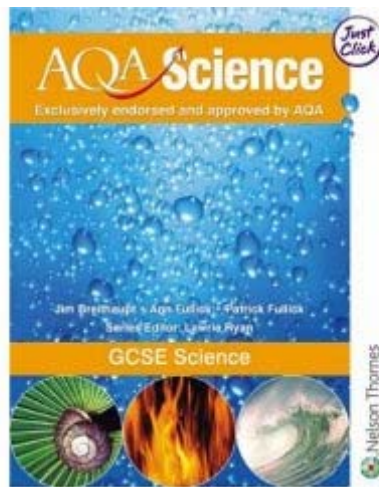




Name:

Revision Booklet



Adaptation for survival

Form 10 A4



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1. Adaptations in animals and plants

Adaptations are part of the evolutionary process which 'shapes life' so that a habitat is populated by organisms which excel there. Adaptations increase an organism's chance of survival; they are 'biological solutions to an environmental challenge!

Examples of how organisms are adapted to their environment.

Life in a very cold climate – Polar bear



- Rounded shape means a small surface area/volume ratio to reduce heat loss.

- Large amount of insulating fat beneath the skin, which also acts as a food store.

- Thick greasy fur to assist insulation against the cold, and to repel water.

- White coat so that is camouflaged.

- Large feet to spread its weight on the ice.

- Powerful swimmer so that it can catch its food.

- Hibernates in the worst weather.



Life in a very hot climate - Camel



- Long, thin legs and neck means a large surface area/volume ratio to increase heat loss.
- Body Fat stored in hump with almost none beneath the skin, means that heat can be lost quickly through skin.
- Sandy brown coat to camouflage in desert.
- Loses very little water through sweating or in urine.

Life in an aquatic (watery) environment – Fish



- Fish are streamlined in shape to allow them to travel quickly through the water.
- They possess gills that can obtain dissolved oxygen from the water.
- Gills have a large surface area which increases the area over which oxygen can be absorbed.



Life in a very hot climate – Cactus



- No leaves and a compact shape means a small surface area/volume ratio to reduce water loss.

- Thick waxy surface to reduce water loss.

- Stores water in a spongy layer inside its stem.

- Spines protect the cacti from predators who would 'steal' the cacti's water store.

- Stomata only open at night to reduce the amount of water lost.

- Some cacti have shallow spreading roots...to absorb surface water whilst others have and ...deep roots to tap into underground supplies of water.

Having in count adaptations in plants, it's important to understand that plants lose water all the time by evaporation from their leaves.

Plants which live in dry and hot climates have specific and special adaptations which help them to reduce water loss. These adaptations may often include reduced surface area of their leaves and/or water-storage tissues.

Basically all living things have adaptations which help them to survive in the conditions where they live.



2. Competition in Animals

Why do animals compete for?



Peacock



Panda



Lion

One source of competition in animals is competition for mates, and elaborate courtship rituals have evolved to demonstrate fitness. Often males fight over harems of females or to “convince” a watching female that each is genetically superior to any other nearby males. Many birds use fancy displays, including brightly-colour feathers, “dances,” etc. to “show off” for the opposite sex.

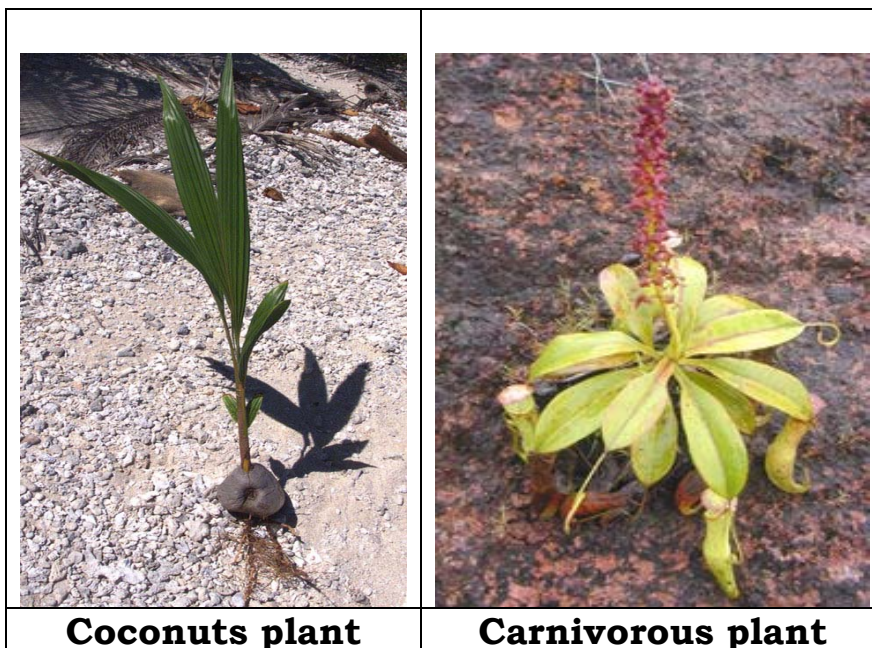
Sexual selection is selective pressure by members of the opposite sex. For example, perhaps the females of a certain species of bird prefer a male who is brightly-colour or who has an extremely-long tail. Sexual selection may actually work in the opposite direction of natural selection, as when, for example, that same brightly-colour or long-tailed male is



thereby more visible and vulnerable to predators. In spiders, special drumming patterns used in species-specific courtship rituals help to distinguish a courting male from dinner!

Animals also compete with both members of the same species and with other species for resources/food, hiding places to avoid predators, and in defence of territory, young, and/or nest sites.

3. Competition in Plants



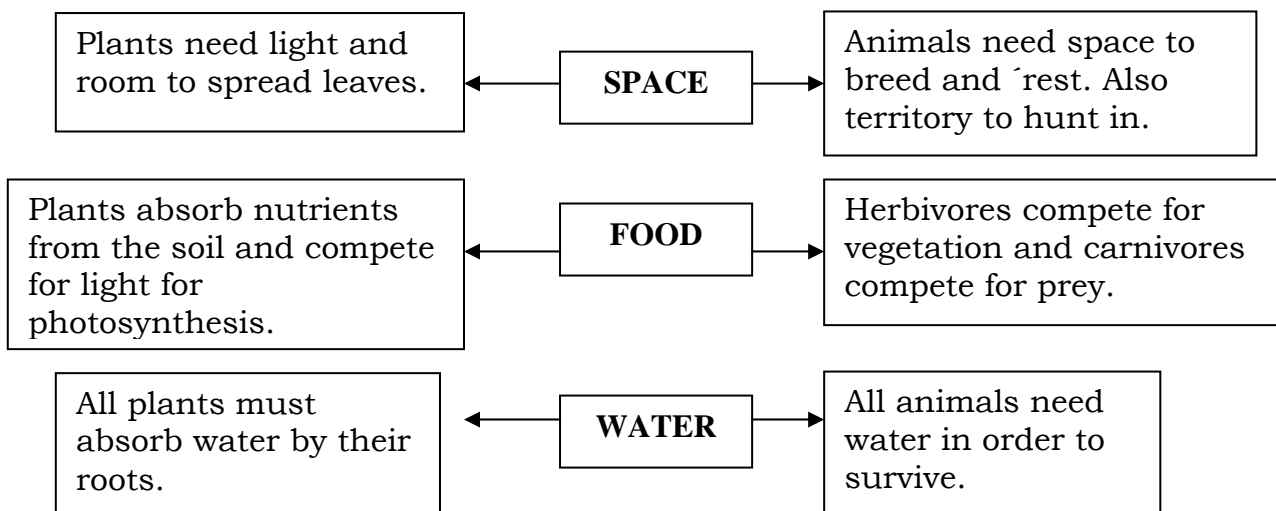
Plants also have ways of competing with other nearby plants for soil nutrients and water or for access to sunlight.

Some plants secrete allelopathic chemicals into the soil to inhibit the growth of or kill other nearby plants.



Spring wildflowers have “solved the problem” of competing with trees for sunlight by emerging early in spring so they can bloom and begin to set seed and so their leaves can make food (which is typically stored in the roots or corm for the following year) before the tree leaves develop.

As a brief summary organisms compete with each other for...





- In addition to competing for the three factors above, animal populations are also affected by **predators, disease** and **migration**.
- Plant populations are also affected by grazing **herbivores** and disease.
- Remember when we talk about populations here we mean the total number of individuals of the **same species** which live in a certain area (e.g. the number of field mice in a meadow).
A **community** is all the organisms in a particular area (i.e. Many populations of plants and animals).
- When two or more organisms compete in a particular area or habitat, the organisms which are better adapted to the environment are more successful and usually exist in larger numbers – often resulting in the complete exclusion of the other competing organisms.

Be aware that in your examination you may be asked to suggest the factors which organisms are competing in a given habitat.



Glossary

- **Adaptations** – special features or behaviour which make an organism...especially well-suited to its environment.
- **Volume ratio** – The ratio between the surface area and volume of cells and organisms has an enormous impact on their biology.
- **Competition** – Act of striving against others for the purpose of achieving dominance. Competition between members of species is the driving force behind evolution and natural selection. The competition for resources (food, water, sunlight, territory etc.) results in the ultimate survival and dominance of the variation of the species best suited for survival.
- **Sexual Selection** – Theory proposed by Charles Darwin that states that the frequency of traits can increase or decrease depending on the attractiveness of the bearer.
- **Migration** – Occurs when living organisms move from one place or environment to another one.

Add more words to your glossary, which you wish to, know and understand the meaning...