The Living World

1. Ecosystems

Ecosystem A community of plants and animals interacting with each other and their non-living environment.

Biotic Living e.g. plants **Abiotic** Non-living e.g. water

Producers	Primary Consumers	Secondary Consumers
Produce energy through photosynthesis.	Herbivores that consume producers.	Feed on primary consumers. Can be omnivores.

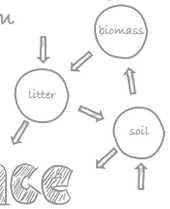
Decomposers Break down organic materials e.g. fungi

Food chain Flow of energy through organisms

Grass ⟹ Rabbit ⟹ Fox ⟹ Wolf

Food web Complex network of interconnected food chains

Nutrient cycle Movement of nutrients through an ecosystem



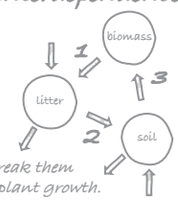
2. Epping Forest

What?: *Small-scale ancient* ***deciduous*** *woodland with high biodiversity*

Location: *NE of London in SE England*

Producers	Primary Consumers	Secondary Consumers	Decomposers
Lichen, mosses, grasses, herbs, ferns, deciduous trees	Insects, worms, caterpillars, beetles, rabbits	Fox, owl, sparrow hawk	Fungi (700 species), bacteria

Interdependence*:



**1. Trees shed leaves in autumn; 2. decomposers break them down, returning nutrients to the soil; 3. supports plant growth.*

Sustainable Management: Designated car parks, paths, and Forest Keepers ensure sustainable use. Volunteers and grazing cattle maintain biodiversity, protecting the forest for future generations.

3. Balance

Changes to one component of an ecosystem can have significant knock-on effects:

- Removing predators can lead to overpopulation of herbivores, damaging vegetation.
- Adding fertilisers to water can cause algal blooms, reducing oxygen and harming aquatic life.
- Deforestation disrupts nutrient cycles and habitats, leading to biodiversity loss.

Epping Forest

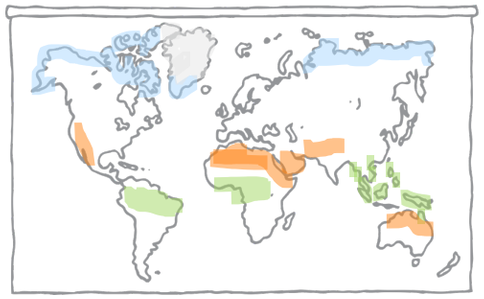
- **Interdependence:** Trees depend on decomposers for nutrient recycling; herbivores rely on vegetation.
- **Impact of Change:** Loss of trees reduces habitat for animals, while overgrazing damages plant regeneration.

Yellowstone National Park (USA)

- **Interdependence:** Wolves reintroduced in 1995 controlled elk populations, reducing overgrazing.
- **Impact of Change:** Vegetation regenerated, stabilising riverbanks and improving biodiversity.

4. Biomes

Biome A large-scale ecological area e.g. tropical rainforest, desert, tundra. The distribution is affected by factors such as climate, altitude, and soil.



Tropical rainforest - Equatorial regions (hot, wet).

Hot desert - Around 15-30° latitude (hot, dry).

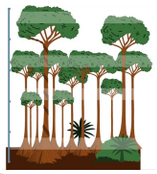
Tundra - Arctic regions, 60°N in Northern Europe, Alaska and Russia (cold, dry).

Polar – Permanent or semi-permanent layer of ice (very cold, dry).

5. Rainforests

Hot (average 27°C) Wet (over 2000mm of rain)

Soil is nutrient poor (concentrated in the top layer)



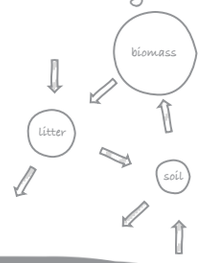
Emergents – tallest trees (50m+)

Canopy – high biodiversity 50%+ of wildlife

Under canopy – bare trunks and lianas

shrub layer – shrubs, ferns and saplings

Nutrient cycle



6. Interdependence

Interdependence All the biotic and abiotic parts of the rainforest rely on each other.

Examples:

- Plants and Animals: Many animals depend on plants for food and shelter, while plants rely on animals for pollination and seed dispersal.
- Soil and Vegetation: The nutrient-rich soil supports plant growth, while decomposing plant material replenishes soil nutrients.
- Climate and Rainforest: Rainforests generate their own microclimate by releasing moisture through transpiration, contributing to high rainfall levels which sustain the forest.
- Human Activity and Rainforests: Human activities like deforestation disrupt these interdependent relationships, leading to soil degradation, loss of biodiversity, and climate change impacts.

7. Adaptations

Vegetation

Layers – emergents grow tall to reach sunlight; drip tips - channel water from leaves (reduce standing water); buttress roots - support tall trees and absorb nutrients from top layer of the soil; epiphytes grow on trees and get moisture and nutrients from the air.

Animals

Poison dart frog – bright colours to deter predators; sloth – long arms and claws to climb trees, prolonged metabolism to stay in safety of trees; Spider monkey – prehensile tail to grasp tree branches and swing; Jaguar – camouflaged fur for hunting and large claws for climbing.

8. Deforestation

Highest rates: South America (Brazil in particular), Indonesia, and Democratic Republic of Congo.

Trends: Declining in some regions (e.g., Brazil); increasing elsewhere (e.g., Southeast Asia). Between 2002 and 2022 there has been an increase in the rates of tropical rainforest deforestation globally. 60 hectares per minute lost globally.

Notes

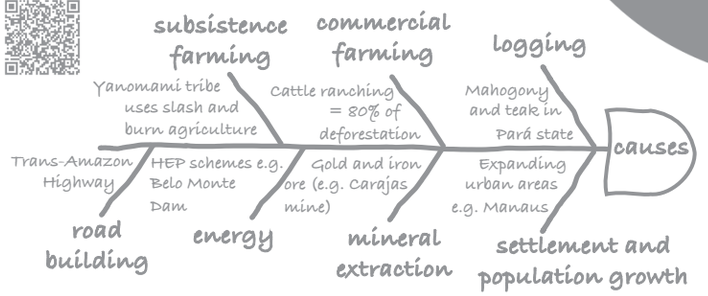
Quizzes

internet geography

The Living World

9. Amazon

Deforestation: Causes and Impacts



EFFECTS

Economic Impacts	Environmental impacts
Income from exports; tax revenue from profits and wages; employment opportunities.	Soil erosion; loss of biodiversity; local climate change; global climate change (loss of carbon sink).

10. Rainforest Value

To people

- Medicine: Source of over 25% of modern medicines.
- Resources: Provides food, timber, and raw materials.
- Indigenous communities: Supports traditional lifestyles and cultures.

To the environment

- Carbon storage: Acts as a carbon sink, mitigating climate change.
- Oxygen production: Generates around 20% of the world's oxygen.
- Biodiversity: Home to millions of plant and animal species.

11. Management

Sustainable Strategies:

- ***Selective Logging***: Removes only mature trees.
- ***Replanting***: Ensures continuity of forest cover.
- ***Conservation:*** Reserves and education.
- ***Ecotourism:*** Low-impact tourism.
- ***International Agreements:*** Promote sustainable ***use of hardwoods e.g. FSC.***
- ***Debt Reduction:*** Countries conserve rainforests in exchange for debt relief.

12. Cold Environments

Tundra has low-growing vegetation and cool summers, while polar regions have extreme cold and minimal vegetation.

Tundra - Arctic regions, 60°N in Northern Europe, Alaska and Russia (cold, dry).

Polar – Permanent or semi-permanent layer of ice (very cold, dry).

Polar environments are located in Arctic and Antarctic regions. Tundra is found in high latitudes such as Siberia and Canada, with seasonal vegetation growth, whereas polar regions, like the Arctic and Antarctic, feature icy landscapes with algae and mosses as the primary vegetation.

Interdependence - Plants stabilise soil, animals depend on vegetation, and humans rely on both for survival.

13. Cold Adaptations

Flora (plants)

Lichen survive in extreme cold by growing on rocks and absorbing moisture; slow growing to reduce energy requirements.

Cotton grass grows quickly during short summers; narrow leaves reduce water loss; shallow roots to access nutrients and water.

Fauna (animals)

Polar bears have thick fur and fat for insulation; large paws to walk on snow; small ears reduce heat-loss, webbed paws to swim.

Wolves have thick fur; rounded ears reduce heat loss; white fur provide camouflage when hunting.

14. Alaska

North America, USA state – 1.7 million km²

Barrow, Alaska: Low -43°C | High 10.5°C

Population almost 750,000 (100,000 Inuit)

Opportunities:

- Mineral Extraction: Gold, zinc, and other. Energy: Oil and gas extraction (e.g., Prudhoe Bay).
- Fishing: Commercial fishing industry provides employment and income.
- Tourism: Visitors drawn to unique landscapes and wildlife.

Challenges:

- Extreme Temperature: Low temperatures make construction and living difficult.
- Inaccessibility: Remote locations with limited infrastructure.
- Provision of Buildings and Infrastructure: Permafrost complicates construction and increases costs.

15. Wilderness Areas

Wilderness Area A natural environment that has not been significantly modified by human activity.

Value:

- Environmental: Store carbon, regulate climate, and provide habitats for unique species; fragile – take a long time to recover from human damage.
- Cultural: Home to indigenous communities and unique lifestyles.

Reasons for protection:

- Fragile ecosystems are easily disrupted and slow to recover.
- Biodiversity conservation is critical for global ecological balance.
- Research into global processes e.g. climate change.

16. Balancing Development

Strategies to to Balance Development and Conservation:

- Technology: Use of raised, insulated pipelines to reduce environmental impact.
- Role of Governments: Creation of protected areas and regulations on resource extraction.
- International Agreements: Treaties like the 1959 Antarctic Treaty ensure peaceful, sustainable use and co-operation between international scientists.
- Conservation Groups: Promote awareness and conduct conservation projects, protecting biodiversity.

internet geography

Notes

Quizzes