

**AQA – Organism exchange substances with their environment – A2 Biology**

1. June/2021/Paper\_1/No.2

0 2 . 1

Explain the advantage for larger animals of having a specialised system that facilitates oxygen uptake.

**[2 marks]**

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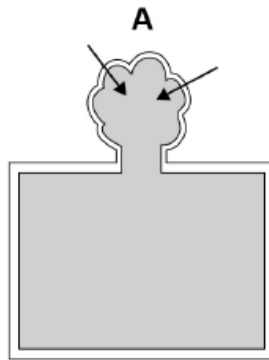
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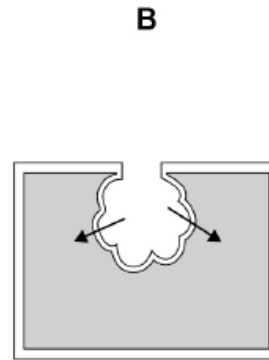
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Figure 2 shows two models of oxygen uptake found in animals.

Figure 2



Oxygen uptake through system developed to the outside of the body, eg fish gills



Oxygen uptake through system developed to the inside of the body, eg human lungs

0 2 . 2

Suggest how the environmental conditions have resulted in adaptations of systems using **Model A** rather than **Model B**.

[2 marks]

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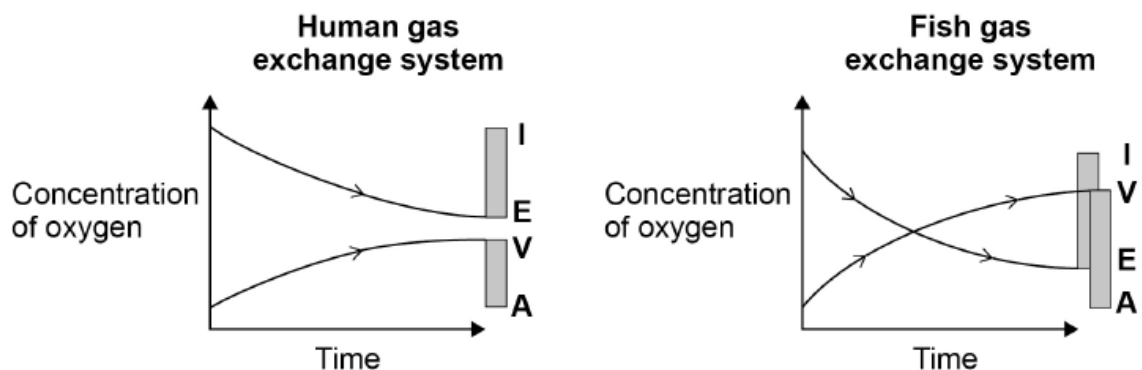
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0 2 . 3 **Figure 3** shows changes in concentration of oxygen in two gas exchange systems.

**Figure 3**



**Key**

- I Air/water entering the gas exchange system
- E Air/water leaving the gas exchange system
- A Arterial blood entering the gas exchange system
- V Venous blood leaving the gas exchange system

A student studied **Figure 3** and concluded that the fish gas exchange system is more efficient than the human gas exchange system.

Use **Figure 3** to justify this conclusion.

[2 marks]

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0 2 . 4 Explain how the counter-current principle allows efficient oxygen uptake in the fish gas exchange system.

[2 marks]

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0 2 . 5 Table 1 shows features of two mammals.

Bats are flying mammals; shrews are ground-living mammals.

Table 1

Mammal	Mean body mass / kg	Mean lung volume / cm <sup>3</sup>
Bat	0.096	12.48
Shrew	0.024	0.72

Calculate how many times the lung volume per unit of body mass of the bat is greater than that of the shrew.

Give your answer to an appropriate number of significant figures.

Give **one** suggestion to explain this difference.

[3 marks]

Answer \_\_\_\_\_