Unit 4 · Plant Respiration

WORKSHEET

Full marks 32

Name _____ Class _____ Roll no. _____ Date _____ Marks _____ / 32

1 Key words [4]

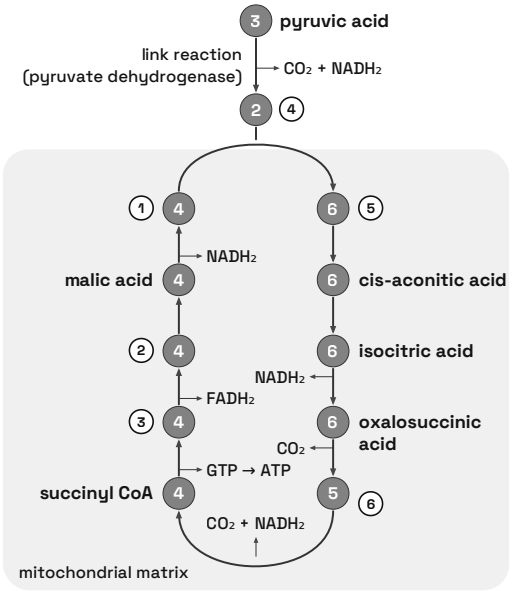
Fill in the blanks with words from the box. Two words in the box are not needed. Each blank carries 0.5 mark.

acetyl CoA	**anabolic**	**ATP**	**ATP synthase**	**catabolic**	**citric acid**	**cytoplasm**	**lactic acid**
oxygen	**photolysis**						

Respiration breaks large molecules into small ones, so it is a _____ process. The cell's energy currency is _____. Glycolysis is also called the EMP pathway, and it takes place in the _____. In the link reaction each pyruvic acid loses one carbon as carbon dioxide and becomes _____. The first stable product of the Krebs cycle is _____. In the electron transport chain, the final acceptor of electrons is _____. Hydrogen ions flowing back into the matrix turn the enzyme _____. Bacteria such as *Lactobacillus* turn the sugar of milk into curd by _____ fermentation.

2 Label the diagram [3]

The diagram shows the link reaction and the Krebs cycle; the number beside each name is its carbon count. Write the names of the compounds 1 to 6. Each carries 0.5 mark.



one turn: 2 CO_2, 3 $NADH_2$, 1 $FADH_2$, 1 GTP

1. _____ **2.** _____

3. _____ **4.** _____

5. _____ **6.** _____

3 Multiple choice [5]

Choose the correct option for each of the following questions.

i. What is the net gain of ATP molecules through glycolysis? [1]

a. 2 **b.** 4

c. 6 **d.** 8

ii. Where does the CO_2 released in aerobic respiration come from? [1]

a. glycolysis and the electron transport chain

b. the link reaction and the Krebs cycle

c. the electron transport chain only

d. the oxygen breathed in

iii. Hydrogen ions flowing through ATP synthase make ATP as they move [1]

a. from the matrix into the intermembrane space

b. from the intermembrane space into the matrix

c. from the cytoplasm into the intermembrane space

d. from the thylakoid into the stroma

iv. A sealed jar of germinating seeds has used up all its oxygen. Which is still produced inside the seeds' cells? [1]

a. water, from the electron transport chain **b.** carbon dioxide, from the Krebs cycle

c. a little ATP, from glycolysis **d.** about 38 ATP per glucose

v. Fresh vegetables last longer in a refrigerator mainly because [1]

a. the cold kills the bacteria on them

b. their cells respire very slowly in the cold, so they use up little of their sugar and age slowly

c. the cold stops photosynthesis

d. respiration needs light, which the refrigerator lacks

4 Short answers [9]

Write short answers to the following questions.

a. Write any two differences between aerobic and anaerobic respiration. [2]

b. Fermentation makes no ATP of its own. Why does a yeast cell short of oxygen still carry it out? [2]

c. A farmer stores freshly harvested, still-damp paddy in a closed heap. After a week the middle of the heap is hot and smells sour. Explain why. **[2]**

d. Explain how the electron transport chain makes ATP by chemiosmosis. **[3]**

5 Numerical problem **[4]**

Use the classic count: each $NADH_2$ gives 3 ATP and each $FADH_2$ 2 ATP in the electron transport chain.

How many ATP are made when one molecule of pyruvic acid is completely oxidized in a mitochondrion (the link reaction and one turn of the Krebs cycle)? Use your answer to show that one glucose gives 38 ATP in aerobic respiration.

Answer:

6 Long answer **[4]**

Write a long answer to the following question.

What is glycolysis? Describe its two phases and the net gain from one glucose.

7 Think [3]

Bread dough rises, but curd made with *Lactobacillus* doesn't froth. Explain the difference from the two kinds of fermentation.

8 Activity: Yeast blows up a balloon (not marked)

Put half a cup of warm water, two teaspoons of sugar and a teaspoon of dried yeast in a plastic bottle, stretch a balloon over its mouth and leave it somewhere warm. Set up a second bottle with cold water, and a third with no sugar.

Bottle	What happened to the balloon after half an hour
warm water with sugar	
cold water with sugar	
warm water, no sugar	

What gas filled the balloon, and what did you smell when you took it off?