

**Year One Science**  
**UNIT 8: Transport System in Living Things**

Name: \_\_\_\_\_ ( ) Class: \_\_\_\_\_ Date: \_\_\_\_\_

**Segment A:** **Chunking into segments for students to follow along more easily**  
 Choose a question to explore.

- i. Why are cells specialised?
- ii. How are nerve cells specialised?
- iii. What is the division of labour?

Do remember to ask a few follow-up questions!

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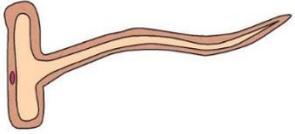
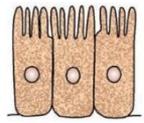


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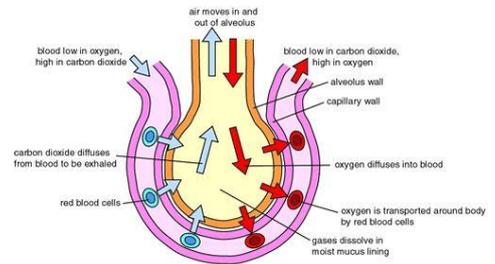
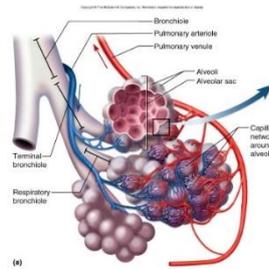
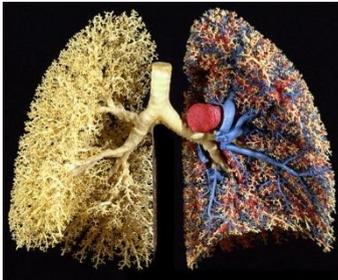
**Segment B: Specialised Cells** **Allowing students to sort information into a graphic organiser for knowledge acquisition**  
 How are these cells specialised?

	<b>Red blood cells</b>	<b>Root hair cells</b>	<b>Epithelial cells of small intestines</b>
			
Function	Transport o _____ from the lungs to various parts of the body	Are modified root epidermal cells that aid in absorption of _____ and _____	absorb d _____ f _____ m _____
Adaptations	<ul style="list-style-type: none"> <li>• Contains h _____ to bind with oxygen weakly</li> <li>• No nucleus: to pack more h _____</li> <li>• Biconcave: increase _____ to _____ ratio for faster rate of diffusion of oxygen</li> <li>• Elastic, flexible membrane: can _____ through blood vessels</li> </ul>	<ul style="list-style-type: none"> <li>• Elongated shape to increase _____ to _____ ratio for the absorption of water and dissolved mineral salts at a faster rate</li> <li>• Concentrated cell sap (cell sap solution more concentrated than soil solution) allows water to enter by o _____</li> <li>• Large number of mitochondria to release energy for _____ of mineral salts</li> </ul>	<ul style="list-style-type: none"> <li>• Microvilli to increase _____ to _____ ratio for the absorption of d _____ f _____ m _____</li> <li>• Large number of m _____ to release energy for a _____ t _____ of mineral salts</li> </ul>

**Segment C: Transport Processes In Systems**

**C1: Human Respiratory System**

- The lungs have a very large total \_\_\_\_\_ to \_\_\_\_\_ ratio  
→ rate of diffusion ↑
- contain millions of alveoli (small structures with large surface area to volume ratio), through which gases like \_\_\_\_\_ and \_\_\_\_\_ diffuse.



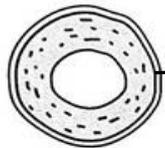
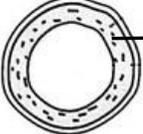
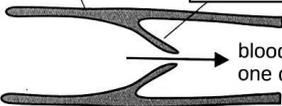
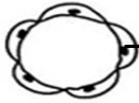
**C2: Human Circulatory System**

- Provides an efficient internal transport system.
- Specialised organs (lungs, small intestines, kidneys) exchange materials with the external environment.
- Circulating fluid connects the aqueous environment of living cells with the exchange organs.
- Brings materials close enough to nearly all cells for diffusion to occur.
- Plasma (liquid part of blood) transports water, salt, digested food molecules, waste substances such as carbon dioxide and urea, hormones.

**Heart**

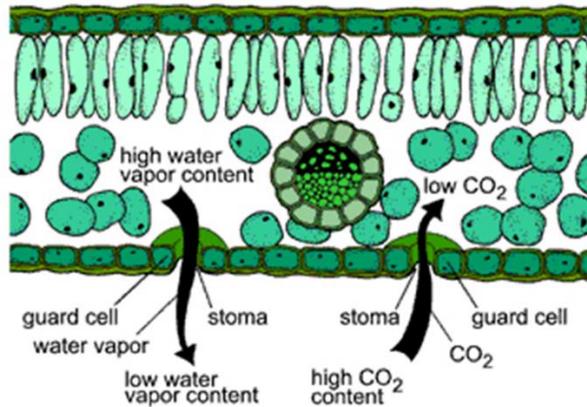
- Hollow muscular organ that pumps blood to the body

Fill in the blanks with 'artery' or 'vein'.

<p><b>Artery</b></p> <ul style="list-style-type: none"> <li>• Carries blood a _____ from the heart</li> <li>• Carries _____ blood (except for the pulmonary artery)</li> </ul>	 <p>Thicker wall: to withstand high p _____ of blood flowing through it</p>
<p><b>Vein</b></p> <ul style="list-style-type: none"> <li>• Carries blood t _____ the heart</li> <li>• Carries _____ blood (except for the pulmonary vein)</li> </ul>	 <p>Thin wall</p> <p>Valve: to prevent b _____ of blood</p>  <p>blood flowing in one direction only</p>
<p><b>Capillary</b></p> <ul style="list-style-type: none"> <li>• One cell thick to allow faster diffusion, osmosis and active transport of substances between blood and body cells</li> </ul>	 <p>One cell thick</p>

### C3: Plant Leaves

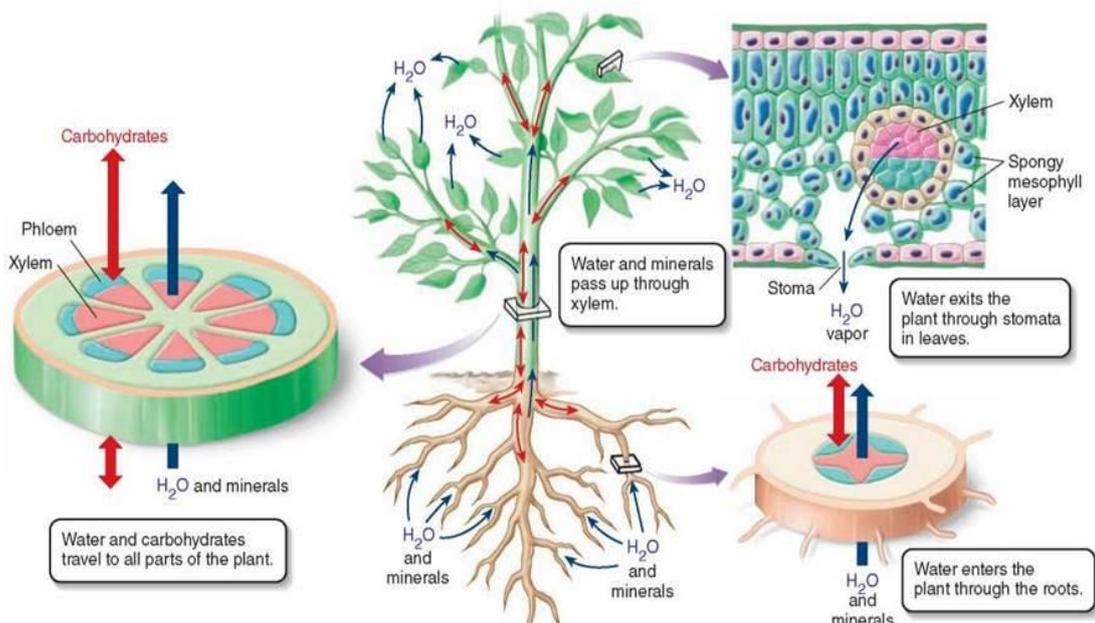
- leaves have very large total surface area → rate of diffusion ↑
- gases like O<sub>2</sub>, CO<sub>2</sub> and H<sub>2</sub>O enter and exit the leaves via the numerous stomata



- CO<sub>2</sub> particles diffuse from the surrounding air (region of higher concentration) through the stomata into the a \_\_\_\_\_ s \_\_\_\_\_ (region of lower concentration) in the leaf
- water vapour particles **diffuse** from the air spaces within the leaf (region of higher concentration) through the s \_\_\_\_\_ into the surrounding air (region of lower concentration)

### C4: Plant Transport System

- Water is transported up the plant via the x \_\_\_\_\_
- Manufactured food substances are transported upwards or downwards the plant via the p \_\_\_\_\_



**Segment D** Using generative AI to allow students to apply concepts to real world contexts

Could transport processes (diffusion/ osmosis/ active transport) explain the following phenomena?

- i. Why does the skin on our fingers wrinkle after a long bath? Does the temperature and the duration of the bath have any effect on whether the skin will wrinkle?
- ii. How does preservation with syrup (concentrated sugar solution) or salt solution work?

Choose a question to explore. Do remember to ask a few follow-up questions!

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After this activity, the students can be given an additional material with practice questions) to assess their learning