

Dalkeith High School  
National 5 Biology  
Respiration Homework

Which substance enters animal cells by diffusion and is used to produce ATP?

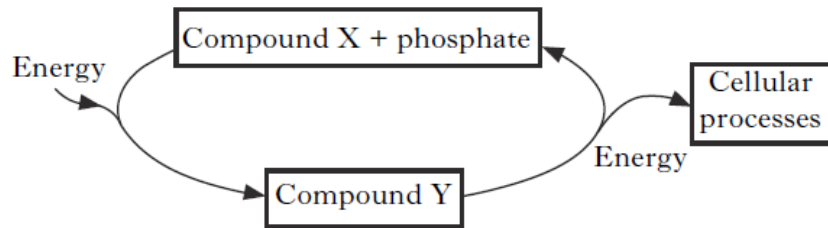
- A Carbon dioxide
- B Starch
- C Water
- D Glucose

Which of the following stages in respiration would result in the production of 38 molecules of ATP?

- A Glucose to pyruvic acid
- B Pyruvic acid to lactic acid
- C Pyruvic acid to carbon dioxide and water
- D Glucose to carbon dioxide and water

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**National 5 Biology**  
**Respiration Homework**

3. The diagram below shows energy transfer within a cell.



Which line in the table identifies correctly compounds X and Y?

	<i>X</i>	<i>Y</i>
A	glucose	CO <sub>2</sub>
B	CO <sub>2</sub>	ADP
C	ADP	ATP
D	ATP	glucose

Four reactions in the respiration pathway are shown below.

- 1 Glucose → pyruvic acid
- 2 Pyruvic acid → carbon dioxide + water
- 3 Pyruvic acid → lactic acid
- 4 Pyruvic acid → carbon dioxide + ethanol

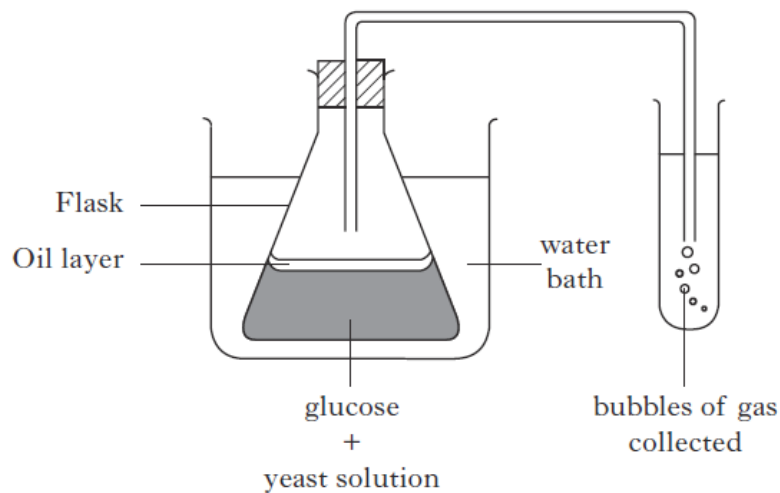
Which of the reactions can occur in yeast?

- A 2 and 3 only
- B 2 and 4 only
- C 1, 2 and 3 only
- D 1, 2 and 4 only

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**National 5 Biology**  
**Respiration Homework**

Questions 6 and 7 are based on the following information.

An investigation into anaerobic respiration in yeast was carried out.

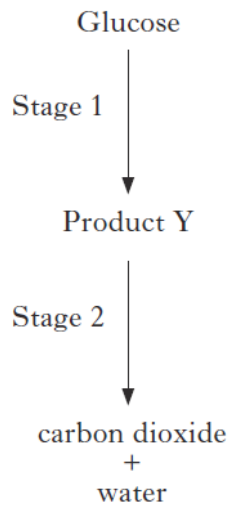


6. The purpose of the oil layer in the flask is to ensure that
- A oxygen from the solution is not released into the flask
  - B carbon dioxide from the flask does not enter the solution
  - C oxygen from the air does not enter the solution
  - D carbon dioxide from the solution is not released into the flask.
7. A control flask was set up to show that anaerobic respiration is due to the activity of yeast. The solution in the control flask was
- A yeast and glucose
  - B dead yeast and glucose
  - C yeast and water
  - D dead yeast and water.

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**National 5 Biology**  
**Respiration Homework**

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The process of aerobic respiration in a muscle cell is outlined below.



(a) (i) Name Stage 1.

\_\_\_\_\_

1

(ii) Name product Y from Stage 1.

\_\_\_\_\_

1

(iii) What other substance must be present for Stage 2 to occur?

\_\_\_\_\_

1

(b) ATP is formed during respiration and broken down for uses in cells.

(i) How many molecules of ATP are formed from each glucose molecule during

Stage 1 only? \_\_\_\_\_

Both Stage 1 and Stage 2? \_\_\_\_\_

1

(ii) What **two** molecules are produced when ATP is broken down?

\_\_\_\_\_ and \_\_\_\_\_

1

(iii) State **one** use of the energy released when ATP is broken down.

\_\_\_\_\_

1

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Respiration Homework

MARKS

- (a) Cellular processes occur in different parts of the cell.

Name the energy producing process which starts in the cytoplasm and is completed in the mitochondria.

1

\_\_\_\_\_

- (b) As a result of the complete breakdown of a number of glucose molecules, 114 molecules of ATP were produced.

State the number of glucose molecules which were broken down to achieve this.

1

*Space for calculation*

\_\_\_\_\_ Glucose molecules

- (c) Explain why a sperm cell contains more mitochondria than a skin cell.

1

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

The souring of milk is a fermentation process.

Name the substrate, product and the type of micro-organism involved.

Substrate \_\_\_\_\_

Product \_\_\_\_\_

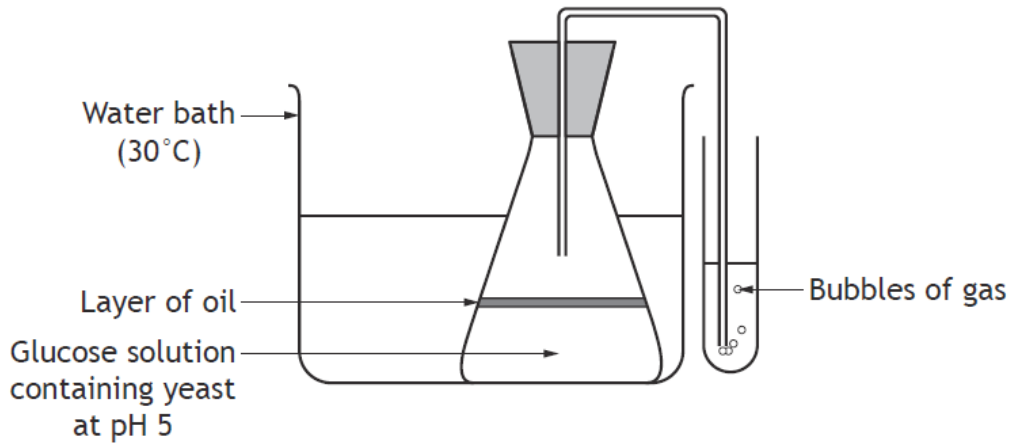
Type of micro-organism \_\_\_\_\_

2

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**National 5 Biology**  
**Respiration Homework**

MARKS

An investigation was carried out to find the effect of pH on fermentation by yeast, using the apparatus shown. Six groups of students carried out the investigation.



The investigation was repeated at pH 3, pH 7 and pH 9.

The number of bubbles produced each minute was counted.

Each group carried out the investigation several times and calculated average values for their results, as shown in the table below.

	<i>Average number of bubbles produced per minute</i>			
<i>Group</i>	<i>pH 3</i>	<i>pH 5</i>	<i>pH 7</i>	<i>pH 9</i>
1	8	25	17	0
2	10	21	13	3
3	15	23	14	0
4	17	22	16	0
5	19	24	12	1
6	22	17	18	9

(a) Name the gas produced during fermentation in yeast. 1

\_\_\_\_\_

(b) From the table, identify the optimum pH for fermentation by yeast and give a reason for your choice.

pH \_\_\_\_\_ 1

Reason \_\_\_\_\_ 1

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Respiration Homework

MARKS

(continued)

- (c) This investigation could be adapted to find the effect of a variable other than pH.

Choose **one** variable from the list. Describe **two** ways that the apparatus would be adapted to demonstrate the effect of this variable.

2

List

Type of yeast

Temperature

Concentration of glucose solution

Chosen variable \_\_\_\_\_

Adaptation 1 \_\_\_\_\_

\_\_\_\_\_

Adaptation 2 \_\_\_\_\_

\_\_\_\_\_

**Total marks 5**