

GRADE 10 | 2024

Life Sciences: Biosphere and Ecology

Life Sciences

CAPS ALIGNED

MatricHub.co.za | South Africa's Matric Resource Hub

1. Levels of Organisation

FORMULA: Atom -> Molecule -> Organelle -> Cell -> Tissue -> Organ -> Organ System -> Organism -> Population -> Community -> Ecosystem -> Biome -> Biosphere

2. South African Biomes

- Fynbos: Western Cape; high plant diversity; fire-adapted
- Savanna: most of South Africa; trees and grass, wet and dry seasons
- Grassland: Highveld; no trees; dominated by grasses
- Nama-Karoo: semi-arid; succulent shrubs
- Succulent Karoo: richest succulent flora in the world
- Forest: small patches along coast and escarpment
- Desert: Namib Desert (NW Namibia border)

3. Energy Flow in Ecosystems

FORMULA: Solar energy -> Producers (photosynthesis) -> Primary Consumers -> Secondary Consumers -> Tertiary Consumers

Only 10% of energy transfers to each level (the 10% rule)

Ecological Pyramids

- Pyramid of numbers: number of organisms at each level
- Pyramid of biomass: total mass at each level
- Pyramid of energy: energy at each level (always true pyramid shape)

4. Nutrient Cycles

Carbon Cycle

Carbon moves between the atmosphere (CO₂), living organisms, and Earth through photosynthesis, respiration, decomposition, and combustion.

Nitrogen Cycle

Nitrogen is fixed by bacteria, absorbed by plants, eaten by animals, and returned to soil by decomposers. Denitrifying bacteria return N₂ to the atmosphere.