

Cycling of carbon, water and nitrogen (qualitative)

Q1.(2019,4)

carbon absorbed

120.1 + 92.8 or 212.9 (1)

OR

carbon released

119.6 + 90 + 6.4 or 216.0 (1)

Evaluation

3.1 (gigatonnes)

Q2.a(2019,4)

all the oxygen had been used up / no oxygen left

Q2.b(2019,4)

An explanation linking:

- the **plant** produced oxygen (1)
- through photosynthesis (1)

Q2.c(2019,4)

Any two from:

- light intensity (1)
- temperature (1)
- size of bell jar / same volume of air (1)
- {size/type} of candle /length of the wick (1)
- **level** of liquid/water in the container (1)

Q2.d(2019,4)

A description including:

- decomposers break down waste matter (into ammonia) (1)
- nitrifying bacteria convert ammonia / nitrifying bacteria make {nitrites / nitrates} (1)
- nitrogen fixing bacteria convert nitrogen into nitrates (1)
- denitrifying bacteria {convert nitrates / release nitrogen} (1)

Q3.a(2021,4)

Any **one** from:

bacteria / fungi / decomposers /
prokaryotes

Q3.b(2021,4)

A description including **two** from:

- (dissolved) in water (1)
- diffusion through the root (1)
- (so water moves) through the xylem (1)
- by transpiration (stream) (1)
- into leaves by diffusion (1)

Q3.c(2021,4)

An explanation linking:

- as light intensity decreases the number of (small) plants (per m²) decreases (1)
- because the (small) plants will not be able to photosynthesise enough (1)

Q3.d(2021,4)

Any **one** from:

- same time of day (1)
- same meter (1)
- same position(s) in area / measure the same size area (1)
- same person makes the readings (1)
- meter held vertically each time (1)

Q3.e(2021,4)

A description including **three** from:

- place a quadrat along a {rope / tape} measure (1)
- tape measure to measure along the transect (1)
- measure light intensity at different distances (from the wood) (1)
- measure the stinging nettles {along the transect / at different light intensities} (1)
- way of measuring growth of stinging nettles (in the quadrats) (1)

Q4.a(2022,4)

X – decomposers

Y – nitrifying (bacteria)

Q4.b(2022,4)

An explanation linking **three** from:

- leguminous crops planted (1)
- that have nitrogen-fixing bacteria (1)
- in root (nodules) (1)
- which fix nitrogen (gas) (1)

Q4.c(2022,4)

An explanation linking:

- nitrates are needed to make {protein / amino acids} (1)
- which are needed for growth (1)

Q5.(2023,4)

A description linking the following:

- (denitrifying bacteria) convert nitrates (1)
- back into (atmospheric) nitrogen (1)

Q6.(2023,4)

Biotic

Plants

- During photosynthesis plants take in carbon dioxide from the atmosphere
- During respiration plants release carbon dioxide into the atmosphere
- Plants store carbon compounds e.g. glucose
- Carbon is transferred to animals when they are eaten

Animals

- Animals release carbon dioxide when they respire
- Animals ingest carbon compounds e.g. glucose when they eat plants or animals

Decomposers

- Decomposers release carbon dioxide
- during respiration
- Decomposers break things down

Abiotic

- Burning fossil fuels releases carbon dioxide or carbon (particulates) into the atmosphere
- The oceans can absorb carbon dioxide
- Carbon can be stored in carbonate rocks
- Erosion of carbonate rocks releases carbon dioxide
- Volcanoes releasing carbon dioxide