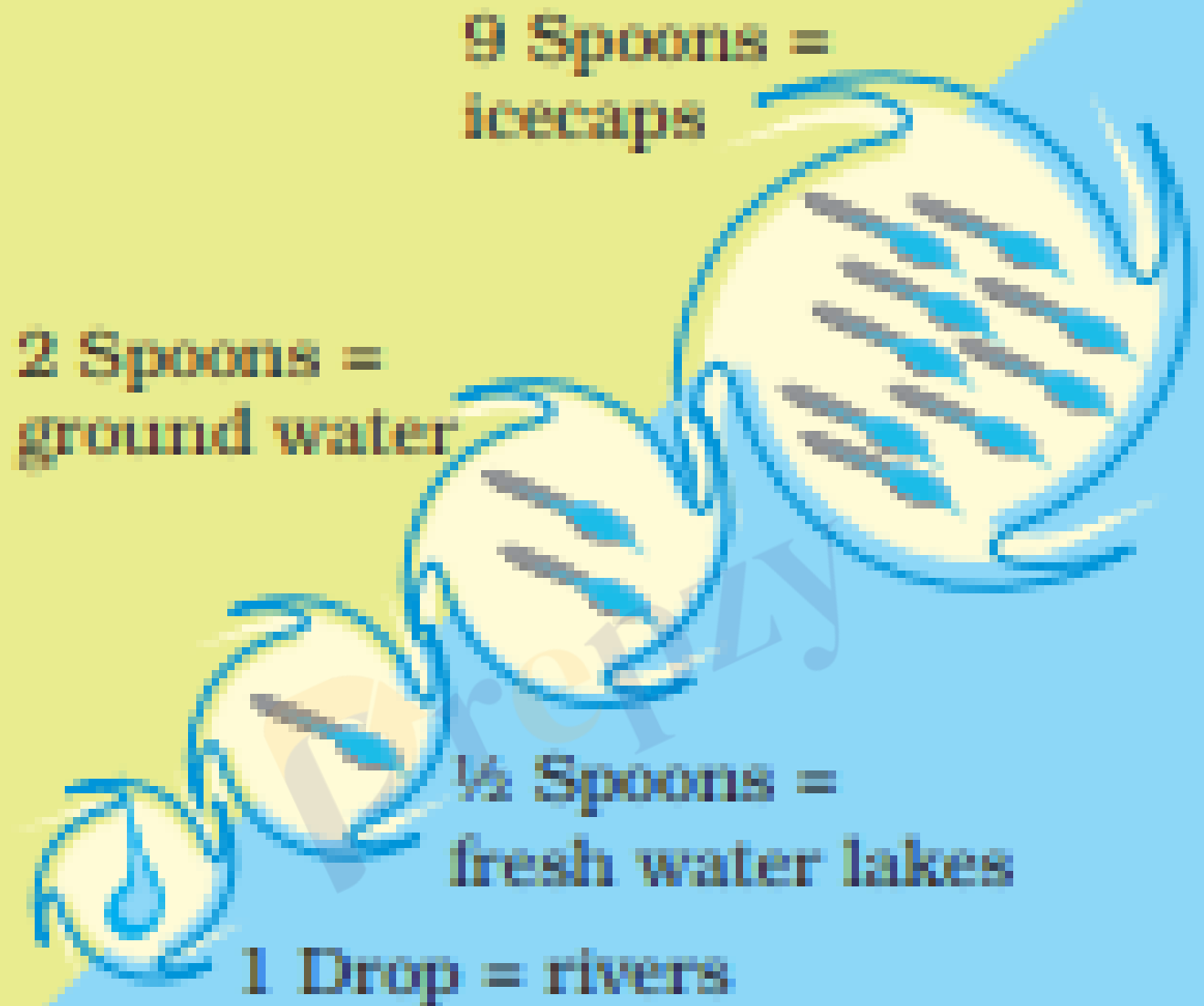


Fig. 5.2: World – Major Seas, Lakes and Rivers

## Freshwater Distribution

Freshwater is distributed as follows: Icecaps (majority), groundwater, freshwater lakes, and rivers (smallest portion).



## ***Distribution of fresh water***

### **Exam Questions**

**Q1:** Why is freshwater scarce despite the abundance of water on Earth?

**A1:** Because most water is saline in oceans and a large portion of freshwater is locked in icecaps.

**Q2:** What are the major sources of freshwater?

## Water Scarcity and Conservation

Water scarcity arises due to pollution, overuse, and uneven distribution. Conservation methods like rainwater harvesting help manage water resources sustainably.

**EVERY DROP COUNTS**

**Water scenario in urban India & Delhi**  
The urban water supply and sanitation sector in the country is suffering from inadequate levels of service, an increasing demand-supply gap, poor sanitary conditions and deteriorating financial and technical performance.

**The water you drink**  
...could be making you ill. The alarming amounts of industrial and human pollution in our water bodies expose us to serious health risks, warns NABQI Member

**Coping with Water Scarcity**  
Droughts have Water Scarcity in the threat to World Water Day 2007, which is celebrated every year on 22 March. The observance of World Water Day is the result of the 1992 United Nations Conference on Environment and Development (UNCED) which was held in Rio de Janeiro in 1992. The United Nations has designated 22 March as World Water Day.

**Dams Have Cut Rivers Off From Their Flood Plains: WWF**  
**Many major rivers in danger of drying out**  
General Many major rivers in the world are at risk of drying out because of climate change and dam construction, which could affect fresh water supplies and many of the global marine goods from WWF says on Tuesday.

**Ganga among 10 dying rivers**  
New Delhi: The Ganga, which is critically over-polluted with toxic effluents, is dying. Pollution, over-extraction of water, encroachment and other factors are causing the river to dry up.

**Beneficial of Rainwater Harvesting:**

- A concrete, tiled paved area of 100 sq. meters can save about four times the annual drinking requirements of a five member family.
- Enhances quality and quantity of ground water.
- Checks soil erosion by reducing surface run off.
- Minimizes water logging by minimizing flow into storm drains.

**Troubled Waters**

River	Status
Colorado	Endangered
Delaware	Endangered
Florida	Endangered
Illinois	Endangered
Indiana	Endangered
Michigan	Endangered
Minnesota	Endangered
Mississippi	Endangered
Ohio	Endangered
Wisconsin	Endangered

- Why is water important for us?
- Suggest some ways in which water can be conserved (a) in your home (b) in your school

## Water Conservation Methods

Rainwater harvesting collects and stores rainwater for future use. Fixing leaks, using water efficiently, and raising awareness are important conservation steps.

## Exam Questions

Q1: What is rainwater harvesting?

A1: A method to collect and store rainwater for later use.

**Q2:** Name two ways to conserve water at home.

**A2:** Fix leaking taps and collect rainwater.

## Terrarium and Water Cycle

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A terrarium is a small enclosed environment that demonstrates the water cycle on a miniature scale, showing evaporation, condensation, and precipitation within the container.

Prepzy



# A Terrarium

## How a Terrarium Works

Sunlight enables plants to perform photosynthesis. Water evaporates, condenses on the glass, and falls back as droplets, maintaining moisture and supporting plant life.

## Exam Questions

**Q1:** What does a terrarium demonstrate?

**A1:** The water cycle and a self-sustaining ecosystem.

**Q2:** Why is moisture important inside a terrarium?

**A2:** It keeps plants hydrated and supports their growth.

## Ocean Circulation

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Ocean water is constantly moving through waves, tides, and currents. These movements influence climate, weather, and marine life.



***Fig. 5.3: Pacific Ocean***

### Waves

Waves are the rise and fall of ocean water caused mainly by wind. They have crests (highest point) and troughs (lowest point).



*Fig. 5.4: Waves*

## Exam Questions

Q1: What causes ocean waves?

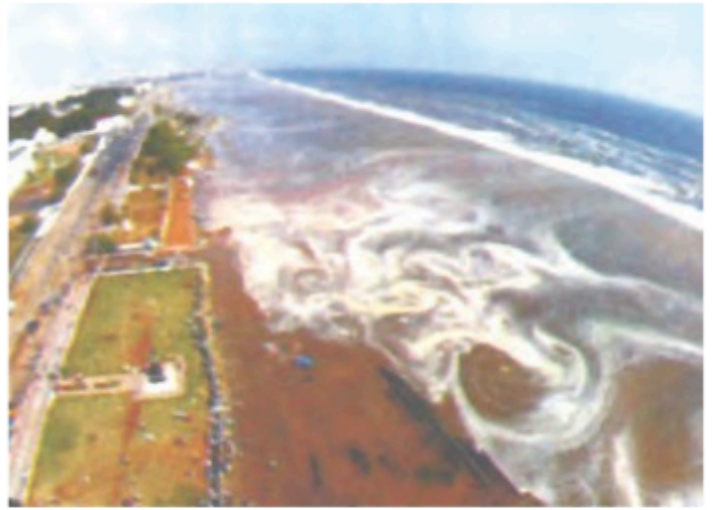
A1: Wind blowing over the surface of the water.

Q2: Define crest and trough in waves.

A2: Crest is the highest point; trough is the lowest point of a wave.

## Tsunami

A tsunami is a large ocean wave caused by underwater earthquakes or volcanic eruptions. The 2004 Indian Ocean tsunami caused massive destruction and loss of life.



*Destruction caused by tsunami on Tamil Nadu Coast*

## Exam Questions

Q1: What causes a tsunami?

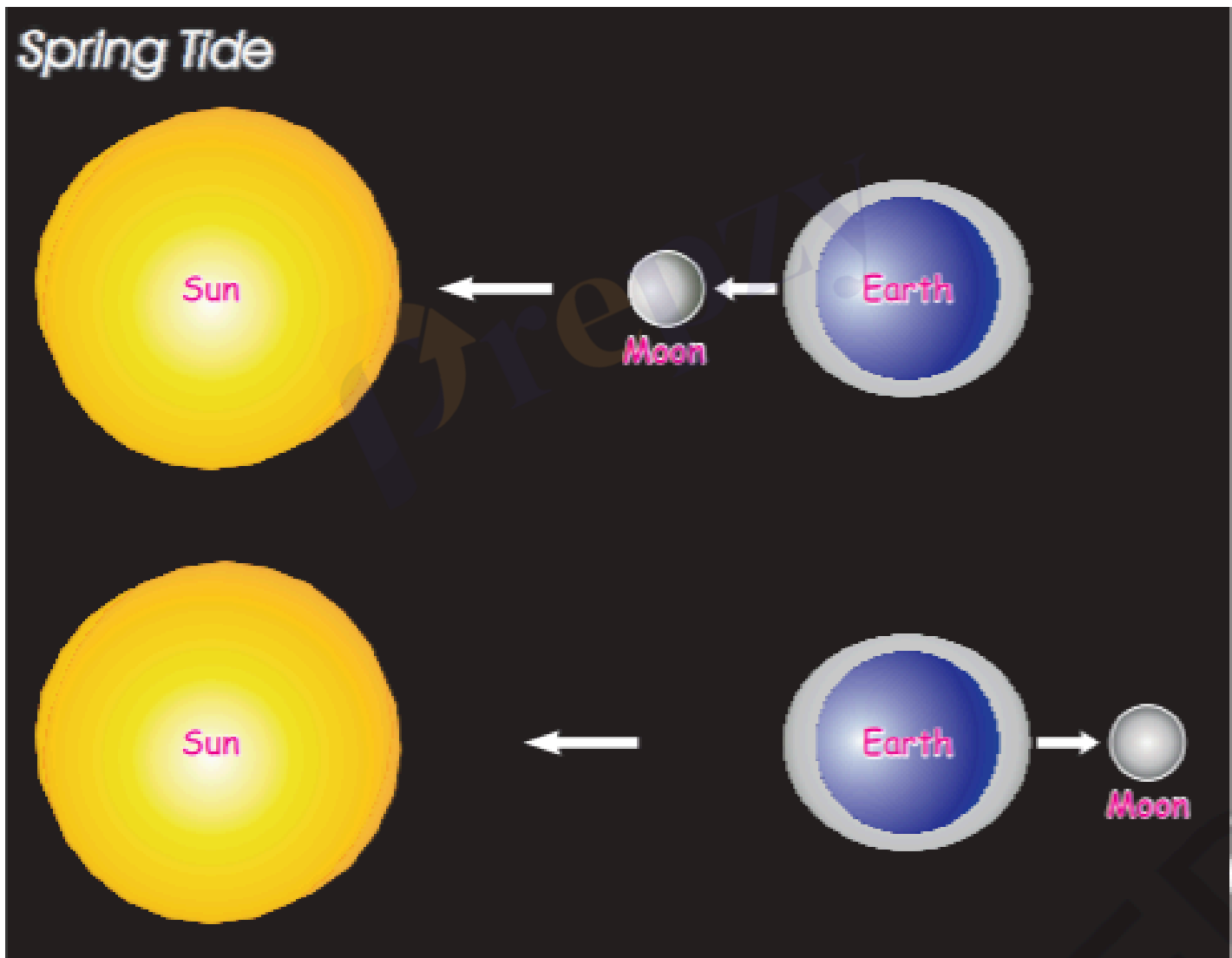
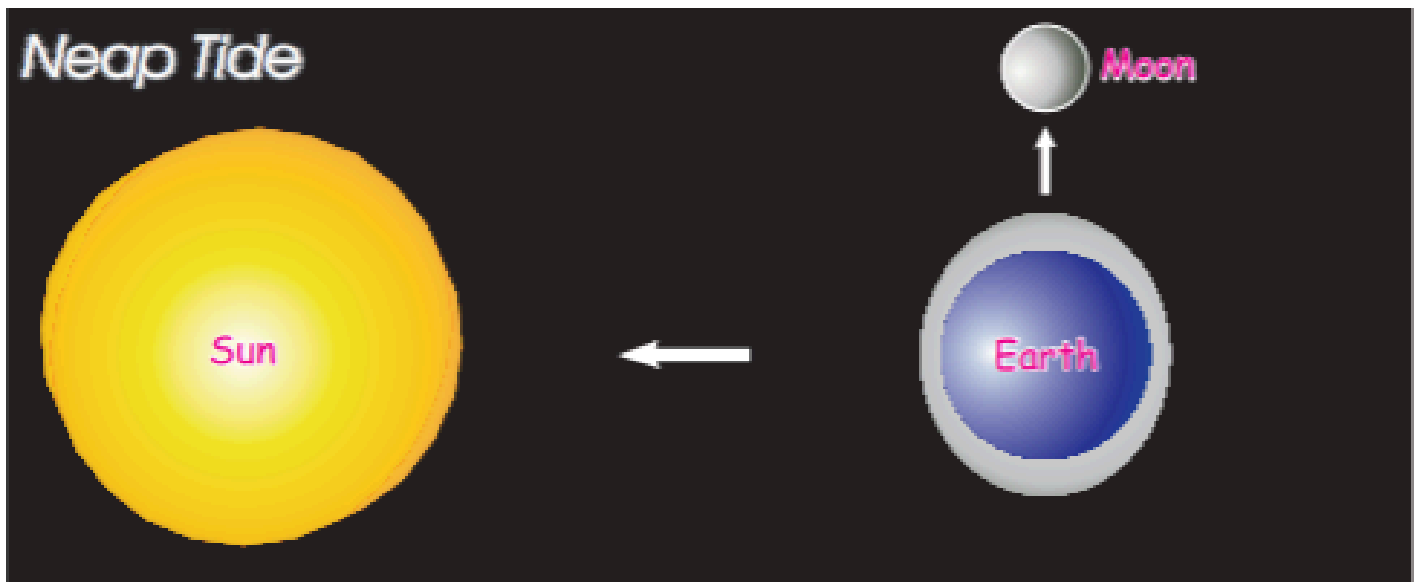
A1: Sudden underwater earthquakes or volcanic activity.

Q2: Why was the 2004 tsunami so devastating?

A2: Due to lack of early warning systems and high population in coastal areas.

## Tides

Tides are the regular rise and fall of ocean water caused by the gravitational pull of the moon and sun. High tides and low tides occur twice daily.



***Fig. 5.5: Spring Tides and Neap Tide***

**Exam Questions**

Q1: What causes tides?

A1: Gravitational pull of the moon and sun on Earth's oceans.

Q2: Differentiate between spring tide and neap tide.

A2: Spring tides occur when sun, moon, and Earth align causing higher tides; neap tides occur when sun and moon are at right angles causing lower tides.

## Ocean Currents

Ocean currents are continuous flows of ocean water in specific directions. Warm currents flow from equator to poles, cold currents flow from poles to equator, affecting climate and marine life.

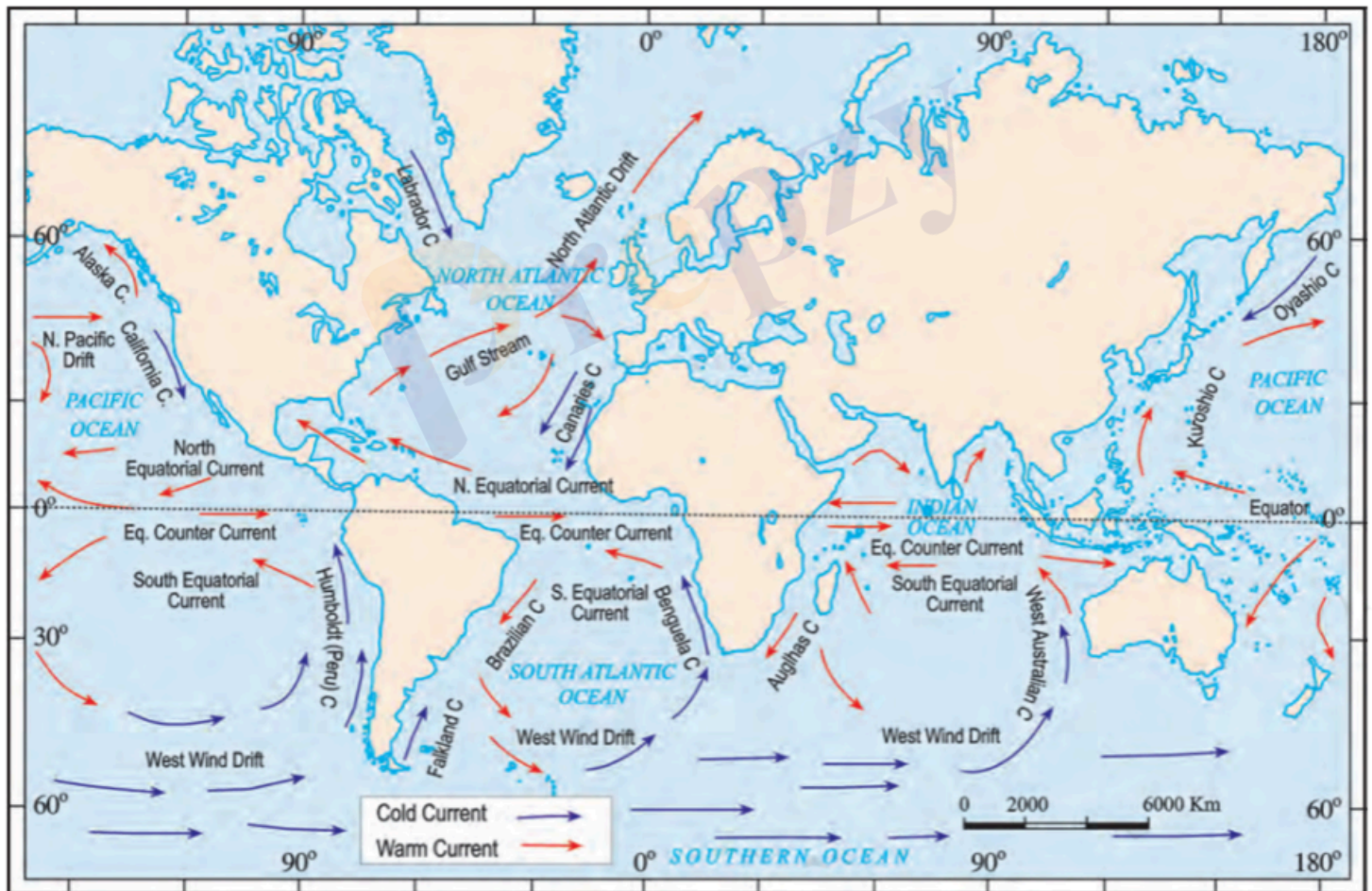


Fig. 5.6: Ocean Currents

## Exam Questions

Q1: What is the difference between warm and cold ocean currents?

A1: Warm currents carry warm water from equator to poles; cold currents carry cold water from poles to equator.

**Q2:** How do ocean currents affect climate?

**A2:** They regulate temperature by transferring heat between regions.

## Solved Examples

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**Example 1:** Explain the process of condensation in the water cycle.

**Solution:** Condensation is when water vapor cools down in the atmosphere and changes back into liquid droplets, forming clouds.

**Example 2:** Why is most freshwater not easily accessible?

**Solution:** Because most freshwater is stored in icecaps and glaciers, which are not easily accessible for daily use.

## Practice Set

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### Easy

- What is evaporation?
- Name two major oceans.

### Moderate

- Describe the difference between spring tide and neap tide.
- What causes ocean currents?

### Challenging

- Explain how a tsunami is formed and its effects.
- Discuss the importance of rainwater harvesting in water conservation.

## Answer Key

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- Evaporation is the process of water turning into vapor due to heat.
- Pacific Ocean and Atlantic Ocean.
- Spring tides occur when sun, moon, and Earth align causing higher tides; neap tides occur when sun and moon are at right angles causing lower tides.
- Ocean currents are caused by wind, Earth's rotation, temperature, and salinity differences.
- A tsunami is formed by underwater earthquakes displacing water, causing large waves that flood coastal areas.
- Rainwater harvesting collects rainwater to reduce dependence on other sources and conserve water.

## Quick Reference

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- **Water Cycle:** Evaporation → Condensation → Precipitation → Runoff
- **Freshwater Distribution:** Icecaps > Groundwater > Lakes > Rivers
- **Tides:** Caused by gravitational pull of moon and sun; Spring and Neap tides
- **Ocean Currents:** Warm currents flow from equator to poles; cold currents flow from poles to equator
- **Tsunami:** Large waves caused by underwater earthquakes or volcanic eruptions

## Glossary

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### Condensation

The process of water vapor cooling and changing into liquid droplets.

### Evaporation

The process of water turning into vapor due to heat.

### Runoff

Water flowing over land into rivers, lakes, or oceans.

### Tsunami

A series of large ocean waves caused by underwater earthquakes or volcanic eruptions.

### Tide

The regular rise and fall of ocean water caused by gravitational forces.

### Terrarium

A small enclosed environment for growing plants, demonstrating a mini water cycle.