

## **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. >/= 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 holds 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**