BIOMES: broad major groupings of natural ecosystems that include animals as well as plant life.

CONSIDER: when looking at biomes consider the following:
- Characteristics of a Biome (Structural Components)
- Distribution of a Biome
- Climate Characteristics (temp & precipitation)
- Causes of Biome (circulation, topography etc.)
- Human Effects

Characteristics of a Biome
- Structural Components of Vegetation
  - Life form
  - Size & Stratification
  - Coverage:
    - Periodicity:
      - Leaf Shape and Size: broadleaf, needle leaf
      - Leaf Texture: succulent, sclerophyllous, membranous

Structural Components of Vegetation
- Size & Stratification
  - Coverage: how much covered?
    - (barren……continuous cover)
Structural Components of Vegetation

- Periodicity: deciduous vs. evergreen
- Leaf Shape and Size: broadleaf, needle leaf
- Leaf Texture: succulent, sclerophyllous, membranous

Periodicity

- Deciduous vs evergreen (broadleaf or needle leaf)
Tundra

Boreal Forests
Temperate Deciduous Forest
Temperate Rainforest
Grasslands
Mediterranean (Chaparral)
Desert
Tropical Grasslands and Savannas
Tropical Rainforest
Aquatic (Marine, Freshwater)

**Tundra**

**Region/Distribution:**
North of Boreal Forest, high latitudes of northern hemisphere in a belt around the Arctic Ocean

**Climate:**
Bitter cold, limited sunlight, Temps: -57° to -15°C (-70° to -5°F) Short growing season, low precipitation (< 12.7 cm (5″) per year)

**Vegetation:**
Low growing lichens, mosses. Grasses, sedges, dwarf shrubs, small plants typically ground hugging or warmth preserving in some way, rosettes

**Soil:**
Permafrost, no true soil development
Tundra

Fauna: small burrowing mammals, lemmings, also foxes, wolves, lynx, owls, grizzly bear, caribou and musk ox; migrants
Other: many insects

Human impacts: Oil drilling, hunting of predators, global warming......

Boreal/Coniferous Forest

Region/Distribution: Northern parts of North America, Europe and Asia, South America, New Zealand, S. Australia

Coniferous or Boreal Forest

Climate: Extremely long and cold winters, snowfall;
Temperatures: -54° -21°C (-62° -70°F);
Precip: 35-600cm (14-234²);
Vegetation: Coniferous (mostly evergreen) forest, ex. Spruce, Pine, Larch, Needle-leaved, short growing season.

Arrowleaf balsamroot

Indian paint brush

Fauna: Large herbivores: moose, elk; small herbivores: squirrels, snowshoe hare, beaver; Predators: wolves, foxes, bears, lynx, weasel family; Birds: warblers, finches, sparrows, ravens

Human use: paper/pulp, furniture industry and acid rain.
A temperate rain forest is defined as any forest in the mid-latitudes that receives more than 50-60 inches of rainfall a year. Winter temperatures rarely drop below freezing, and summer temperatures seldom exceed 80°.
Long-lived, fire-resistant Pacific Yew (Taxus brevifolia) is found in Temperate Deciduous Forest Regions/Distribution: Western Europe, East Asia, Eastern U.S. between 30-50° north or south.
Climate: Seasonal Temperatures: -30° C (-22° F) to 38° C (100° F)
Annual rainfall: 60-225 cm (30-80"

Vegetation: Broad leaf deciduous trees, (120-150' tall), oaks, hickories, maples,

Fauna: Mammals such as white tail deer, porcupines, raccoons, rabbits, squirrels,
Many birds (neotropical migrants), frogs and salamanders, snakes,

Most carnivores eliminated by hunting i.e. wolf, coyote, mountain lion,
Region/Distribution: West coast and Central California, SW. Australia, tip of S. Africa, West Peru- Chile, Mediterranean

Climate: Warm summer/cool winter, precipitation in winter 20-65cm (8-25"), dry in summer

Vegetation: Grassland, scattered trees (oaks, eucalyptus), scrub. Fire tolerant, Sclerophyllous (hard leaf evergreens, chaparral)

Fauna: Burrowers like ground squirrels, gophers, deer, mountain lions, coyotes, many birds
Susceptible to fire during dry season, some species need fire to regenerate, Susceptible to erosion and desertification, development, threatened biome.

**Temperate Grasslands**

*Region/Distribution: Central North America, Asia, South Africa, Australia, SE South America*

**Grassland/Prairie**

*Climate: Seasonal, Moderate to hot summers, cold winters, Rainfall: 25-75 cm (11-30”) annually, evenly distributed or high in summer.*
Grasslands

Vegetation: Grasses, tall to short prairie, pampas, steppe, sod forming grasses, sparse bushes, occasional trees in some areas.

Soils: mollisols

Fauna: Large grazing animals, bison, antelope, wild horses, kangaroos, burrowing animals: rabbits, prairie dogs, predators: wolves, coyotes, dingoes, leopards.
Most N. American grasslands have been converted to agricultural fields. Wild grazers replaced by cattle, sheep, goats.

Desert

Regional Distribution:
- Parts of Africa (Sahara and Sahel)
- Parts of Middle East and Asia, Great Basin of N. America
- and Southwest U.S., Northern Mexico

Vegetation:
- Widely scattered thorny bushes, cacti, small flowers, extensive shallow roots or long tap roots, shrubs, succulents

Climate:
- Very dry. Temperatures: 5°–57°C (41°–135°F)
- High diurnal fluctuation
- Rainfall 0–25 cm/yr, irregular
Little to no organic layer, soil not well developed: *Entisols, Aridisols*

Fauna:
- Many rodents, lizards, toads, snakes and other reptiles
- Many birds, owls, vultures
- Many insects (adaptive strategies)

Deserts cover 1/3 of the earth’s surface and are growing due to desertification.

Links to TRF

Warm and cold deserts
Tropical Savannas & Grasslands

Region/Distribution: Subequatorial Africa, South America, Southern India and South America, Southern India (25° N and S Latitude)

Climate: Hot and dry most of the year, abundant rain in wet season. High average temperature: 13°-40° C (55°-104° F); Rainfall 90-150 cm/yr (30-60²² ), during warm wet season

Vegetation: Continuous cover of perennial grasses, scattered trees or shrubs

Fauna: Large grazing animals; antelope, zebra, giraffe, elephant.
Predators: lions, leopards, cheetahs, hyenas

Termite mounds

Susceptible to desertification
Tropical Rainforest

Distribution: Northern South America, Central America, West and Central Equatorial Africa, SE Asia, NW Coastal Australia, Pacific Islands

Climate: Non-seasonal, Annual temperature greater than 50°F, mean 82°F (18-35°C). Almost daily rainfall, heavy annual > 240cm (94.5"").

Vegetation: Thousands of species, tall trees, many canopy layers, evergreen, broadleaf trees, vines, epiphytes, lianas, climbers, stranglers, heterotrophs.

Soils: Mostly oxisols (highly weathered)

FIGURE 27.9

Sols: Nearly geologic (heavily weathered)
Fauna: More species than all other biomes combined, colorful insects, amphibians, reptiles, and birds.
Most exploited and endangered

Increased population pressure

Fig. 6.16, p. 131