

Biomes

I. Rain Forest

A. Introduction

1. Tropical zone
 - a. Equator, direct sun
2. ~20 C average (68 F)
3. up to 450 cm rain per year
 - a. may have wet / dry seasons

B. Structure

1. Most diverse and productive biome
 - a. 700 tree species in 10 hectares Borneo
2. dense canopy broadleaf evergreen 200 cm rain
3. 70-90% of all species
4. Trees
 - a. Cyprus, Teak, Mahogany
 - b. up to 50-60 m tall
 - c. Dense canopy catches 99% of light
5. Understory
 - a. sparse
 - b. low light
6. \geq nutrients to others
 - a. locked in living orgs
 - b. 5 cm topsoil
 - c. trees have shallow roots
 - (1) supported by buttresses
7. Dead matter quickly recycled
 - a. heat and moisture good for bugs and fungi
8. most rain forest life is in the trees
 - a. multiple niches in canopy
 - (1) like water levels in a lake

C. Organisms and Diversity

1. High species diversity
 - a. high plant diversity
 - b. wide variety of habitats

2. 3D habitat

- a. multiple layers within trees

3. Estimated to be millions of species

D. Deforestation

1. 1950- 10% Earth's surface covered by RF

- a. Now ~3%

2. Deforestation

- a. destruction of forest as a result of human activity
 - (1) grazing, farmland, living space

3. Contribution to extinction

- a. Dense, vertical habitat
- b. slow to regenerate

II. Tundra

A. Introduction

1. cold, windy, dry
2. ~10% Earth surface
3. Low biodiversity

B. Climate

1. less than 25 cm precip/ year
2. Temp 10 C or less
3. Permafrost
 - a. permanently frozen ground
 - b. thin active zone on top
4. Short growing season
5. Poor drainage creates bogs
 - a. standing water leads to large insect population
 - (1) bottom of the food web

C. Organisms

1. Growing season ~60 days
2. Plants
 - a. Short, shrubby
 - (1) short growing season
 - (2) limited root space
3. Animals

a. Some are seasonal

(1) migration

b. Birds

c. Caribou

d. Adaptations

(1) shorter legs

(2) smaller ears

(3) thicker fur

III. Grasslands

A. Introduction

1. In between a forest and a desert.

a. Not enough water to be a forest.

2. Lots of grass

a. in Earth's history, grass covered more than 50% of earth

B. Climate

1. In rain shadows, dry air blows and it barely rains.

2. As it blows, it absorbs water that evaporated from land and makes it rain.

a. you need enough moisture for it to rain.

3. Grasslands can easily become a desert.

a. not enough moisture, it becomes dry, and plants don't grow.

C. Organisms

1. Many organisms live in the grasslands

a. The most common is grass though.

b. Most grass plants mass is underground.

(1) like an iceberg

(2) 1 rye plant grows about 2m, the roots spread 600 km.

2. Fires

a. Plays an important role in the growth process.

b. If there weren't fires, plants would overgrow.

c. Help to release nutrients and minerals from soil.

d. Germination process depends on heat

3. Grassland Surroundings

a. Animals help continue to grow grass

(1) Underground animals make water more accessible

- (2) The roots reach all of the nutrients they need.
- b. Usually grow near ponds, lakes, streams, and springs.
- c. Some grasslands are drought-resistant
 - (1) Survive in dry habitats.

4. biotic and abiotic factors

- a. shallow soil/grazing cause
 - (1) less growth for trees, shrubs and grass
- b. very little rain
- c. when it rains it is important to grassland ecosystems
 - (1) cycles
 - (a) heavy rain
 - (b) long droughts
- d. precip determine types of organisms living in grasslands
 - (1) many orgs adapted drought resistant
- e. grasslands around the world vary by climate and organisms
 - (1) steppes, prairie, savanna

IV. Steppes and Prairies

A. Introduction

1. Steppe-grasslands of short bunchgrass
 - a. <50 cm rain/year
 - b. plant life sparse
2. Prairie-rolling hills, plains, sod-forming grasses
 - a. fertile
 - (1) where people get most of their food
 - (2) breads, cereals come from prairies

B. Climate

1. Steppe-rain evaporates quickly
 - a. high winds and high temp.
 - b. rain reaches only top 25 cm of soil
 - c. temp. -5 C-30 C
2. Prairie-50-75 cm rain/year
 - a. can get twice that amount, occasionally

C. Organisms

1. Prairie-soil holds water very well

- a. absorbency is influenced by organisms
- b. **roots of grasses form sod**
 - (1) **hold soil together**
 - (2) soil does not dry out quickly or blow away
- c. **Humus**
 - (1) **layer of org matter**
 - (2) holds water and nutrients

2. Bunchgrasses

- a. Short fine bladed grass
 - (1) grows in a clump
- b. saves water by storing it in a small root area

3. Animals

- a. Adaptive to the climate
 - (1) **migrating**
 - (2) **hibernating**
 - (3) **burrowing**

4. Steppe and Prairie grasses

- a. lightly damaged by feed in habits of migrating grazers
- b. Poor farming and ranching practices cause extensive damage
 - (1) **native grasses removed**
 - (2) **loss of soil stabilization**
 - (3) **ex- Dust Bowl, US 1930's**
 - (4) introduced species don't grow as well

V. Deciduous Forest

A. Introduction

1. Grow in lower latitudes than coniferous forests
 - a. grow in the temperate zone
2. **trees lose their leaves**
 - a. form niches used by other organisms
3. temp. varies greatly
 - a. 30 C to -30 C
4. 50-300 cm of precip per year
 - a. falls regularly throughout the year
5. growing season 6 months

- a. trees grow quickly, produce, store lots of food
- b. in autumn, trees lose leaves and become dormant
 - (1) loss of leaves saves water
 - (2) photosynthesis stops and trees no longer make food
 - (3) tree survives by consuming food stored in trunk, roots, branches
- c. in spring, new leaves grow and photosynthesis begins again

6. Trees

- a. maple, oak, birch, beech, ash, hickory
- b. inhabitants more diverse than in coniferous forest
 - (1) several distinct layers
 - (2) each layer has own group of plant species

B. Canopy

- 1. The highest layer of the deciduous forest
 - a. Its made up of the upper branches and leaves of the tall trees
 - b. The canopy gets most of the suns direct light

C. Understory

- 1. The under story is below the canopy
 - a. Its made up of the smaller and younger trees
 - b. shrubs grow underneath the under story
 - (1) small plants on the forest floor

D. Leaves

- 1. Leaves that fall from the trees enrich the soil
 - a. The leaves decay faster during the warm summer
 - (1) the decaying leaves produce a deep rich layer- humus

E. Humus

- 1. The humus and fallen leaves are homes to many bugs

F. Organisms

- 1. Fungi and other decomposers are eaten by small animals
 - a. Herbivores, reptile, amphibians and predators roam in these woods
 - b. Predatory birds are also here

G. Human activity

- 1. These forests once spread across Europe and Asia
 - a. It also covered America from Mississippi to the Atlantic
 - (1) today, very little is left of these forests worldwide

b. The loss of these forests equally severe in both the US and Europe

2. Human Consumption

a. **Rich soil**

(1) **deep**

(2) **fertile**

b. Deciduous Trees

(1) **harder, denser wood**

VI. Deserts

A. Introduction

1. diverse biome

2. **defined by little/no precipitation**

B. Ground layers

1. soil

a. lots of minerals

b. very little org matter

2. leaching

a. rain carries minerals through soil

3. pavement

a. larger stones/gravel under soil

b. exposed by wind erosion

C. **Types**

1. Hot

a. Sahara, Mojave, Gobi

2. Cool

a. Great Basin

3. Cold

a. Antarctica

D. Desert Climate

1. Rarely gets more than 25cm of precip a year

a. determines kinds of plants that live in the region

b. kinds of plants determine animals that live there

2. Most deserts receive less than 10cm rain per year

a. most of rain falls during a few short thunder storms

b. desert pavement is dry and compact

(1) rain usually runs off instead of absorbing in ground

3. **Temperatures vary greatly in the desert**

a. **moisture in atmosphere stabilizes temp in region**

b. **moisture absorbs heat during day and hold well at night**

c. desert air has very little moisture

(1) temp can rise/fall dramatically in a 24hr period

E. Desert Organisms

1. Orgs living in deserts adapt to surviving 2 challenges

a. **lack of water and high temps**

2. Some adaptations for orgs to live in deserts involve **physical structure**

a. other adaptations would involve **behaviors**

3. Deserts are also species-rich, complex ecosystems.

F. Desert Plants

1. Able to absorb scarce water from ground

2. Tissues prevent loss of water

3. Succulents

a. Plants that have thick water-filled tissues

b. Enables plants to survive long periods

4. Roots

a. **Shallow roots** that grow over a wide area

(1) **Maximize the absorbency of rain into plants**

b. **Long roots** that extend into ground

(1) **Collect water from aquifers**

G. Desert Animals

1. Insects, reptiles, birds, and mammals

2. Get water from food

3. Animal adaptations

a. Insects and reptiles

(1) **outer coating reduces water loss**

b. Rodents

(1) **Stay underground- protection from heat**

(2) **Nocturnal Animals**

(a) **Active at night and sleep all day**