

Definitions

- **Habitat;** the place where an organism lives
- **Environment;** all the conditions or factors experienced in the habitat
- **Population;** a group of individuals of the same species living in a particular area at a specific time
- **Community;** all the populations (living things) in a given area at a specific time
- **Ecosystem;** all the communities (living things) and the physical environment (non-living things) in an area at a specific time
- **Niche;** the role or way of life of an organism in a community

Ecological niche

- Role or way of life of an organism. It is a combination of where the organism lives (**its habitat**) and how it lives there (**their adaptations**).
- When describing a niche use the information given and describe or explain the following:
 - Feeding habit (e.g. herbivore etc.)
 - Activity pattern (e.g. nocturnal/ diurnal)
 - Adaptations
 - Where it lives

Habitat and Adaptations

Environmental factors

- These are the factors experienced within the habitat and will be different depending on the organism. e.g. sunlight is important to plants but not for worms living in the soil.
Broken down into two types:
- **Biotic factors;** factors due to other **living** things within the habitat. e.g. food supply, predation, competition etc.
- **Abiotic factors;** factors due to physical or climatic conditions. **Non-living** factors which effect the habitat. e.g. light intensity, rainfall, day length, pH levels, tidal exposure etc.

Adaptations

- **Structural (or morphological)** adaptations are the physical features of the organism. These include things you can see, like its shape or body covering, as well as its internal organisation.
- **Physiological adaptations** relate to how the organism's metabolism works. These adaptations enable the organism to regulate their bodily functions, such as breathing and temperature, and perform special functions. e.g. excreting chemicals as a defence mechanism.
- **Behavioural adaptations** are learned or inherited behaviours that help organisms to survive, for example, the sounds made by whales.

Gause's principle

- When niches of different species overlap, interspecific competition between them will occur. The greater the overlap the higher the competition. If the niches are too similar, then the species cannot **co-exist**; one species will be better adapted and will out-compete the other. The other species will need to adapt, move or be eliminated.
- This is known as **Gause's principle** and explains that if two species appear to be co-existing, then they must have something different in their ecological niches or they couldn't co-exist.
- e.g. The flax notch and window caterpillars which have a different mouthpart so they feed on different parts of the flax leaf.

Limiting Factors

- These are environmental factors which limit the growth of the organism or the population when they are exceeded.
- These can be density dependent (disease) or density independent (floods etc).
- **Liebig's law** states that "the functioning of an organism is limited by the essential environmental factor that is present in the least favourable amount."

Habitat and Adaptations

Tolerance curve

- Most environmental factors that affect an organism do not remain constant and an organism has to be able to tolerate these changes. If it can't tolerate these changes it must either migrate or die.
- The range in which the organism thrives = optimum range
- Organisms will experience stress outside this range and will try to avoid areas that lead it to live outside its tolerance range
- If the tolerance curve is spread, the organism can tolerate wide fluctuations in this factor

