



# Surface Area to Volume Ratio

1 2 3 4 5

Single Celled  
Organism

\*

Flatworm

\*

Small Mammal

\*  
┌───┐  
│ │  
│ │  
└───┘

Big Mammal

\*  
└──┘  
└──┘



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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

Diffusion Distance:



Surface Area: →



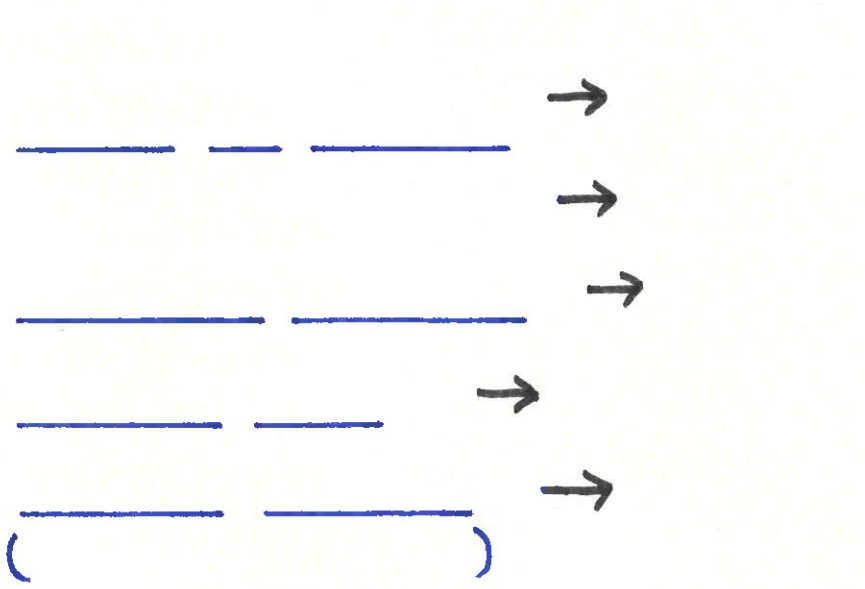
Concentration Gradient:



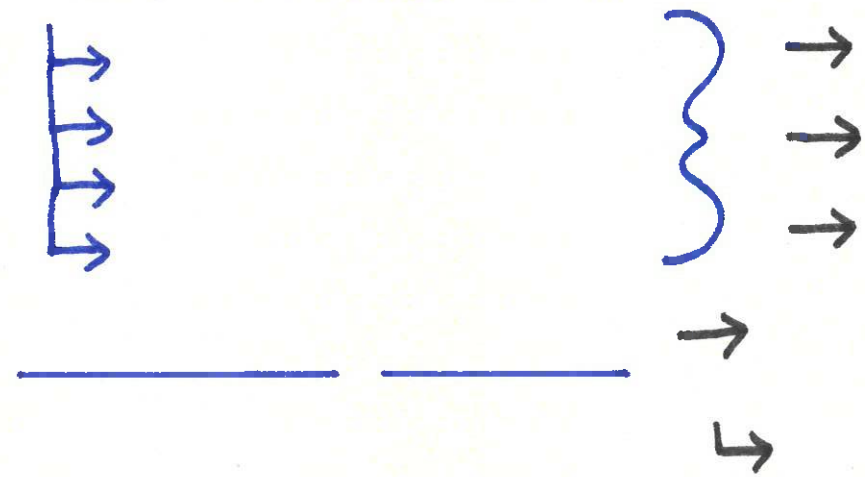


# Mammalian Gaseous Exchange System

- 1
- 2
- 3
- 4
- 5



Elastic fibres in the ...





# Gas Exchange in Humans - Ventilation

1

2

3

4

5

Inspiration



Expiration



Forced Expiration





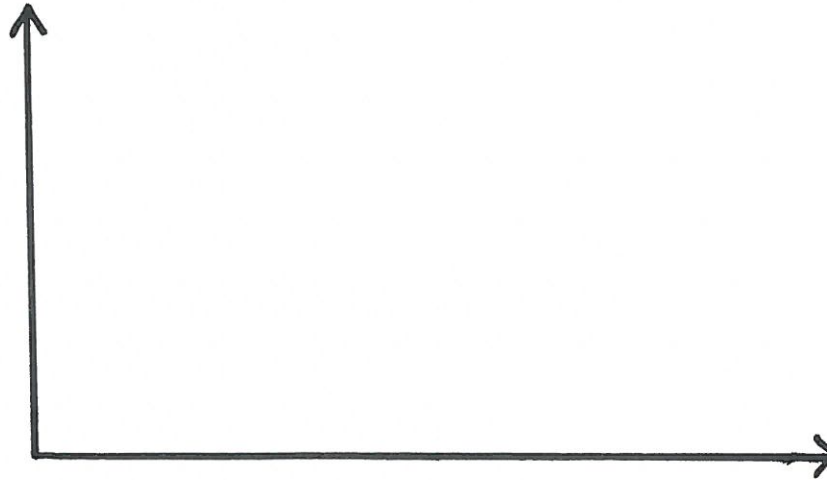
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# Ventilation

Tidal Volume

## Spirometer Trace

Breathing /  
Ventilation  
Rate



Pulmonary  
Ventilation /  
Respiratory  
minute  
ventilation

\_\_\_\_ :  
\_\_\_\_ / \_\_\_\_ :

AQA : \_\_\_\_\_

Edexcel : \_\_\_\_\_

Oxygen  
Consumption

## Effect of Exercise

Tidal Volume :

Breathing Rate :

Pulmonary Ventilation / Respiratory Minute Ventilation:

Oxygen Consumption :



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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





# Ventilation in Bony Fish

1 2 3 4 5

