# Quiz – Topic B2 Scaling up

# Instructions and answers for teachers

These instructions cover the learner activity section which can be found on [page 10](#_Topic_B1_Cell). This quiz supports OCR GCSE (9-1) Biology A (Gateway Science), J247.

**When distributing the activity section to the learners either as a printed copy or as a Word file you will need to remove the teacher instructions section.**

### The Activity

This quiz is a teaching and learning resource containing 10 multiple choice questions on the theme of Scaling Up.

This resource can be used to test and consolidate understanding at the end of a topic or to revisit and refresh knowledge at a later point in the course.

### Learning Outcomes

This lesson element relates to the specification learning outcomes of

B2.1 – Supplying the cell

B2.2 – The challenges of size

### Introduction

Multiple choice questions allow rapid coverage of a wide range of sub-topics.

Contrary to a widespread belief among learners, multiple choice questions are not necessarily easy – they can be easy, moderate or difficult.

The questions are written so that the incorrect answers are plausible distractors based on common errors or misconceptions.

### Quiz – answers

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| **1** | | A raw potato was peeled, cut in half and a hollow cut out of the centre. It was placed in water with a concentrated salt solution in the hollow.  Look at the diagram of the slice of potato.  raw peeled potato  **2:** water  **1**: concentrated salt solution  petri dish  What observations would you see after 2 days? **[1]** | | |
|  | | **A** | No change to the levels of solutions. |  |
|  | |  | Incorrect, there will be osmosis as the potato is raw and the cell membranes are still intact. | |
|  | | **B** | The level of both solution **1** and **2** has gone up. | |
|  | |  | Incorrect, water molecules will move from the water into the potato by osmosis making the level of solution 2 go down. | |
|  | | **C** | The level of solution **1** has gone up and the level of solution **2** has gone down. | |
|  | |  | Correct answer. Water moves from solution 2 by osmosis into the potato and then from the potato into solution 1 which is more concentrated making the level go up. | |
|  | | **D** | The level of solution **2** has gone up and the level of solution **1** has gone down. | |
|  | |  | Incorrect, the level of solution 1 will go up because it has a lower water potential and water will move into it by osmosis.  C | |
|  | Your answer | | | |

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| **2** | | The diagram below shows a specialised cell from the small intestine.    How is this cell specialised for the absorption of food molecules in the small intestine? **[1]** | |
|  | | **A** | Cilia on the surface move the food along the intestine. |
|  | |  | Incorrect, although the microvilli look similar to cilia, moving the food would not aid absorption. |
|  | | **B** | It contains chloroplasts to provide energy for uptake of food molecules. |
|  | |  | Incorrect, chloroplasts are not present in animal cells and are not the site of respiration. |
|  | | **C** | It has no cytoplasm to make space for food molecules. |
|  | |  | Incorrect, all animal cells contain cytoplasm and the food molecules are in solution, cells are not empty. |
|  | | **D** | It provides a large surface area for absorption. |
|  | |  | Correct answer. The microvilli on the surface provide a large surface area increasing the area over which absorption can take place.  D |
|  | Your answer | | |

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| **3** | | Where are stem cells **not** present? **[1]** | |
|  | | **A** | adult animals |
|  | |  | Incorrect, stem cells are present in adult animals, they are used for repair of tissues. |
|  | | **B** | embryonic animals |
|  | |  | Incorrect, embryonic animals contain stem cells which are undifferentiated and can develop into many different types of cells. |
|  | | **C** | plant xylem |
|  | |  | Correct answer. Xylem does not contain undifferentiated stem cells. |
|  | | **D** | plant meristems |
|  | |  | Incorrect, plant meristems contain totipotent stem cells, capable of forming a complete new plant. They are generally present in roots and shoots.  C |
|  | Your answer | | |

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| **4** | | What is the function of stem cells? **[1]** | |
|  | | **A** | To connect a number of different cells of the same type to form an organ. |
|  | |  | Incorrect, stem cells divide to form the cells that make up organs but do not connect the cells together. |
|  | | **B** | To divide to form two new organisms. |
|  | |  | Incorrect, stem cells do divide frequently but are involved in the growth, development and repair of a single organism. |
|  | | **C** | To produce a range of different cell types for growth, development and repair. |
|  | |  | Correct answer. |
|  | | **D** | To elongate in a plant and allow it to grow towards sunlight. |
|  | |  | Incorrect, stem cells are not the cells used to make a plant stem longer. The term must be carefully defined to avoid this assumption.  C |
|  | Your answer | | |

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| **5** | | Why is it important that leaves are **thin**? **[1]** | |
|  | | **A** | because it provides a larger top surface for absorption of light in photosynthesis |
|  | |  | Incorrect, the thickness of the leaf will not affect the top surface area, a very large thick leaf would be able to absorb the same amount of sunlight. |
|  | | **B** | so that the diffusion distances for the gases needed for respiration and photosynthesis are shorter |
|  | |  | Correct answer. The thin leaf allows diffusion supply the needs of the plant, through the stomata. |
|  | | **C** | to allow the absorption of gases into the circulatory system so they can be transported around the plant |
|  | |  | Incorrect, plants do not use a circulatory system to move gases, this only occurs in animals. |
|  | | **D** | to decrease the surface area to volume ratio |
|  | |  | Incorrect, the surface area to volume ratio is increased in thinner leaves.  B |
|  | Your answer | | |

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| **6** | | Which of the following carries deoxygenated blood? **[1]** | |
|  | | **A** | aorta |
|  | |  | Incorrect, this vessel carries oxygenated blood from the heart to the body. |
|  | | **B** | hepatic artery |
|  | |  | Incorrect, this vessel carries oxygenated blood to the liver. |
|  | | **C** | pulmonary artery |
|  | |  | Correct answer. This vessel carries deoxygenated blood from the heart to the lungs. |
|  | | **D** | pulmonary vein |
|  | |  | Incorrect, unusually this vein carries oxygenated blood, from the lungs to the heart. Most veins carry deoxygenated blood.  C |
|  | Your answer | | |

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| **7** | | The rate of blood flow in capillaries is slower than in arteries.  Why is this important? **[1]** | |
|  | | **A** | Because the blood is being squeezed through the narrow lumen of capillaries. |
|  | |  | Incorrect, this reason does not relate to the importance of slower flow, and reveals the misconception that blood flow is slower because of the narrow diameter of the capillary. |
|  | | **B** | To allow for exchange of molecules with the surrounding tissue by diffusion |
|  | |  | Correct answer. The slow flow of blood allows for diffusion from the blood vessel into the surrounding tissue and cells. |
|  | | **C** | So that blood can be prevented from flowing backwards by the valves |
|  | |  | Incorrect, capillaries do not contain valves. |
|  | | **D** | So waste materials are very quickly removed. |
|  | |  | Incorrect, the slow flow of blood actually hinders the fast removal of waste, however, the movement of blood does maintain a concentration gradient of waste substances allowing them to be removed effectively.  B |
|  | Your answer | | |

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| **8** | | Which of the following takes place in **both** transpiration and translocation? **[1]** | |
|  | | **A** | Bulk transport of sucrose. |
|  | |  | Incorrect, this takes place in translocation only, when sucrose is moved in phloem. |
|  | | **B** | Movement of water through cell walls. |
|  | |  | Incorrect, this take place only in transpiration when water is drawn through the plant due to evaporation from leaves. |
|  | | **C** | Transport of substances up the plant from root to leaf. |
|  | |  | Correct answer, although translocation can take place from the leaf to the roots, it can also take place from root to leaf when substances are needed for growth. Transpiration is always from roots to the leaves. |
|  | | **D** | Transport of substances using energy from respiration. |
|  | |  | Incorrect, only translocation needs energy and is stopped by poisons or high temperatures which inhibit cell metabolism, transpiration is a passive process.  C |
|  | Your answer | | |

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| **9** | | The graph shows the percentage of stomata open in two different types of plant during a day.  0 2 4 6 8 10 12 14 16 18 20 22 24  midnight noon midnight  100  0  stomata  open (%)  time (hours)  Key:  Plant A  Plant B  Which of the following explains the difference shown in the graph between plant A and plant B in opening of the stomata? **[1]** | |
|  | | **A** | Both plants close stomata to prevent water loss by transpiration. |
|  | |  | Incorrect, although this statement is true it does not explain the differences seen in the graph. |
|  | | **B** | Only plant A needs to allow gases to enter for photosynthesis and so has to have its stomata open during daylight. |
|  | |  | Incorrect, both plants need to photosynthesise and need carbon dioxide to enter the leaf. |
|  | | **C** | Plant A is in an area high in carbon dioxide so the rate of transpiration will increase and the stomata need to close at night. |
|  | |  | Incorrect, carbon dioxide has no effect on the rate of transpiration; it affects the rate of photosynthesis. |
|  | | **D** | Plant B is in a very hot, dry environment and so must close stomata during the middle of the day to prevent water loss. |
|  | |  | Correct answer. The plant traps some carbon dioxide during the night (by fixing it and storing it in vacuoles), but photosynthesis will be limited by the low concentrations of carbon dioxide available during daylight.  D |
|  | Your answer | | |

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| **10** | | The table below shows the results from an experiment using a simple potometer. The plant was placed in a laboratory away from direct sunlight. The experiment was repeated in three different conditions.  It shows the reading on the capillary tube at the start of each test and after 1 minute at the end of each test.   |  |  |  |  | | --- | --- | --- | --- | | Number | Description of conditions | Reading at start (mm) | Reading at end (mm) | | 1 | in laboratory away from direct sunlight | 0 | 5 | | 2 | apparatus in sunlight | 3 | 9 | | 3 | electric fan blowing air over the apparatus | 0 | 8 | | 4 | shoot covered by plastic bag | 2 | 6 |   In which conditions is the rate of transpiration the highest? **[1]** | |
|  | | **A** | 1 |
|  | |  | Incorrect, the difference is 5mm. |
|  | | **B** | 2 |
|  | |  | Incorrect, the difference is 6mm. The sunlight will increase both light intensity and temperature and have increased the rate of transpiration. |
|  | | **C** | 3 |
|  | |  | Correct answer. The difference is 8mm, which is the highest amount of water intake in the time; this is assumed to be the same as transpiration as water loss due to other factors, such as photosynthesis, will be very small. The fan will remove moist air from the surface of the leaf and increase evaporation from the leaf. |
|  | | **D** | 4 |
|  | |  | Incorrect, the difference is 4mm. The covering of the shoot will increase the humidity around the leaf, slowing down transpiration to the lowest rate.  C |
|  | Your answer | | |



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# Quiz – Topic B2 Scaling up

## Learner Activity

|  |  |  |  |  |
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| **1** | | A raw potato was peeled, cut in half and a hollow cut out of the centre. It was placed in water with a concentrated salt solution in the hollow.  Look at the diagram of the slice of potato.  raw peeled potato  **2:** water  **1**: concentrated salt solution  petri dish  What observations would you see after 2 days? **[1]** | | |
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|  | | **C** | The level of solution **1** has gone up and the level of solution **2** has gone down. | |
|  | | **D** | The level of solution **2** has gone up and the level of solution **1** has gone down. | |
|  | Your answer | | | |

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| **2** | | The diagram below shows a specialised cell from the small intestine.  How is this cell specialised for the absorption of food molecules in the small intestine? **[1]** | |
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|  | | **B** | It contains chloroplasts to provide energy for uptake of food molecules. |
|  | | **C** | It has no cytoplasm to make space for food molecules. |
|  | | **D** | It provides a large surface area for absorption. |
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| **3** | | Where are stem cells **not** present? **[1]** | |
|  | | **A** | adult animals |
|  | | **B** | embryonic animals |
|  | | **C** | plant xylem |
|  | | **D** | plant meristems |
|  | Your answer | | |

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|  | | **C** | to allow the absorption of gases into the circulatory system so they can be transported around the plant |
|  | | **D** | to decrease the surface area to volume ratio |
|  | Your answer | | |

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| **6** | | Which of the following carries deoxygenated blood? **[1]** | |
|  | | **A** | aorta |
|  | | **B** | hepatic artery |
|  | | **C** | pulmonary artery |
|  | | **D** | pulmonary vein |
|  | Your answer | | |

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| **7** | | The rate of blood flow in capillaries is slower than in arteries.  Why is this important? **[1]** | |
|  | | **A** | Because the blood is being squeezed through the narrow lumen of capillaries. |
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|  | | **C** | So that blood can be prevented from flowing backwards by the valves |
|  | | **D** | So waste materials are very quickly removed. |
|  | Your answer | | |

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|  | | **D** | Plant B is in a very hot, dry environment and so must close stomata during the middle of the day to prevent water loss. |
|  | Your answer | | |

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| **10** | | The table below shows the results from an experiment using a simple potometer. The plant was placed in a laboratory away from direct sunlight. The experiment was repeated in three different conditions.  It shows the reading on the capillary tube at the start of each test and after 1 minute at the end of each test.   |  |  |  |  | | --- | --- | --- | --- | | Number | Description of conditions | Reading at start (mm) | Reading at end (mm) | | 1 | in laboratory away from direct sunlight | 0 | 5 | | 2 | apparatus in sunlight | 3 | 9 | | 3 | electric fan blowing air over the apparatus | 0 | 8 | | 4 | shoot covered by plastic bag | 2 | 6 |   In which conditions is the rate of transpiration the highest? **[1]** | |
|  | | **A** | 1 |
|  | | **B** | 2 |
|  | | **C** | 3 |
|  | | **D** | 4 |
|  | Your answer | | |