Exercise walk-through

# 2.4
# Climate and biomes

International Baccalaureate · IB Diploma · Environmental Systems and Societies · SL

# Simpson's reciprocal index

- Site A has 10, 6 and 4 individuals; site B has 18, 1 and 1.
- Same richness, but A is shared more evenly.

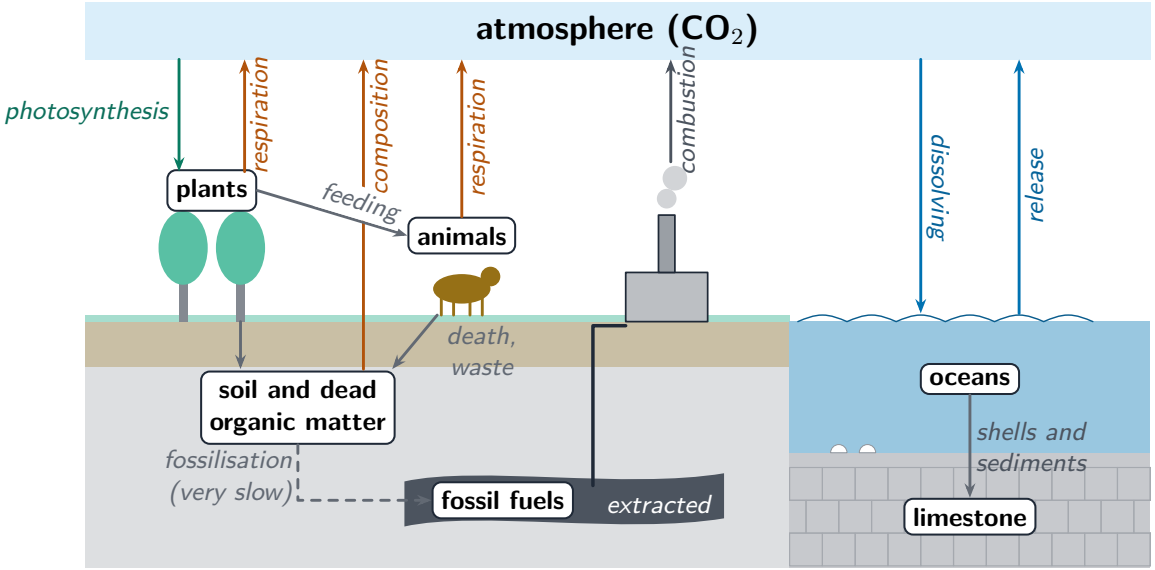
$$D = \frac{N(N-1)}{\sum n(n-1)}$$

$$D_A = \frac{380}{132} = 2.88$$

$$D_B = \frac{380}{306} = 1.24$$

These invented samples have equal richness and different evenness; compare like sampling.

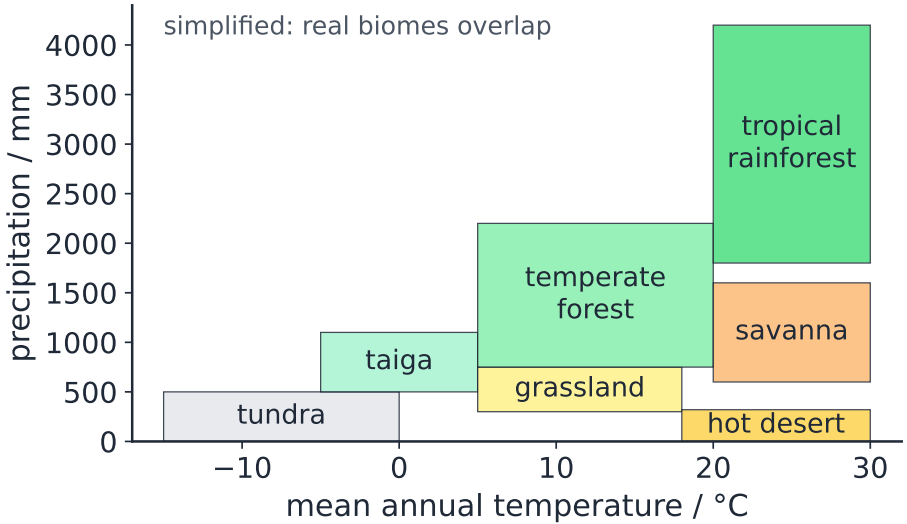
# The carbon cycle




storages in boxes, flows on arrows; not to scale

A store is an amount; a net **sink** is defined by the balance of flows over time.

# Biomes



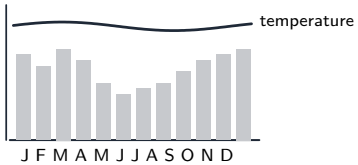

**Climate** envelopes describe broad influences, not every local land cover.

# Exercises 2.1·2.2

**2.1** State the **two** climate factors that most control the distribution of biomes. [2]




**2.2** The climograph shows monthly temperature (line) and precipitation (bars). Identify the biome, and give **two** reasons from the data. [3]




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# Exercises 2.1·2.2

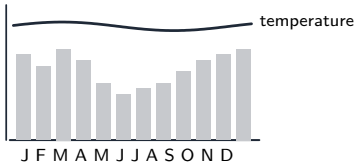
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**2.1**

temperature; precipitation

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**2.2**

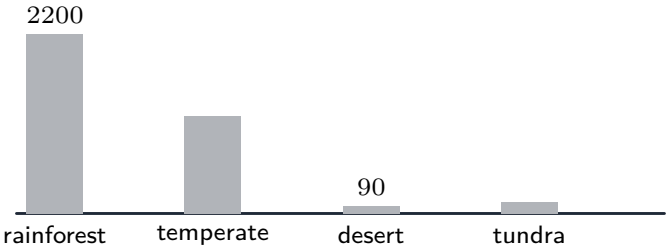
tropical rainforest; high temperature all year, about 26–28 °C; high rainfall every month, so no dry season

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# Exercise 3.1 (a)

**3.1** Tropical rainforest has an NPP of about 2200 g $m^{-2}$ $yr^{-1}$; hot desert has about 90 g $m^{-2}$ $yr^{-1}$.

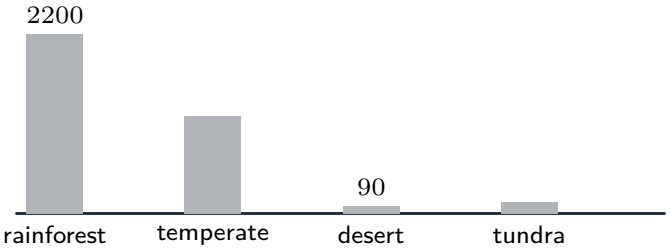
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(a) rainforest has high temperature, light and water all year, so photosynthesis is fast; in the desert, lack of water limits plant growth and cover

# Exercise 3.1 (b)

**3.1** Tropical rainforest has an NPP of about 2200 g $m^{-2}$ $yr^{-1}$; hot desert has about 90 g $m^{-2}$ $yr^{-1}$.

(b) Suggest why tundra also has low NPP, although it is not dry. [2]

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(b) low temperatures slow enzyme reactions and photosynthesis; the growing season is short and soils are frozen or poor in nutrients

# Exercise 3.2 (a)

**3.2** Mountain plant zones are moving uphill as the climate warms.

(a) Explain why the zones move uphill. [2]

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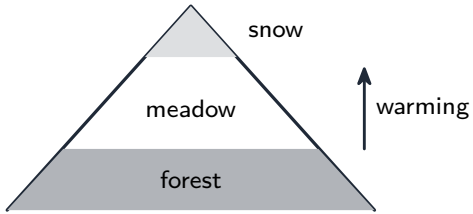
(a) Explain why the zones move uphill. [2]

(a) temperature falls with height; as the climate warms, each species' suitable temperature range is found higher up

# Exercise 3.2 (b)

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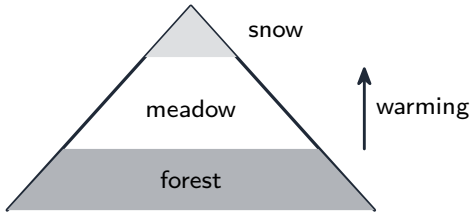
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(b) the area of land gets smaller towards the top, so populations shrink; they cannot move higher than the summit; species moving up from below compete with them