

Adaptive features

Revision notes • Adaptive features as inherited features that aid survival and reproduction, with hydrophyte and xerophyte examples.

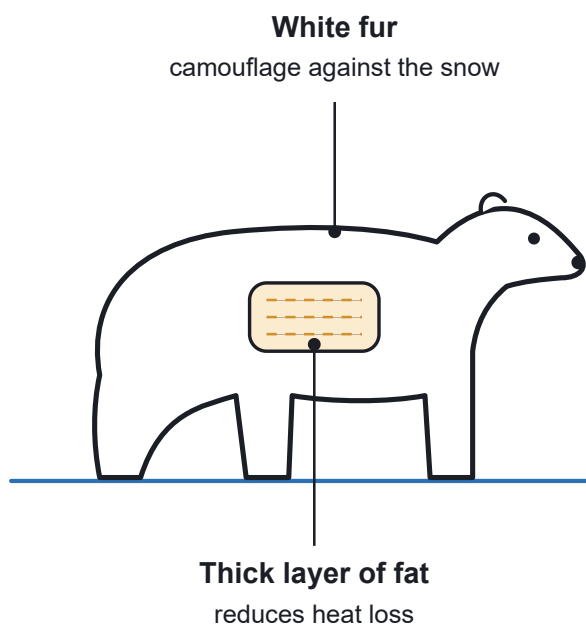
For Cambridge IGCSE Biology 0610 (and 0970, which has the same content). **Supplement** is Extended content, only examined on Papers 2 and 4.

Adaptive features Spec 18.2.1-18.2.3

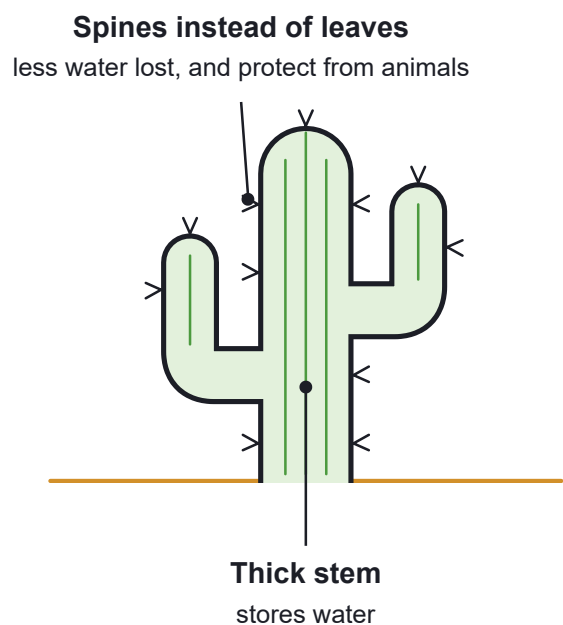
Adaptive features Spec 18.2.1, 18.2.2

An **adaptive feature** is an inherited feature that helps an organism to survive and reproduce in its environment.

The feature can be a body structure, such as the shape of a beak, or a way the body works, such as producing concentrated urine to save water. It can also be a pattern of behaviour. It must be **inherited**, so a skill learned during life is not an adaptive feature.



Polar bear: cold Arctic



Cactus: hot, dry desert

Adaptive features of a polar bear in the cold Arctic and a cactus in a hot, dry desert.

Interpreting a species

In the exam you are given a picture or some information about an organism. Link each feature to the environment and say how it helps survival or reproduction.

Linking feature to advantage	
Feature	How it helps
White fur (polar bear)	camouflage against the snow, so it is harder for prey to see it
Thick layer of fat (polar bear)	insulation, so less heat is lost
Spines instead of leaves (cactus)	smaller surface area, so less water is lost; protection from animals
Thick stem (cactus)	stores water for dry periods

Exam tip: Use the pattern: feature, then what it does, then why that helps the organism survive. 'White fur camouflages the bear so it can creep up on seals' scores; 'white fur because it is cold' does not.

Hydrophytes and xerophytes Spec 18.2.3 Supplement

Hydrophytes are plants adapted to live in water or very wet places. **Xerophytes** are plants adapted to live in dry places where water is scarce.

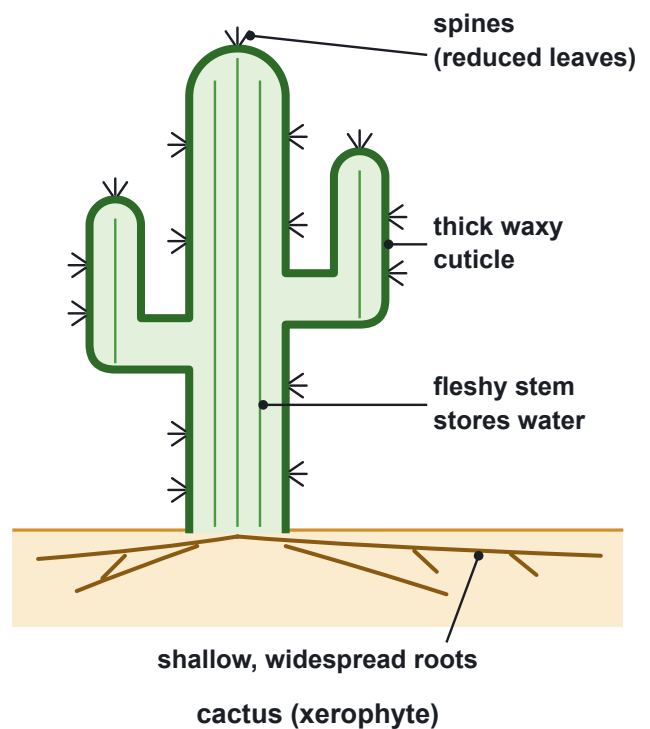
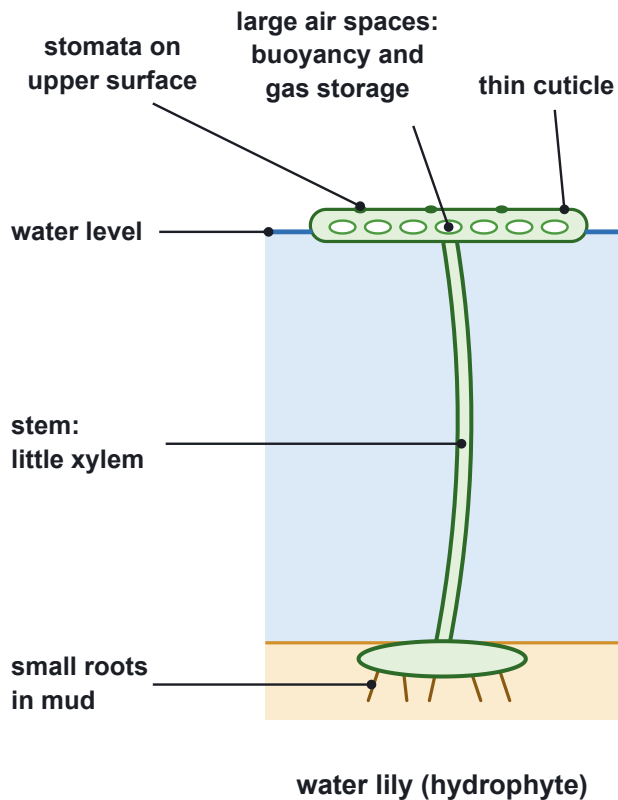
Hydrophytes (for example the water lily)

Adaptive features of a hydrophyte	
Feature	Explanation
Large air spaces in the leaves and stems	make the plant float so leaves are near the light; store oxygen and carbon dioxide for gas exchange
Stomata on the upper surface of floating leaves	the lower surface is in water, so the stomata on top can exchange gases with the air
Thin or no waxy cuticle	water is not scarce, so there is no need to prevent water loss
Small or reduced roots and little xylem	water can be absorbed over the whole surface and the water supports the plant

Xerophytes (for example cactus and marram grass)

Adaptive features of xerophytes	
Feature	Explanation
Thick waxy cuticle	reduces evaporation of water from the leaf surface
Leaves reduced to spines (cactus)	smaller surface area, so less water is lost by transpiration
Leaves rolled up with hairs (marram grass)	traps a layer of humid air next to the leaf, which reduces the concentration gradient of water vapour, so less water vapour diffuses out
Stomata in pits or sunken, few stomata	reduces diffusion of water vapour out of the leaf
Thick, fleshy stem (cactus)	stores water
Long roots or shallow, widespread roots	long roots reach water deep in the soil; widespread roots absorb rain water quickly over a large area

Supplement



A **hydrophyte** (water lily) and a **xerophyte** (cactus) have opposite adaptive features for water.

Supplement

Exam tip: 'Explain' means give a reason. For every feature say what it does and why that suits the environment, for example 'air spaces make the leaf float so it gets more light'.

Quick check

1. Define adaptive feature.
2. Why is a skill learned during life not an adaptive feature?
3. **Supplement** Where are the stomata on a floating water lily leaf?
4. **Supplement** Why do xerophytes have a thick waxy cuticle?

Quick check answers

Adaptive features

1. An inherited feature that helps an organism to survive and reproduce in its environment.
2. It is not inherited.
3. On the upper surface.
4. To reduce evaporation of water from the leaf surface.