

# Edexcel (B) Biology A-level

## 4.3 - Gas exchange

### Flashcards

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Name three features of an efficient gas exchange surface.



Name three features of an efficient gas exchange surface.

1. Large surface area, e.g. folded membranes in mitochondria.
2. Thin/short distance, e.g. wall of capillaries.
3. Steep concentration gradient, maintained by blood supply or ventilation, e.g. alveoli.



Name and describe the main features of an insect's gas transport system.



Name and describe the main features of an insect's gas transport system.

- Spiracles = openings on the body's surface.
- Tracheae = large tubes extending through all body tissues, supported by rings to prevent collapse.
- Tracheoles = smaller branches dividing off the tracheae.



# How are insects adapted for gas exchange?



## How are insects adapted for gas exchange?

- Spiracles can be opened or closed to regulate diffusion.
- Muscles in the trachea allow mass movement of air in and out.
- Tracheoles highly branched to provide large surface area.



Name and describe the main features of a fish's gas transport system.





Name and describe the two features of a fish's gas transport system.

- Gills = made of filaments and supported by arches.
- Lamellae = folds that cover the filaments. Water passes over them due to pressure from the floor of the mouth.



# How are fish adapted for gas exchange?



## How are fish adapted for gas exchange?

- Gills made of numerous filaments and covered by lamellae, providing a high surface area.
- Countercurrent exchange system means water and blood flow in opposite directions, so water is always next to blood of a lower oxygen concentration; maintains a steep gradient.



# How are mammals adapted for gas exchange?



## How are mammals adapted for gas exchange?

Alveoli provide a large surface area and very thin diffusion pathway, maximising the amount of oxygen absorbed from one breath. They also have a plentiful supply of deoxygenated blood, maintaining a steep concentration gradient.



# How are plant leaves adapted for gas exchange?



## How are plant leaves adapted for gas exchange?

1. Spongy mesophyll layer provides large surface area.
2. Waxy cuticle is impermeable to gas, preventing excessive water loss.
3. Lenticels (loosely arranged cells) allow gases to enter and leave.



How do plants limit their water loss while still allowing gases to be exchanged?





How do plants limit their water loss while still allowing gases to be exchanged?

Stomata regulated by guard cells which allows them to open and close as needed. Most stay closed to prevent water loss while some open to let oxygen in.

