BIOMES / TERRESTRIAL ECOSYSTEMS

Basics

- **Biome**: Large ecological region defined by **climate, vegetation, fauna, and soil**.
- Climate (temperature + precipitation) determines biome boundaries.
- Major terrestrial biomes: **Tundra, Forests, Grasslands, Deserts**.

TERRESTRIAL BIOMES – COMPARATIVE TABLE

Biome	Climate	Vegetation	Soil Type	Key Fauna / Features
Tundra (Arctic & Alpine)	*Very cold, low precipitation*	*Mosses, lichens, grasses (no trees)*	*Permafrost*	*Reindeer, arctic fox, polar bear; reptiles absent*
Taiga / Boreal Forest	*Cold, long winters*	*Evergreen conifers (pine, spruce, fir)*	***Podzols (acidic, leached)***	*Wolf, lynx, bear; low productivity*
Temperate Deciduous (British Type)	*Moderate rainfall, cool winters*	*Oak, beech, elm, birch*	*Deep podzolic soil*	*Seasonal leaf fall*
Temperate Rainforest	*Cool, very high rainfall*	*Tall conifers + epiphytes*	*Rich organic soil*	*Grizzly bear; mosses & lichens abundant*
Sub-Tropical Deciduous	*Warm, humid*	*Evergreen + deciduous trees*	*Fertile soils*	*Eastern China, SE USA*
Steppe / Temperate Grassland	*Semi-arid*	*Short nutritious grasses*	*Chestnut soils*	*Low animal diversity*
Mediterranean Biome	*Hot, dry summers, mild, wet winters*	*Small evergreen broad-leaved trees*	*Thin, rocky*	*Fire-resistant, xerophytic plants*
Tropical Deciduous (Monsoon Forest)	*Seasonal rainfall*	*Teak, sal, bamboo, neem*	*Red & laterite soils*	*Dominant forest type in India*
Savanna (Tropical Wet & Dry)	*Distinct wet & dry seasons*	*Tall grasses + scattered trees*	*Porous soils*	*Elephant, giraffe, umbrella-shaped trees*
Tropical Rainforest	*Hot & wet year-round*	*Evergreen, multi-layered canopy*	*Lateritic (leached)*	*Highest biodiversity; epiphytes*
Desert (Hot & Mid-latitude)	*Extremely arid*	*Xerophytes, cactus, thorny shrubs*	*Sandy/saline*	*Long roots, waxy leaves*

AQUATIC ECOSYSTEMS

Classification (Based on Salinity)

- **Freshwater** (<5 ppt)
- **Brackish water** (5–35 ppt)
- **Marine** (≥35 ppt)

Freshwater Ecosystems

- **Lentic** (still water): lakes, ponds, swamps.
- **Lotic** (running water): rivers, streams.

Aquatic Organisms (Based on Zone)

- **Neuston**: air–water interface.
- **Periphyton**: attached to plants/substrates.
- **Plankton**: floating (phyto + zoo).
- **Nekton**: active swimmers.
- **Benthos**: bottom dwellers.

Limiting Factors of Aquatic Productivity

1. Sunlight

- Light decreases with depth.
- **Photic zone**: photosynthesis + respiration.
- **Aphotic zone**: only respiration.
- Turbidity reduces productivity.

2. Dissolved Oxygen (DO)

- Avg freshwater DO: ~10 ppm.
- Warm water → less oxygen solubility.
- DO < 3–5 ppm → organism death.
- **Winterkill**: fish die due to ice cover blocking photosynthesis.

3. Temperature

- Aquatic organisms have narrow tolerance limits.
- Small temperature changes can be fatal.

MCQs

Q1. Podzol soils are characteristically associated with which biome?

A. Tropical Rainforest
B. Savanna
C. Taiga (Boreal Forest)
D. Mediterranean Biome

Answer: C

Q2. Which of the following biomes is characterised by permafrost and the absence of trees?

A. Steppe
B. Tundra
C. Taiga
D. Temperate Rainforest

Answer: B

Q3. Epiphytes are most commonly associated with which biome?

A. Temperate Deciduous Forest
B. Tropical Rainforest
C. Savanna
D. Desert

Answer: B