

Biotic components

Plants

Decomposer bacteria

Animals

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 ions

Found 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