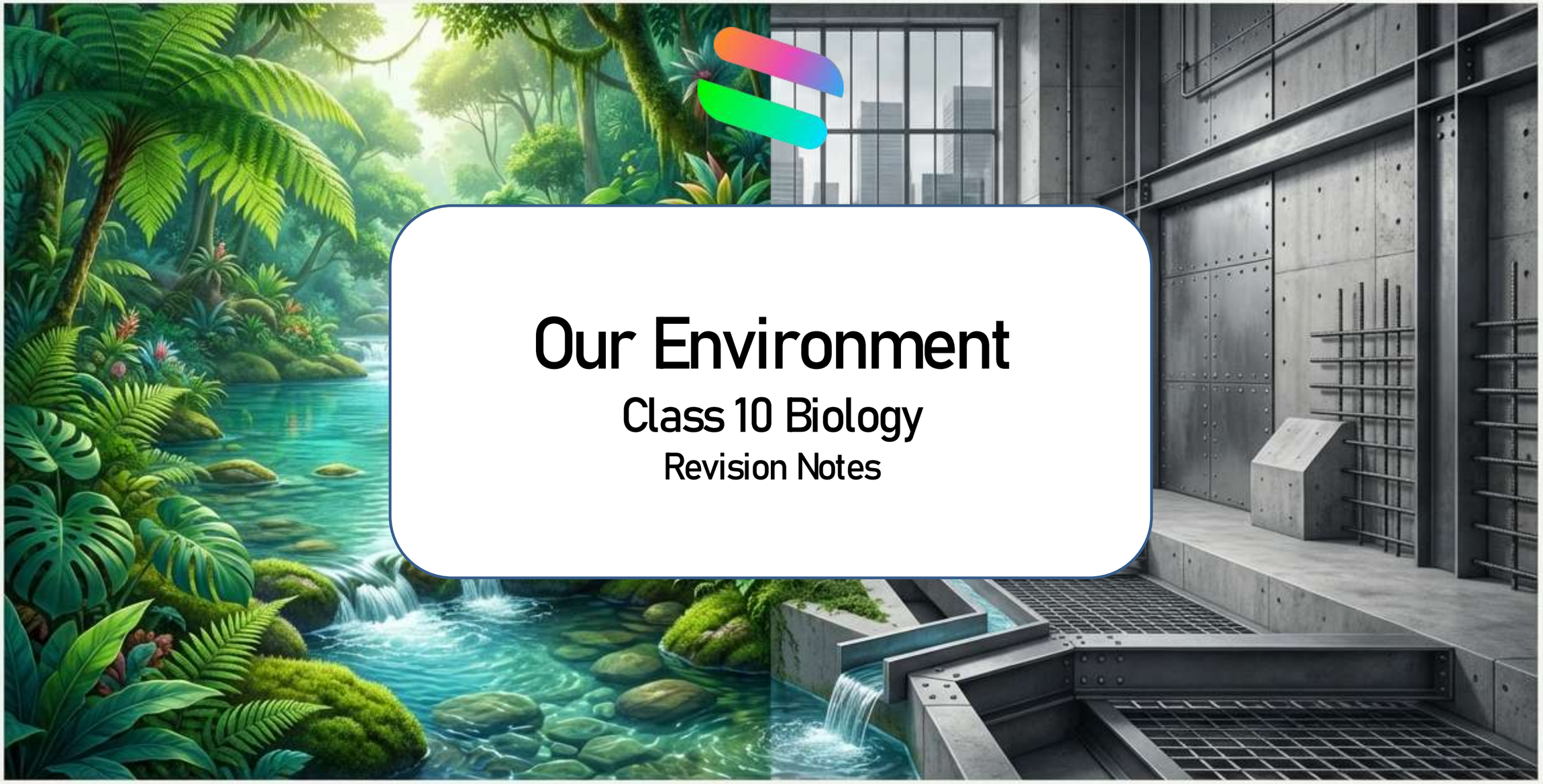


Our Environment

Class 10 Biology

Revision Notes

Every ecosystem relies on two interacting worlds

Ecosystem

Biotic
(Living)

Producers
(Plants)

Consumers
(Animals)

Decomposers
(Micro-organisms)

Abiotic
(Non-Living)

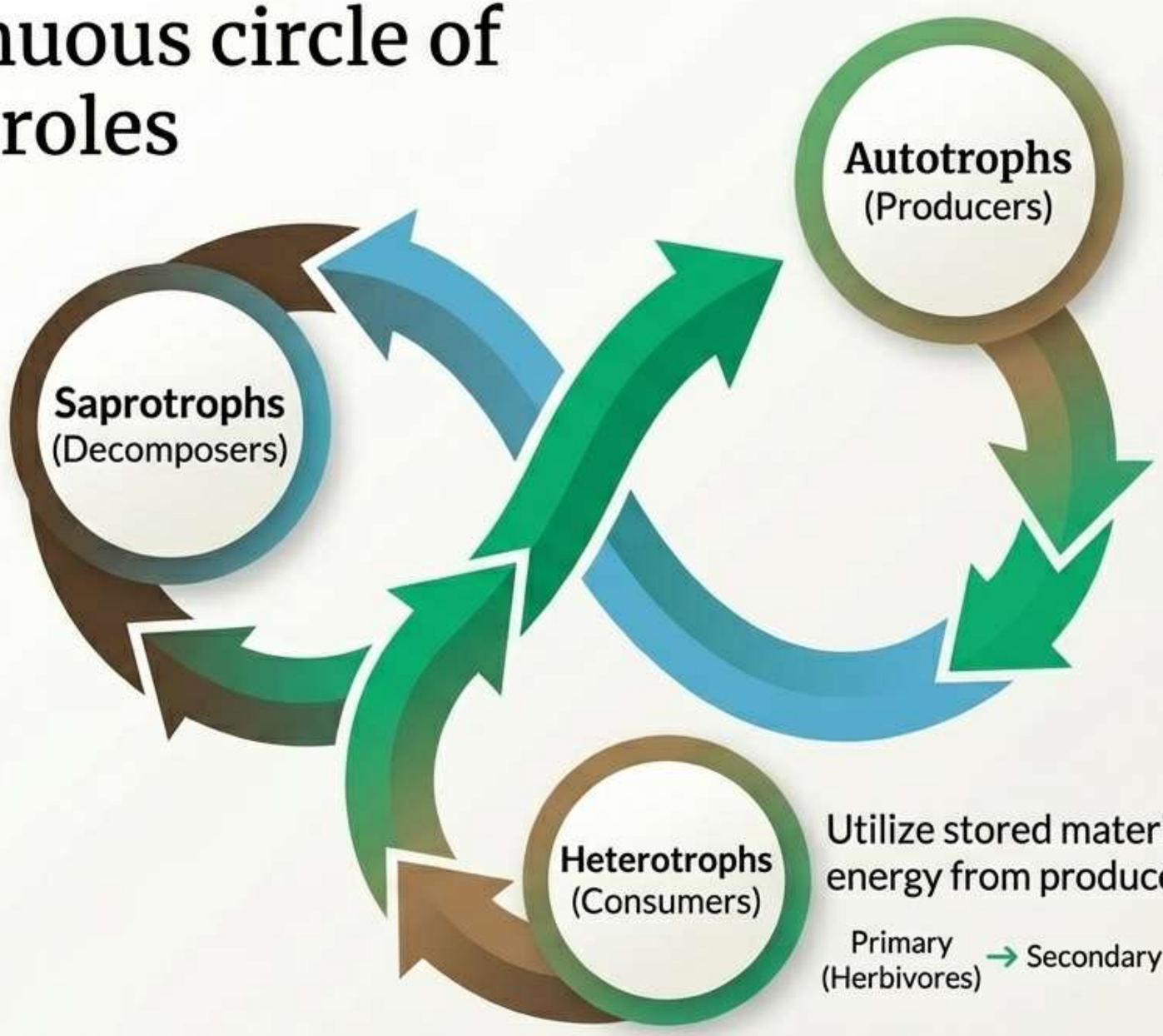
Physical Environment

Air, Soil, Water

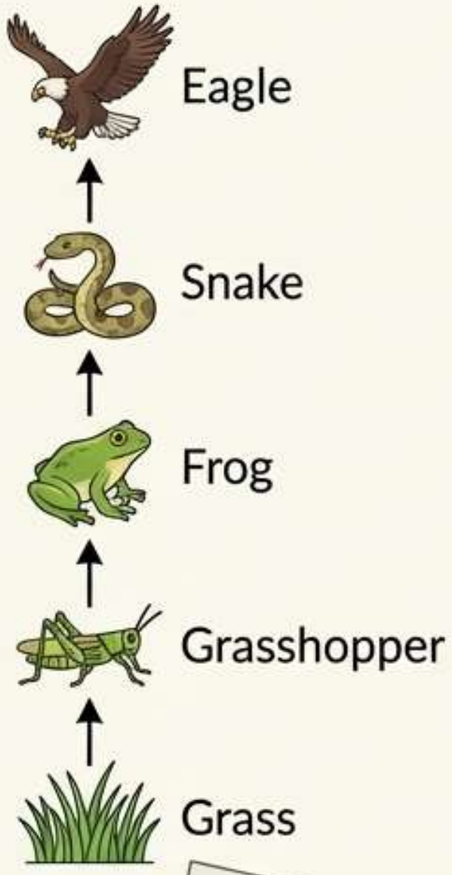
Climatic Factors

Sunlight, Temperature, Humidity

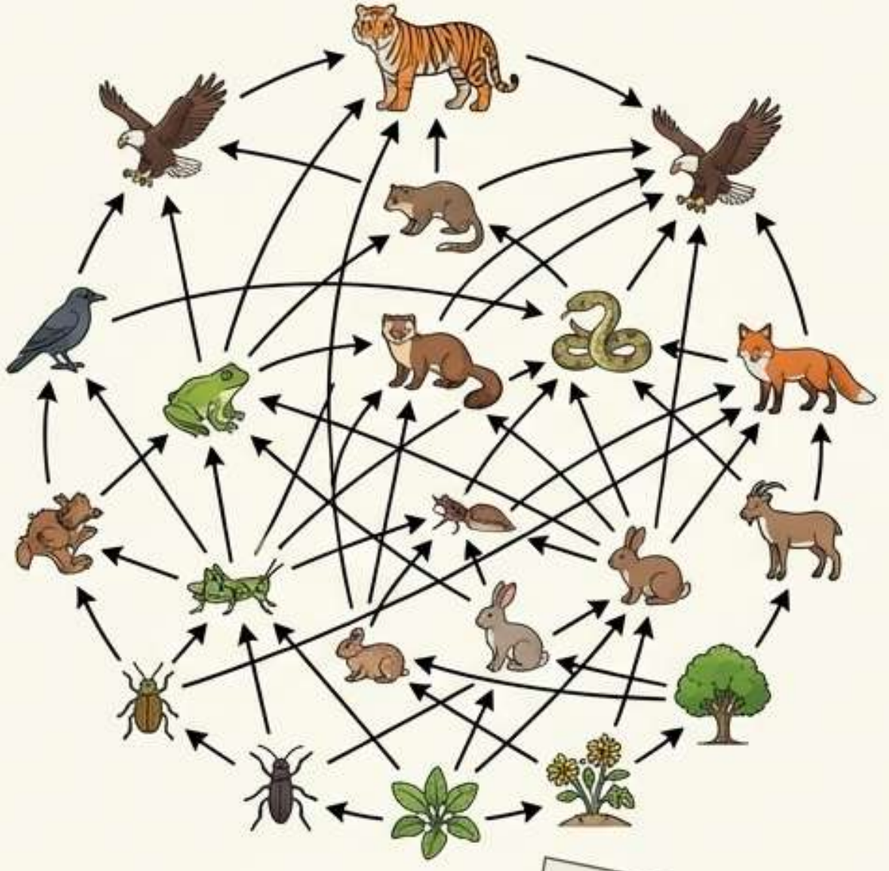
The continuous circle of biological roles



Networks provide stability that linear chains cannot

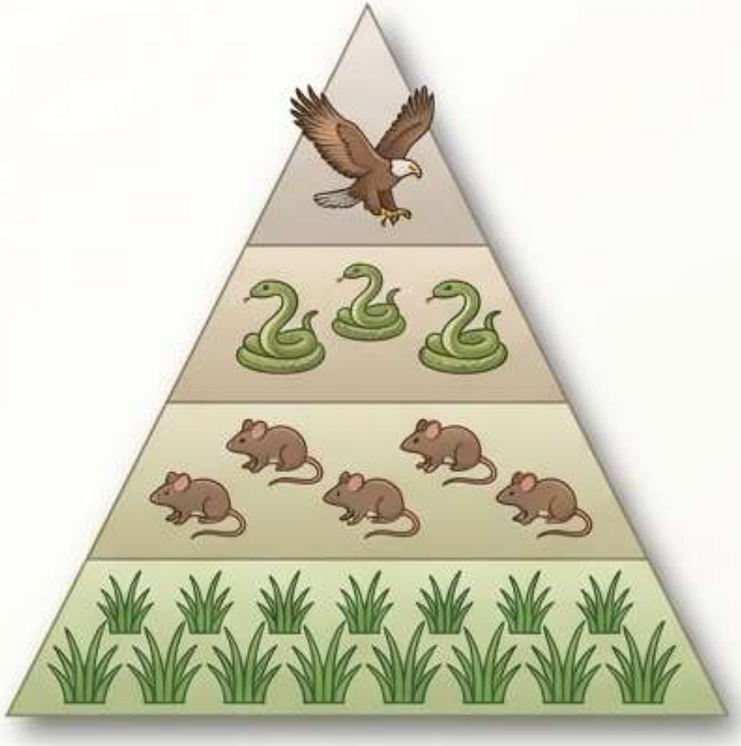


Food chains demonstrate a unidirectional, straight-line flow of energy.

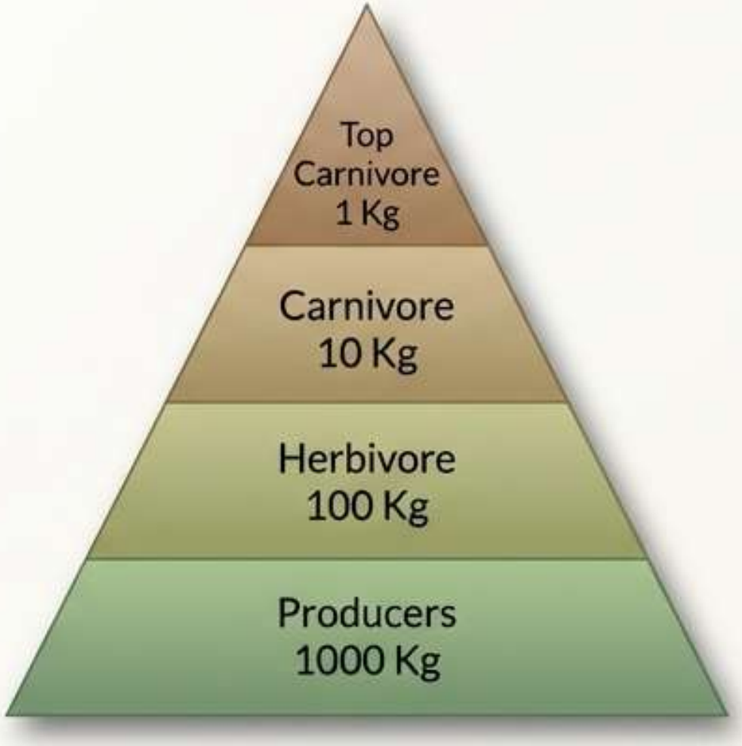


Food webs offer alternative pathways. If one species declines, predators can shift to another, preventing overpopulation and making the entire ecosystem more stable.

Visualizing trophic levels through ecological pyramids

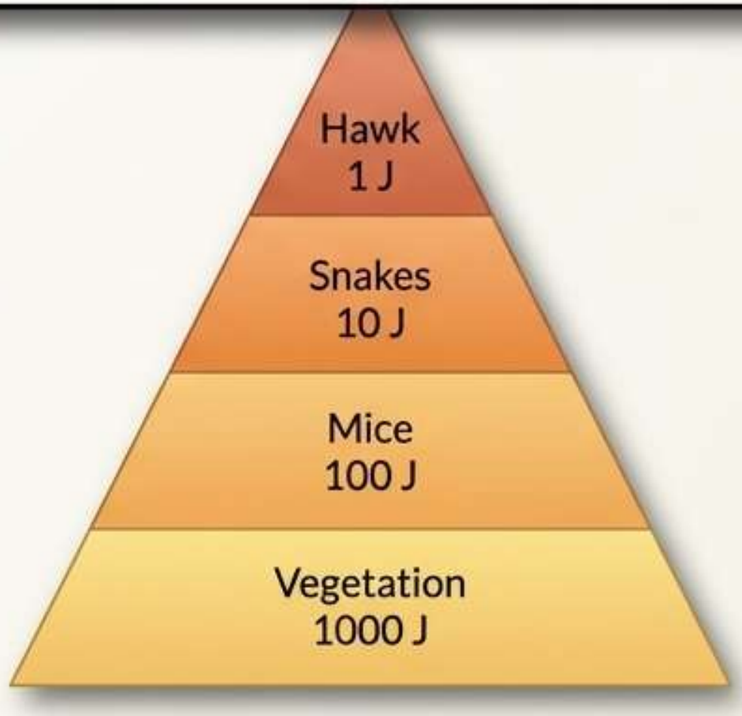


Pyramid of Number



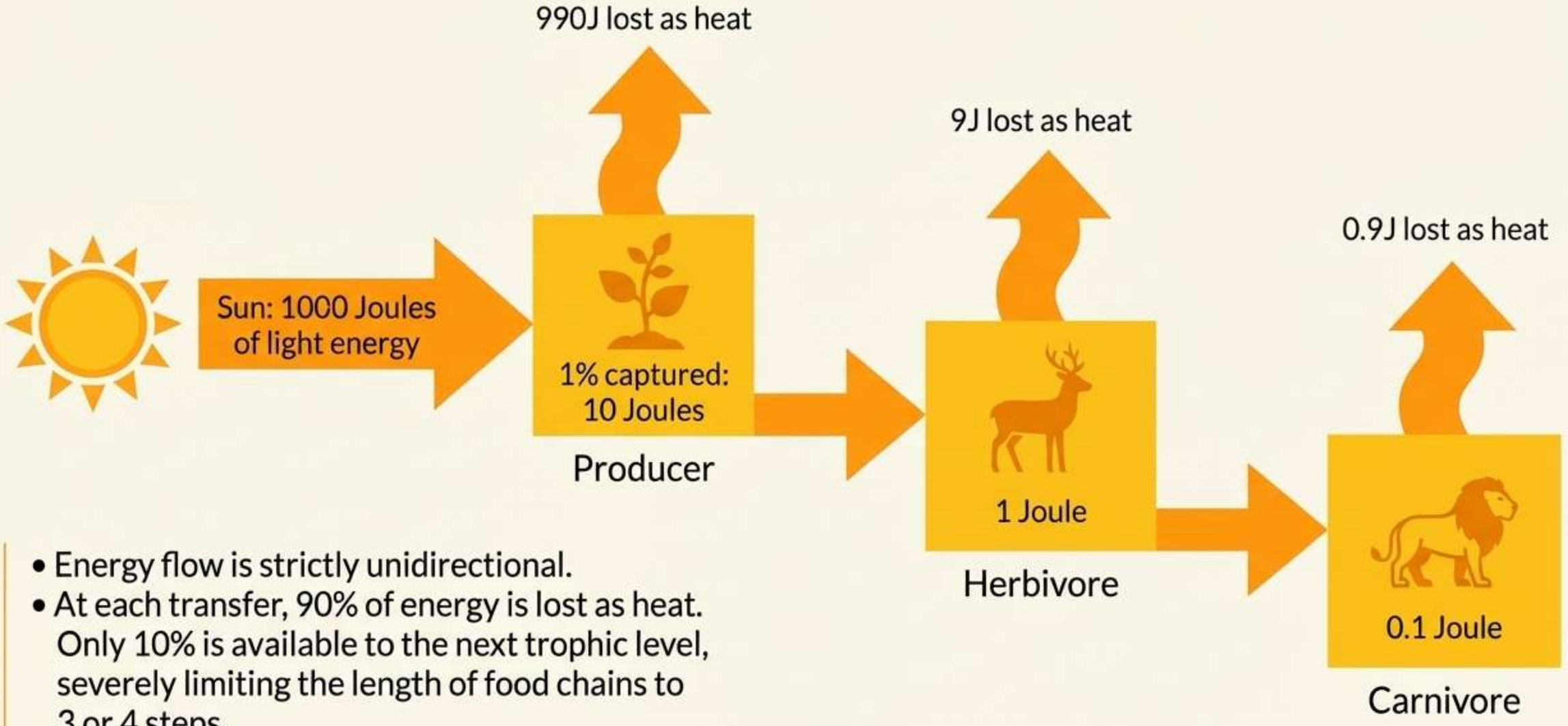
Pyramid of Biomass

The **Pyramid of Energy** is the **only pyramid** that is **ALWAYS upright** in all ecosystems.



Pyramid of Energy

Raymond Lindeman's 10% Law of energy flow

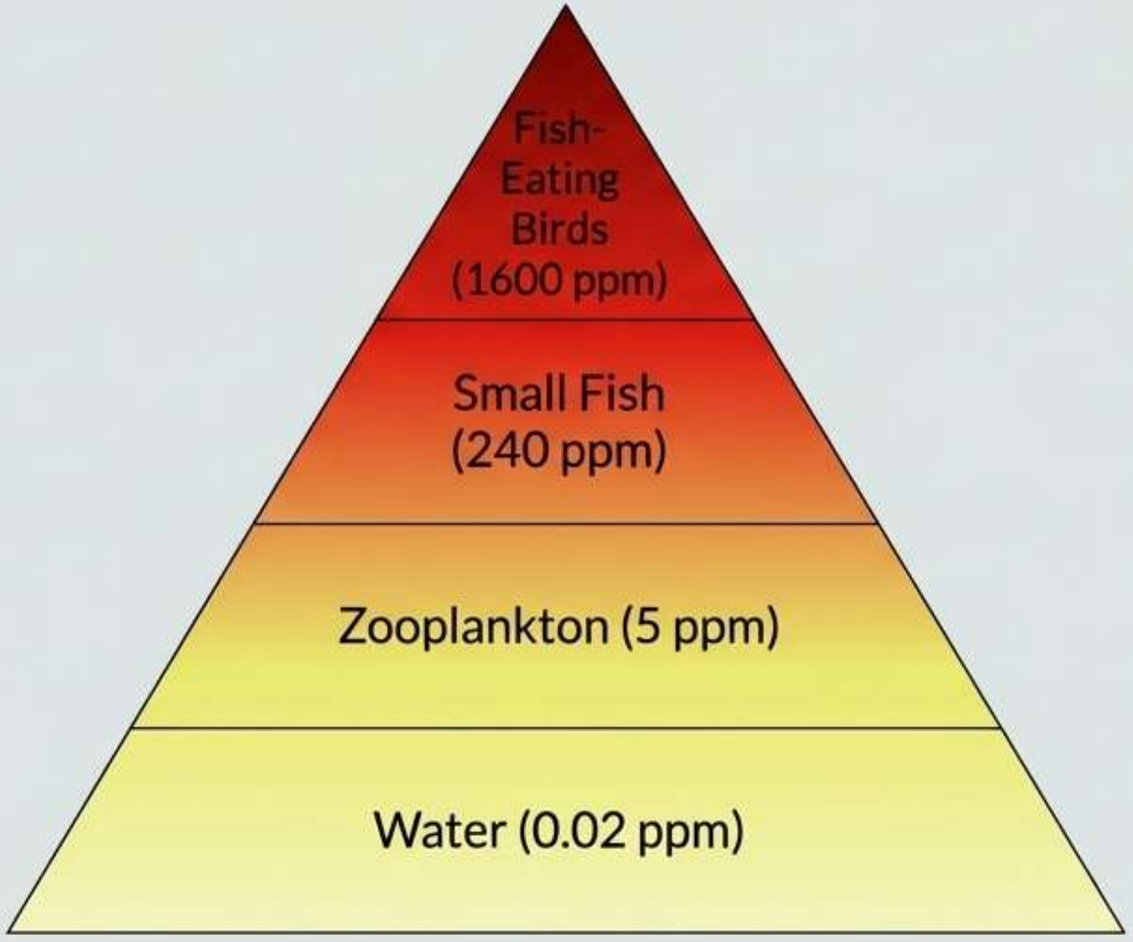


- Energy flow is strictly unidirectional.
- At each transfer, 90% of energy is lost as heat. Only 10% is available to the next trophic level, severely limiting the length of food chains to 3 or 4 steps.

Human activity breaks the natural cycle

"While nature cycles matter efficiently, human activities introduce permanent, non-cyclical disruptions."

The silent threat of biological magnification



- **Harmful, non-biodegradable chemicals (like DDT** or **heavy metals)** cannot be broken down and accumulate at each higher trophic level.
- Because humans occupy the highest trophic levels, we accumulate the maximum quantity of these toxins (e.g., Minamata disease from mercury poisoning).

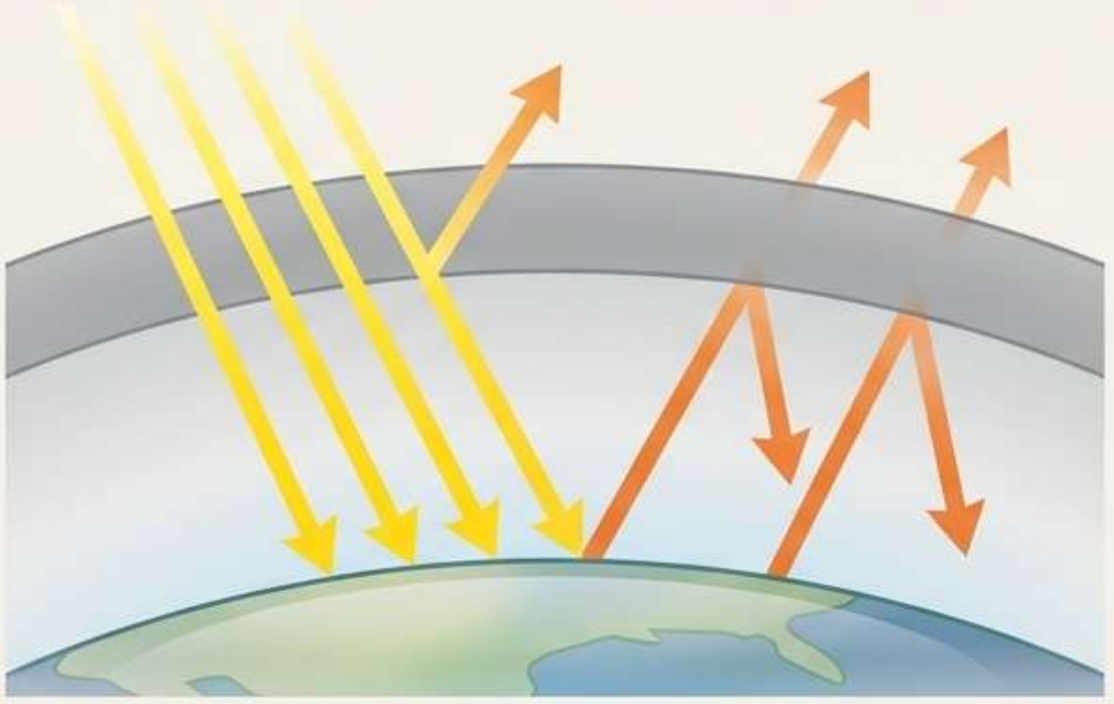
The solid waste crisis blocks biogeochemical cycles

Biodegradable	Non-Biodegradable
 Broken down by natural bacterial/fungal enzymes. Re-enters biogeochemical cycles.	 Cannot be broken down by biological catalysts; persists in environment for centuries. Requires extreme physical heat and pressure to degrade.
 **Harm:** Acts as a pollutant only when accumulated in massive heaps, creating disease vectors (malaria, dengue) and foul odors.	 **Harm:** Permanently reduces soil fertility, alters soil pH, and drives biomagnification.

Greenhouse gases trap heat and alter global climates

The Gases:

- CO2 (fossil fuels)
- Methane (marshes, paddy fields)
- CFCs (refrigerants)
- Nitrous Oxides (fertilizers, automobiles)

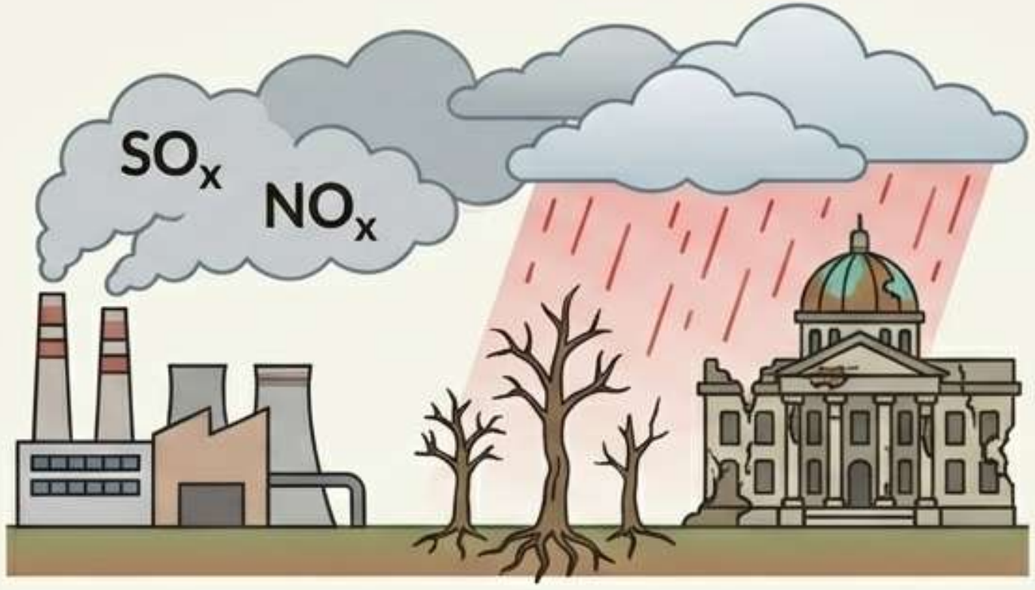


The Impact:

- Atmospheric temperature rose by 0.6°C in the 20th century
- Melting glaciers and sea-level rise
- Altered soil moisture and species extinction

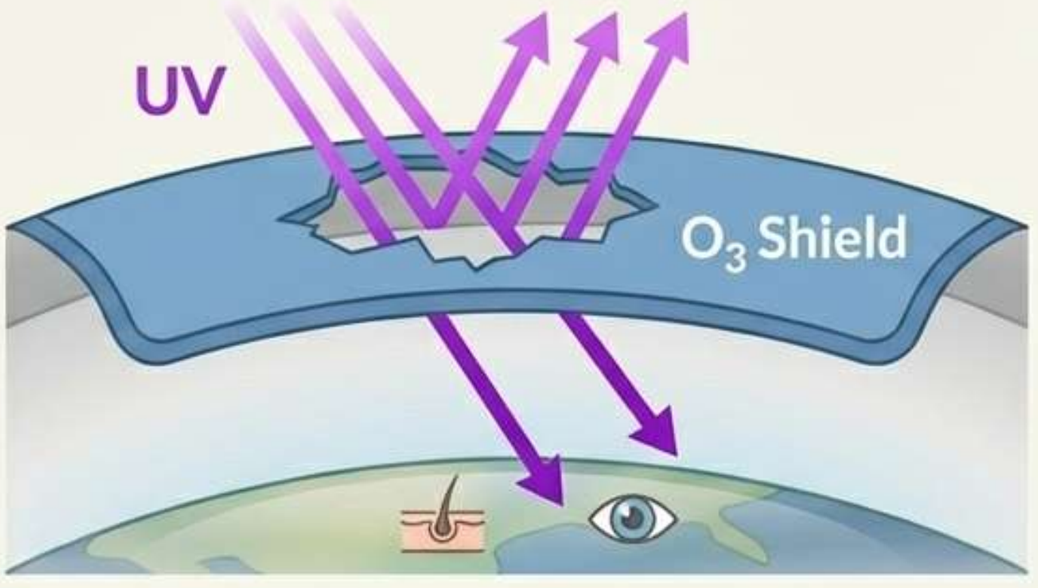
Threats from above: Acid rain and ozone depletion

Acid Rain



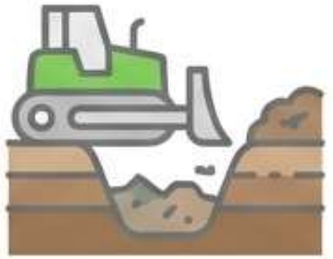
Sulphur and nitrogen oxides form sulfuric and nitric acids, devastating aquatic life and soil chemistry.

Ozone Hole



CFCs release active chlorine radicals in the stratosphere. A single radical initiates a chain reaction destroying the O3 shield, allowing UV radiation to cause skin cancer and cataracts (first discovered over Antarctica, 1985).

Scientific approaches to managing solid waste



Landfills

Burying waste to level uneven terrain in urban areas.

Recycling

Remoulding plastics, paper, and metals at specialized industrial plants.

Composting

Converting organic household waste into natural manure.

Incineration

Burning hospital and chemical waste at >1000°C to reduce bulk to ash.

Biogas

Processing biodegradable waste into cheap fuel and fertilizers.

Restoring the balance through collective action

Everyday Mitigation

Minimize fossil fuel usage, switch to energy-efficient devices, and aggressively reuse/recycle materials to reduce greenhouse emissions.

A Proven Success

In 1987, the United Nations Environment Programme (UNEP) successfully forged a global agreement to freeze CFC production. This decisive action proved that humanity can successfully intervene to protect the ozone layer and restore natural balance.