

Edexcel IAL Biology A-level

5.9-5.14 - Ecosystems and Biomass

Flashcards

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What is meant by net and gross primary productivity?



What is meant by net and gross primary productivity?

Gross primary productivity (GPP) - the rate of chemical energy fixture during photosynthesis by all producers in an ecosystem, measured in $\text{kJ m}^{-2} \text{ year}^{-1}$

Net primary productivity (NPP) - the amount of chemical energy that is available to heterotrophs in an ecosystem



How is net primary productivity calculated?



How is net primary productivity calculated?

It is calculated by subtracting chemical energy generated in respiration (R) from gross primary production:

$$\text{net primary production (NPP)} = \text{gross primary production (GPP)} - \text{respiratory losses (R)}$$



What is a trophic level?



What is a trophic level?

The position that an organism holds in a food chain, food web, pyramid of numbers or pyramid of biomass



What is biomass and how is it transferred? How can we measure this?



What is biomass and how is it transferred? How can we measure this?

- The total weight of living matter in a certain area, transferred up trophic levels through consumption
- Measured in terms of mass of carbon, or dry mass of tissue



State the formula for efficiency of biomass transfer



State the formula for efficiency of biomass transfer

$$\text{Efficiency} = \frac{\text{biomass transferred}}{\text{biomass intake}} \times 100$$



Why are biomass transfers not 100% efficient?



Why are biomass transfers not 100% efficient?

Energy is lost through

- Egestion (removal of faeces)
- Excretion (removal of waste products e.g. urine)
- Respiration
- The production of inedible bones and shells



Why do food chains usually have fewer than five trophic levels?



Why do food chains usually have fewer than five trophic levels?

Biomass transfers are not 100% efficient and so there is often not enough energy to support five trophic levels



Define population



Define population

All organisms of the same species living with one another in a habitat at the same time



Define community



Define community

All of the populations of different species living together in a habitat



What is a habitat?



What is a habitat?

The region where an organism normally lives



Define ecosystem



Define ecosystem

- The community of organisms (biotic) and non-living (abiotic) components of an area and their interactions
- Vary from very large, e.g. biome, to very small, e.g. microhabitat



Describe biotic and abiotic factors, giving examples



Describe biotic and abiotic factors, giving examples.

- **Biotic** - living features of an ecosystem, e.g. predators, disease
- **Abiotic** - non-living features of an ecosystem, e.g. light, temperature



Define niche



Define niche.

Describes how an organism 'fits' into an ecosystem and its role in that environment



What do population numbers depend on?



What do population numbers depend on?

- Birth rate
- Death rate
- Immigration
- Emigration



What is distribution?



What is distribution?

The spread of living organisms in an ecosystem



What is sampling?



What is sampling?

Selecting a group of individuals that will represent the whole target population.

Allows us to measure the distribution and abundance of organisms



Suggest methods of assessing
abundance and distribution of organisms



Suggest methods of assessing abundance and distribution of organisms.

- **Quadrats** - square frames placed at random in area to be investigated
- **Transects** - line or belt that runs across the area to be investigated



Suggest different ways abundance can be quantified



Suggest different ways abundance can be quantified.

- Percentage area cover
- Percentage frequency
- Density



What is random sampling?



What is random sampling?

A sampling technique used to avoid bias,
e.g. creating a square grid and
generating random coordinates



What is systematic sampling?



What is systematic sampling?

- Sampling technique used to determine the abundance and distribution of organisms along an area at periodic intervals, e.g. along a belt transect
- Commonly used in ecosystems where some form of gradual change occurs

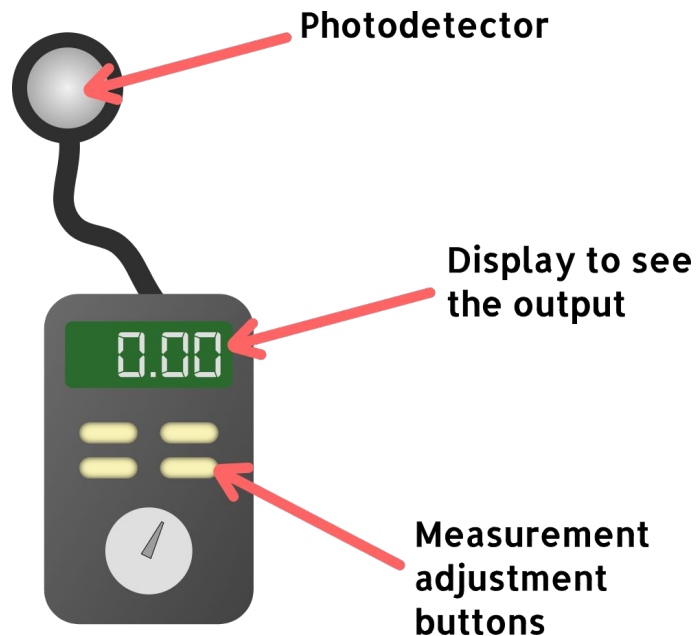


How can the light intensity be measured?



How can the light intensity be measured?

Using a light meter placed near the ground with the photodetector facing the light source



How can the soil pH be measured?



How can the soil pH be measured?

Using a pH probe which is placed in the soil in order to provide a reading on the display for soil pH

