

Biotic components

Plants

13. carbon cycle**Reduced:** Photosynthesis**Produced:** Respiration: plant / animal / decomposer(bacteria/fungi)

Plants/animals decompose back into useful products

Combustion of Fossil fuels: CO₂ back into air

Deforestation: less photosynthesis

14. water cycle

Transpiration from plants / evaporation of sea from sun's energy: water → water vapour

Warm water vapour rises – cools/condenses into clouds

Precipitation: clouds release water

Surface run-off: water back to sea

Potable water: water safe to drink**Desalination:** removes salts

Salt water boiled in large enclosed vessel – water evaporates & separates from salt – condensed back to pure water

Reverse osmosis:

Salt water treated to remove solids

Fed at high pressure into vessel containing partially permeable membrane – only allows water

Pressure causes water molecules to move in opposite direction to osmosis: high → low salt concentration – separated

15. Nitrogen cycle

Nitrogen gas (78%) – very unreactive: can't be used directly by plants

Atmospheric nitrogen has to be turned to nitrates/ammonium to be used by plants for: growth / making proteins

Nitrogen passed through food chain in form of proteins

Plants absorb nitrates from soil by active transport – use to build up proteins

Animal eats plant – biomass used to produce animal protein

Nitrogen-fixation: turning nitrogen from air → nitrogen containing ions in soil for plant use**Nitrogen-fixing bacteria:** turn nitrogen → ammonia – forms ammonium ionsFound in root nodules of leguminous plants: nitrogen gas → nitrates used for growth**Lightning:** so much energy in bolt – makes nitrogen react with oxygen → nitrates**Decomposers:** proteins (rotting plants) & urea (animal waste) → ammonia – forms ammonium ions in solution for plant use**Nitrifying bacteria:** turn ammonia in decaying matter → nitrites → nitrates – each by different species of nitrifying bacteria**Denitrifying bacteria:** turn nitrates → nitrogen gas: no benefit to living organisms – often found in waterlogged soils**Farmers** use ammonium nitrate fertiliser: help crops grow / increase yields

Crops harvested: don't decompose – nutrients not returned to soil

Ways of increasing amount of nitrates in soil:

Crop rotation

Grow crops: takes minerals out of soil

Nitrogen-fixing / leguminous crop: helps put nitrates back in soil for next crop

Fertilisers

Compost/manure recycles nutrients left in plant/animal waste and returns them to soil through decomposition

Artificial fertilisers: contain nitrates – expensive & can cause eutrophication

16. Bioindicators: species' presence/absence indicates condition/pollution level

Simple/cost-effective – don't give accurate figures of how polluted area is

Non-living indicators: dissolved oxygen meters & chemical tests – measure concentration of dissolved oxygen in water

Electronic meters & various laboratory tests – measure sulphur dioxide concentration

Water pollution – eutrophication**polluted:** bloodworm / sludge-worm**clean:** freshwater shrimps / stonefly**Air pollution**

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