

APES – Chapter 4 – Global Climates and Biomes

Intro: Floods, Droughts, and Biomes (p. 87)

- a) How are floods tied to droughts?
- b) Other than famine, what are the consequences of these phenomena?
- c) Relate these conditions to predictions made by those studying global warming/global climate change.

I. **Global Processes Determine Weather and Climate**

Weather =

Climate =

- A. **Earth's Atmosphere** – structure, composition, functional importance
From the ground up: (predominant gases, temp changes, characteristics)
(see fig. 4.1, p. 89)

1. Troposphere –
2. Stratosphere –
3. Mesosphere –
4. Thermosphere –
5. Exosphere –

B. **Unequal Heating of Earth**

1. Role of the tilt of Earth's axis (see fig. 4.3, p. 90) Seasons (fig. 4.10, p. 95)
2. Importance of surface area, shape of Earth, angle of incidence
3. Role of absorption and reflection (Albedo)....(see fig. 4.4, p. 90)

C. **Atmospheric Convection Currents** – Properties of Air are Important

1. Density of air – relate to altitude
2. Saturation point (dewpoint) of air (fig. 4.5, p. 91)
3. Effect of pressure changes

Adiabatic cooling –

Adiabatic warming –

4. Release of latent heat during condensation

Convection currents – movement, distribution of heat (see fig. 4.6, p. 92)

Global wind belts (see fig. 4.9, p. 94)

D. **Earth's Rotation and Coriolis Effect** (see fig. 4.8, p. 93)

E. **Ocean Currents** – an effective means of heat transport

Gyres – global surface currents (see fig. 4.11)

Thermohaline circulation (fig. 4.12)

El Nino – Southern Oscillation (ENSO) ...(see fig. 4.13, p. 98)

Rain Shadow (Orographic Effect)....(see fig. 4.14, p. 98)

II. Terrestrial Biomes- Climate and Dominant Plant Communities
The relationship between Avg. Annual Temp. and Annual Precipitation
(see fig. 4.16)

Biome Map – The relationship to latitude and proximity to ocean (fig. 4.17)

Climate Diagrams (Climographs)...(see fig. 4.18, p. 101)
Linking productivity to monthly temperature and precipitation data.

You need to be familiar with each biome in terms of: geographic location, temp/precip, plant community, ecological conditions, etc.

Tundra
Boreal Forest (Taiga)
Temperate Rainforest
Temperate Seasonal Forest (Deciduous Forest)
Woodland / Shrubland (Chaparral)
Temperate Grassland / Cold Desert (includes prairie, pampas, steppes)
Tropical Rainforest
Tropical Seasonal Forest / Savanna (Tropical Seasonal Forest)
Subtropical Desert (Hot Deserts)

III. Aquatic Biomes – characterized by salinity, depth, and water flow which interact to affect dissolved oxygen (DO₂) and carbon dioxide (CO₂), light penetration, temperature, turbidity, nutrient load, etc.

These in turn, influence plant and animal communities, food chain, etc.

Be able to describe “conditions” and communities in each of the following:

Streams and Rivers (including various stages of the river)

Lakes and Ponds (including various life zones in them)

Freshwater Wetlands (ex: marshes, swamps, bogs, fens)

Salt Marshes (coastal wetlands)

Estuaries

Mangrove swamps

Intertidal Zone

Coral Reefs

Open Ocean (various zones: photic and aphotic, benthic zone)

Note: Deep Sea Oases with Hydrothermal Vents – ecosystems that exist without solar energy by utilizing Chemosynthesis

WORKING TOWARD SUSTAINABILITY (p. 113 - 114)

Is Your Coffee Made in the Shade?

- a) What conditions are optimal for coffee growing?
- b) The problems of monoculture?
- c) The solution?
- d) The economic consequences arising from the solution?
- e) The ecologic benefits arising from the solution?