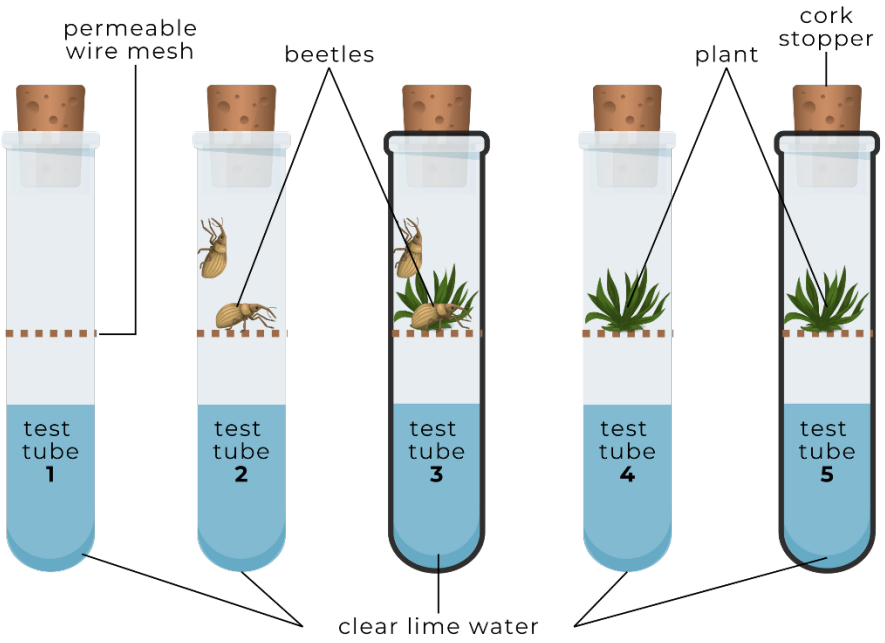
TOPIC 1 – PHOTOSYNTHESIS & RESPIRATION REVISION QUESTION 3

The diagrams below show the apparatus setups used during an investigation to determine if living organisms release carbon dioxide during respiration. The investigation was conducted in the light. Test tubes **3** and **5** were covered with black paper.



1. Provide the aim for this investigation. (2)
2. Identify the dependent variable for the investigation. (1)
3. What is the purpose of the clear limewater? (2)
4. Explain the purpose of wrapping test tubes **3** and **5** in black paper. (3)
5. Explain the purpose of test tube **1**. (2)
6. Consider the movement of gases and explain the importance of the:
   (a) permeable wire mesh (2)
   (b) cork stopper (2)
7. After 12 hours, give the number(s) (**1** – **5**) of the test tube(s) where there will be:
   (a) the most carbon dioxide (1)
   (b) the most oxygen (1)
   (c) no change in the colour of the lime water (1)

8. Explain your answer in QUESTION 7 (c). (6)

9. Describe the expected results for:

   (a) test tube **2** (1)

   (b) test tube **3** (1)

   (c) test tube **5** (1)

10. List any TWO constant variables for this investigation. (2)

MEMORANDUM

1. To determine if living organisms release carbon dioxide during respiration. ✓✓ (2)
2. the release of carbon dioxide✓ (1)
3. – to indicate✓ the presence of carbon dioxide✓ **OR**
   – it is an indicator✓ for carbon dioxide✓ (2)
4. – the black paper will block any light✓
   – as test tubes 3 and 5 have green plants✓ in them
   – photosynthesis would occur✓ if light were present
   – which would use carbon dioxide✓ / not release carbon dioxide (any 3)
5. – it is the control setup✓
   – with which the results of test tubes 2 - 5 can be compared✓
   – to show that respiration caused the release of carbon dioxide✓ (any 2)
6. (a) – allows any carbon dioxide produced✓ by the organisms
   – to move down into and dissolve✓ in the lime water (2)

   (b) – prevents any gases from entering or leaving✓ the test tubes during the investigation
   – no carbon dioxide from outside the test tube can influence the results✓ / no carbon dioxide inside the test tubes can escape (2)
7. (a) 3✓ (b) 4✓ (c) 1 and 4✓ (3)
8. <u>TEST TUBE 1</u>
   – has no living organisms✓
   – no respiration can occur✓
   – no carbon dioxide is released✓

   <u>TEST TUBE 4</u>
   – the green plant is exposed to light✓
   – photosynthesis will occur✓
   – no carbon dioxide will be released✓ / all carbon dioxide will be absorbed/used (6)
9. (a) clear lime water turns milky white✓ (1)
   (b) clear lime water turns milky white✓ (1)
   (c) clear lime water turns milky white✓ (1)
10. – the same size test tubes✓
    – the same amount of lime water✓
    – leave the test tubes for the same amount of time
    – all the test tubes must be sealed
    – the same type of cork stopper
    – the same sized plant in test tubes 3 – 5
    – the same species of beetles in test tubes 2 and 3 (any 2; FIRST 2 ONLY)