

Ch 1.1b: Abiotic Factors

A) Major Abiotic Factors That Influence the Characteristics and Distribution of Biomes

I) Temperature & Precipitation

- Temperature and precipitation (includes: _____)
- Influenced by _____ etc.

II) Latitude

- Affects temperature and precipitation
- Latitude is the _____ measured in _____ from the equator.

Label and share the following zones in the following graph as:

- **north temperate zone, tropical zone, and south temperate zone.**



a) Latitude & Temperature

- The amount of sunlight is affected by the **angle** at which the sun's rays (radiant energy) strike the Earth's surface

Equator (A):

- Radiant energy _____.
- Tropic Zone: receives more _____.

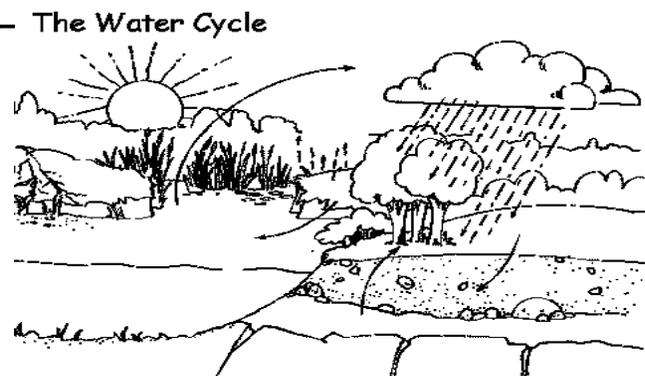
North/South Temperate Zone (B):

- Radiant energy _____.
- North & South Temperature Zones: sun's ray hit Earth at an angle, _____



b) Latitude & Precipitation

- Hot air picks up moisture **better** than cold air.
- Moisture **condenses** to form **clouds**.
- When cold air masses and warm moist air masses meet, it results in **rainfall**.

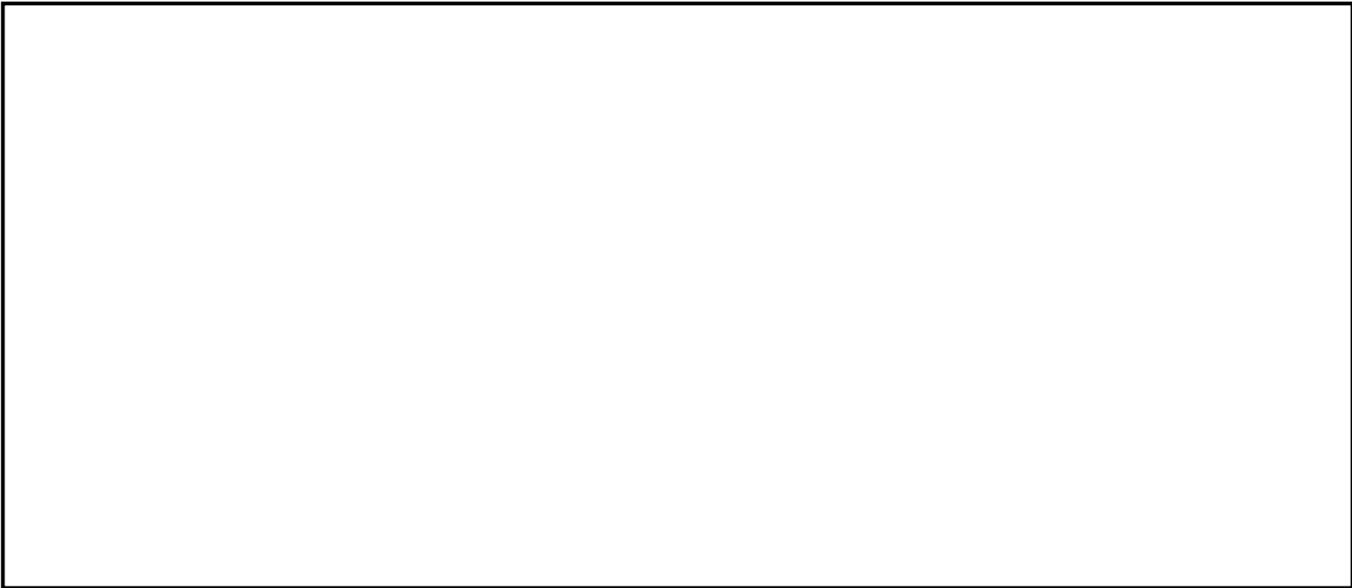


Example: Equator

- Equator: _____, divides Earth into the northern and southern hemispheres.
- Sun shines almost _____ overhead (not at an angle, no tilting).
- Hence receives _____ of sunlight each day, little annual fluctuation (changes) in temperature.
- Land and ocean on the equator receive the _____ amount of **rainfall** because direct sunlight warms up the air and picks up moist air better.
- Therefore, the tropical rainforests are in the tropical zone near the equator.

III) Elevation

- **Elevation:** height of a land mass above **sea level**.
- As elevation **increases**, the atmosphere becomes **thinner**, and it retains less heat (**cooler**).
- Temperature and biomes can change as elevation changes.
- Example: Elevation affects vegetation. (refer to Fig 1.8, BC Science p.15)

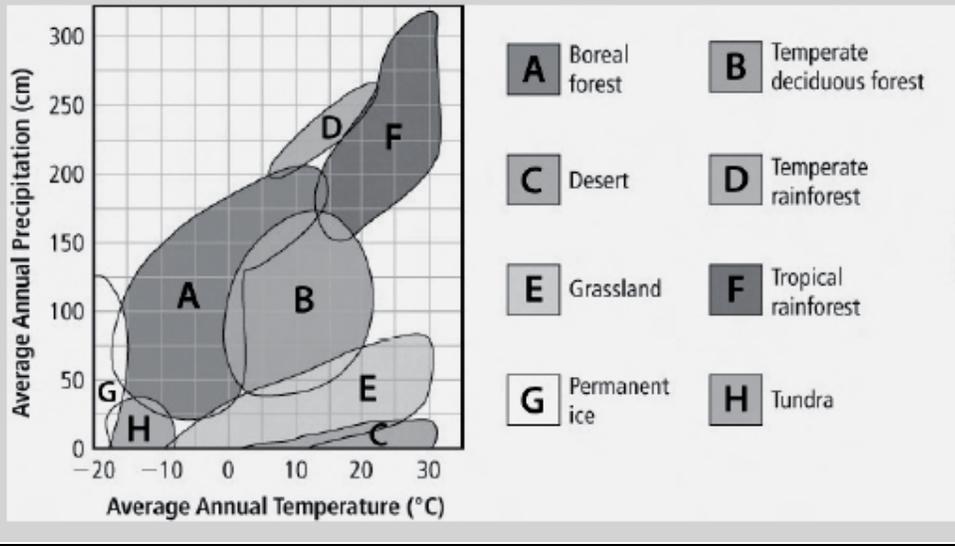


IV) Ocean Currents

- Ocean currents affect temperature and precipitation
- Coastal regions have more moderate temperature and are more humid (wetter)

1.

Use the Precipitation and Temperature Graph to answer the following questions.



- What is the highest average annual temperature that would be found in a grassland biome?
- What is the range (lowest and highest) of annual average temperatures for a temperate deciduous forest biome? Highest _____; Lowest _____
- What is the lowest average annual precipitation in a tropical rainforest biome? _____
- What is the range (lowest and highest) of annual average precipitation in a boreal forest biome? Highest _____; Lowest _____
- What is the highest average annual precipitation and temperature in a desert biome? Precipitation _____; Temperature _____
- Which biomes can have both an annual average rainfall of less than 25cm precipitation and a temperature below 0°C? _____, _____, _____

2. Use the Biomes of the World map on p.10 of your textbook to answer the following questions.

- What factor, latitude or elevation, is likely more responsible for the locations of the permanent ice biome? _____
- Which factor, latitude or precipitation, is likely more responsible for the locations of the desert biome? _____

Review Questions: (Answer the following questions on a separate sheet of paper)

- How does temperature change with latitude? Explain the relationship in terms of the angle at which the sun rays strike the Earth's surface. Give two examples.
- How does precipitation change with latitude?
- How does elevation affect precipitation patterns?
- How can the temperate rainforest biome be located in 2 very different parts of the world?
- Explain why you might find a permanent ice biome at the top of a mountain and a temperature forest biome at the bottom.

SUMMARY:

1. Annual (yearly) **temperature and precipitation** (rainfall, snow, mist, and fog) are two of the most important abiotic factors that influence which biome will be in an area.
2. Other important abiotic factors include:
 - **Latitude**—the distance north and south from the equator. Latitude influences both temperature and precipitation. The tropical zone has very warm temperatures and high precipitation.
 - **Elevation**—the height above sea level. Higher elevations have less air, so retain less heat. Windward sides of mountains are wet, leeward sides are very dry.
 - **Ocean currents** carry warmth and moisture to coastal areas. Temperate biomes are found where warm currents meet land.

Biome	Main characteristics
tundra	<ul style="list-style-type: none">■ located in the upper northern hemisphere; very cold and dry■ due to permanently frozen soil, plants are short and there are few trees
boreal forest	<ul style="list-style-type: none">■ found in the far north; below freezing half the year■ mainly coniferous (cone-bearing) trees
temperate deciduous forest	<ul style="list-style-type: none">■ located in temperate regions, mostly eastern North America, eastern Asia, and western Europe■ trees lose their leaves in winter■ large seasonal changes with four distinct seasons
temperate rainforest	<ul style="list-style-type: none">■ found along coastlines where ocean winds drop large amounts of moisture■ cool and very wet, allowing trees (mainly evergreens) to grow very tall
grassland	<ul style="list-style-type: none">■ occurs in temperate and tropical regions■ covered with grasses that have deep roots, which are well adapted for drought
tropical rainforest	<ul style="list-style-type: none">■ found in a wide band around the equator■ wet and warm year-round, allowing for the growth of a dense canopy of tall trees
desert	<ul style="list-style-type: none">■ occur in temperate and tropical regions; days are hot and nights are cold■ rainfall is minimal and plants and animals are adapted to reduce water loss
permanent ice	<ul style="list-style-type: none">■ includes the polar land masses and large polar ice caps■ the few animals that live here are well insulated against the extreme cold