



Surface Area to Volume Ratio

1 2 3 4 5

Single Celled
Organism

*

Flatworm

*

Small Mammal

*
┌───┐
│ │
│ │
└───┘

Big Mammal

*
└──┘
└──┘



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Spiracles

Gas Exchange

- 1
- 2
- 3
- 4
- 5

- 1)
- 2)
- 3)

Trachea

Insects

Fish

Diffusion

Ventilation

Filaments



Lamellae



Counter Current Flow



Water loss



Circulation of Blood





Gas Exchange in Plants

Mesophyll

Gas Exchange in Plants

Adaptations for Plants

Stomata

Guard Cells



Stomata Close to Save Water





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Gas Exchange in Humans

- 1
- 2
- 3
- 4
- 5

Short Diffusion Pathway

Structure:

Adaptations for Efficient Gas Exchange

Alveoli

Ventilation

Circulation

Surface Area: →



Diffusion Distance:



Concentration Gradient:





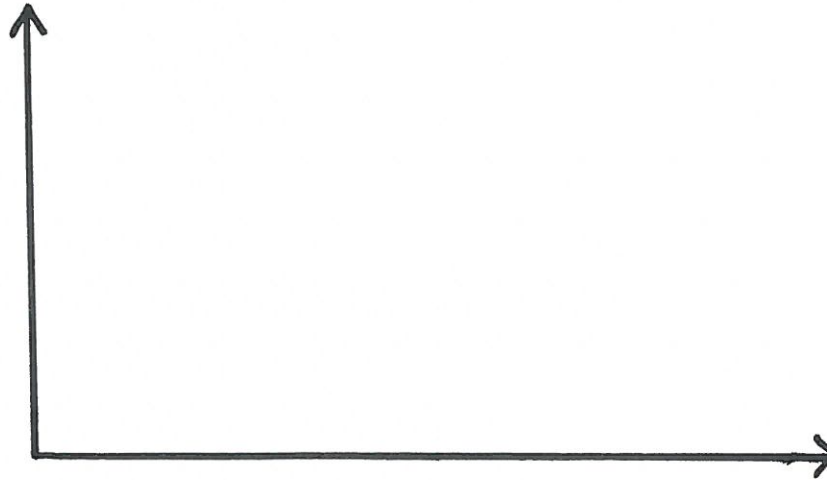
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Ventilation

Tidal Volume

Spirometer Trace

Breathing /
Ventilation
Rate



= X

Pulmonary
Ventilation /
Respiratory
minute
ventilation

____ :
____ / ____ :

AQA : _____

Edexcel : _____



Oxygen
Consumption

Effect of Exercise

Tidal Volume :

Breathing Rate :

Pulmonary Ventilation / Respiratory Minute Ventilation:

Oxygen Consumption :



Gas Exchange in Humans - Ventilation

1

2

3

4

5

Inspiration



Expiration



Forced Expiration

