Cellular Respiration and Energy

New Regents original practice • Name: _____ Date: _____
Show your work for written answers.

A simplified net model of aerobic cellular respiration is $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O$. Cells capture some of the energy released in forms they can use, including ATP.

1 Which substances enter the net reaction as reactants?

(1) Glucose and oxygen

(2) Carbon dioxide and water

(3) Oxygen and carbon dioxide

(4) Water and glucose

2 Explain where the carbon atoms from glucose end up in the net model. [1]

Answer and work

_____

_____

3 How many oxygen molecules are consumed for each glucose molecule in the balanced net model?

(1) 1

(2) 2

(3) 6

(4) 12

4 Explain why ATP can be discussed even though the net equation shown accounts only for the four named substances. [1]

Answer and work

_____

_____

A Cell Model Tracks Gas Exchange

Use the information below to answer the questions.

A model counts molecules exchanged as glucose is used in aerobic respiration. All glucose counted in each run follows $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O$.

Run	Glucose consumed (molecules)	Oxygen consumed (molecules)
P	2	12
Q	4	24
R	5	30

5 Use the net equation to calculate the number of carbon dioxide molecules produced in R. [1]

Answer and work

6 Which run consumes twice as much oxygen as P?

(1) P

(2) Q

(3) R

(4) None of the runs

7 A student records 20 oxygen molecules consumed in another run with four glucose molecules. Explain how the record compares with the model. [1]

Answer and work

8 Which statement correctly compares oxygen consumed and carbon dioxide produced in run Q?

(1) The modeled counts are equal.

(2) Carbon dioxide is produced at half the oxygen count.

(3) No carbon dioxide is produced.

(4) Twice as many carbon dioxide molecules are produced.