

Competition:

For survival, plants need: light, space, water & mineral ions

Animals need: space, food, water & mates

In a community, species practise interdependence (need each other for resources)

Stable community = abiotic & biotic factors are constant/ in balance

Abiotic: non-living factors

E.g. Light, temperature, wind intensity, oxygen, soil pH & mineral content

Decrease in light intensity = less photosynthesis = less plant growth = herbivores have no food source = decreased population size

Biotic: living factors

E.g. predators, competition, pathogens

New predator = decreases prey population

Food chains:

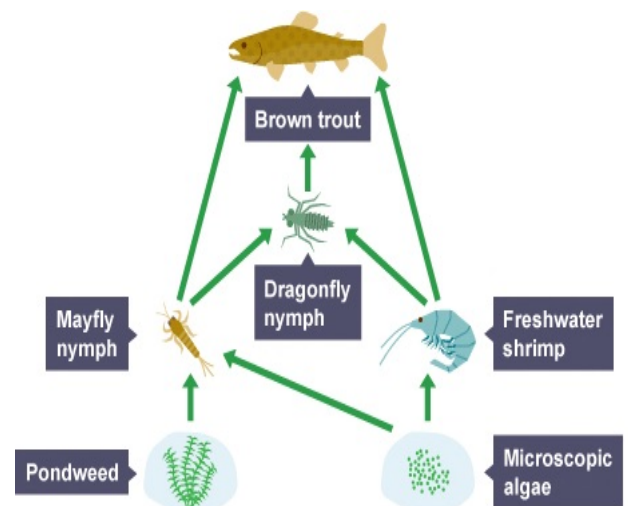
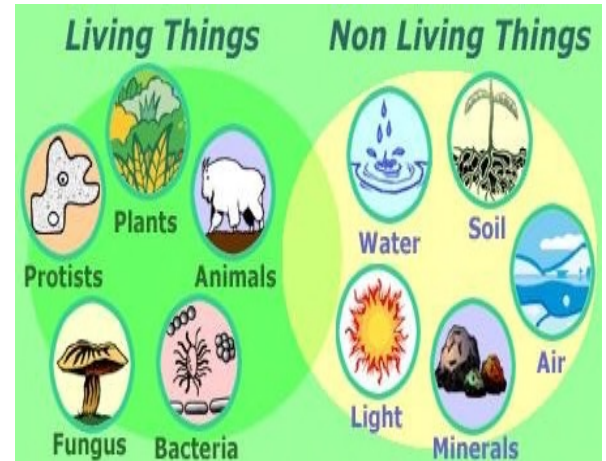
1. Producer (algae & plants make food via photosynthesis)
2. Primary consumer (herbivores)
3. Secondary consumer (omnivores)
4. Tertiary consumer (carnivores aka the predator)

Energy is transferred through food chains biomass

It can be lost via: digestion (movement so respiration) or excretion or not all parts of animals are eaten = very little energy transfer

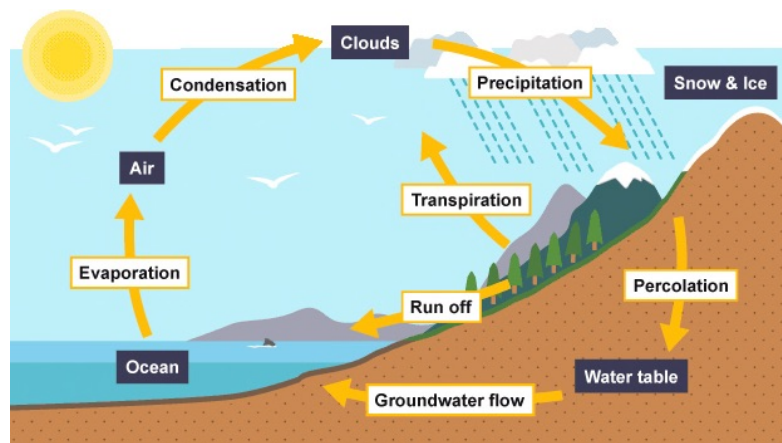
Biomass transfer = (biomass transferred to next level / biomass at previous level) x100

Population numbers are limited by the food source available
e.g. prey increases → predators increase → prey decrease → predators decrease → prey increase and so on...
Predator-prey cycles are out of phase with each other = gradual adjustments



Water cycle:

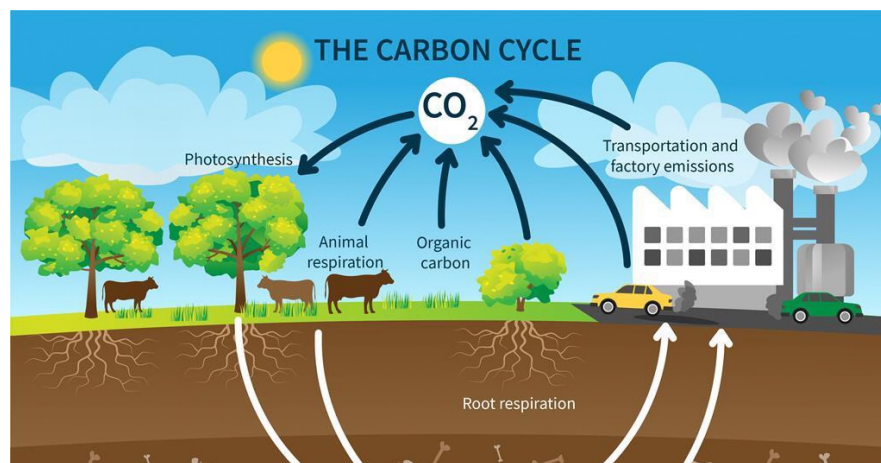
1. Sun heats oceans
2. Water vapour rises as it's less dense (& water from the transpiration of plants)
3. Warm air cools and condenses = clouds are formed
4. Precipitation falls
5. Water drains into oceans & cycle repeats



Carbon cycle:

1. Plants remove CO_2 from atmosphere via photosynthesis
2. Plants respire, releasing CO_2 & animals eat them (carbon moves through the food chain)
3. Animals respire, releasing CO_2
4. Microorganisms respire when they decompose dead animals & plants
5. Combustion of fossil fuels emits CO_2

= carbon is constantly being recycled in a CYCLE



Decay:

Compost = decomposed organic matter used as fertiliser

Rate of decay affected by:

Temperature: warmer = quicker decay as increased enzyme activity

O₂: microorganisms need O₂ to respire

Water: quicker in moist environments

Decomposers: more = rapid process

Biogas:

Organic matter → generator → methane

On industrial scale: sludge from sewage & sugar factories is used

Need constant temperature & methane used right away (can't be stored as requires too high of a pressure)

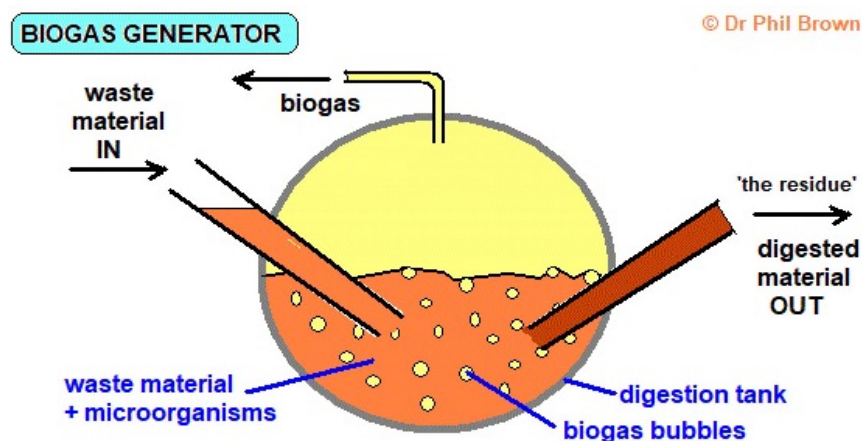
Batch generators:

Manually loaded with waste, by-products cleared after each batch

Continuous generators:

Waste is continuously fed in & biogas is made at a steady rate

Generators have: an inlet for waste, an outlet for digested waste to be removed via, an outlet to pipe biogas to where it's required



Waste management:

Higher population = higher demand for goods = more waste

Water pollution: toxic chemicals from industry & sewage disrupt ecosystems

Land: chemicals e.g. herbicides, burying nuclear waste underground

Air: Sulfur dioxide causes acid rain

Global warming:

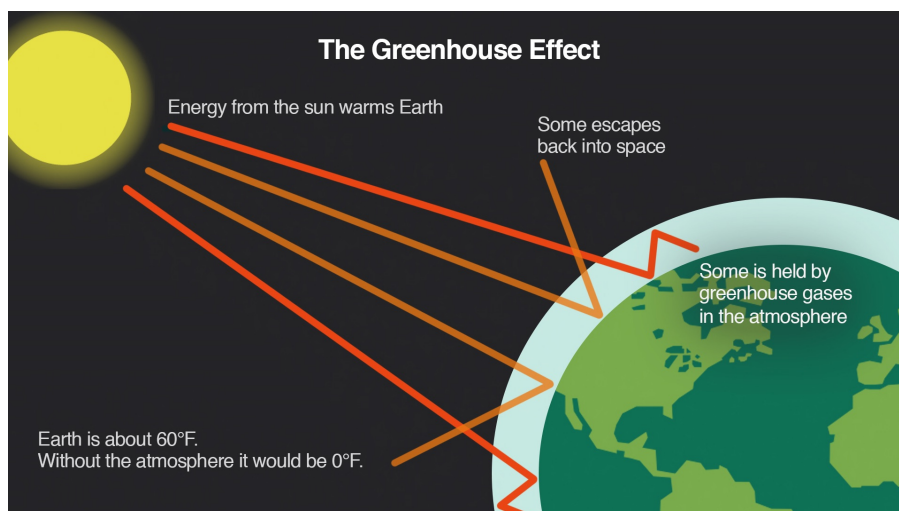
Enhanced greenhouse effect:

1. Sun emits short-wave length radiation to earth
2. Some is absorbed, some is reflected back to space as long wave length radiation
3. Green house gases create a 'blanket' which traps heat in the earth's atmosphere
4. Temperatures rise = global warming

Consequences:

Higher temps = thermal expansion = melting of icebergs = sea levels rise =
habitats are destroyed = species are endangered = species go extinct =
ecosystems are disrupted

Higher temps = more areas of low pressure = more depressions = more intense &
frequent storms = coastal flooding = migration



Maintaining ecosystems:

Breeding programs prevent extinction

Regenerative programs for habitat e.g coral reef & mangrove forests

Reintroducing hedgerows & field margins = more habitat = wider biodiversity

Gov regulations to reduce deforestation & encourage in carbon offsetting

Recycling to reduce landfill waste

Issues:

High cost means cost benefit analysis has to be conducted

Reducing deforestation = unemployment = loss of livelihoods = lower GDP

Conflict between protecting biodiversity & food security (killing pests reduces biodiversity whilst increasing crop yields)

Development can be hindered by not exploiting resources



Food security:

Having enough to feed a population

Threats to food security:

Birth rates rise = higher population = higher demand for food imports (resources become scarce)

Farming affected by: pathogens, pests & environmental conditions = famines

Input costs of farming & tech = too high

Conflicts & wars affect supply of food to regions

Efficient food production:

Keeping livestock in cages = limits movement (thus energy transfer to environment) = more energy for animal growth
→ factory farming

Protein rich foods also given to increase rate of growth

Factory farming is **HIGHLY** unethical

