

Fuel to ATP

Track how cells turn food fuel into usable energy and products.

SC.8.L.18.2 "Describe and investigate how cellular respiration breaks down food to provide energy and releases carbon dioxide."

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline each phrase that tells what happens to glucose or released energy, and circle every named material product of cellular respiration, carbon dioxide, water, and ATP.

A Cell's Fuel System

- ① After a student eats a banana, digestion changes much of its food into simple molecules, including glucose. Cells use glucose as a fuel. Inside cells, cellular respiration is a set of chemical reactions that breaks down glucose. Oxygen from breathing is used in these reactions. As bonds in glucose are rearranged, usable energy is released. The cell uses some of that released energy to make ATP, a molecule that can power cell activities such as muscle contraction, active transport, and building larger molecules.
- ② Cellular respiration also produces carbon dioxide and water. Carbon dioxide is a waste gas for many animals. It moves from cells into the blood, travels to the lungs, and leaves the body when a person exhales. Water may be used by the cell or leave the body in several ways. The energy released during respiration is not itself a material product. Instead, cells capture some of it by making ATP. ATP is a product molecule, but it is not the same thing as energy.
- ③ During a sprint, leg muscle cells need ATP quickly. They carry out cellular respiration when glucose and oxygen are available. The reactions break down glucose and release usable energy, and the cells use some of that energy to make ATP. Carbon dioxide forms during the reactions. It is carried away in the blood and removed through the lungs. The water formed is another material product. Thus, respiration changes food fuel into products while providing cells with ATP for work.

2 ANSWER WITH EVIDENCE Use the passage

1 What food molecule is used as fuel in cellular respiration, and what gas is used in the reactions?

2 What happens to some of the usable energy released when glucose is broken down?

3 Describe the path carbon dioxide can take from a cell to the outside of the body.

4 Name the three material products in the passage. How is ATP different from released energy?

3 YOUR TURN Your own words

Write exactly three sentences describing cellular respiration in a heart cell after lunch. Include glucose and oxygen, explain that breaking down glucose releases energy used to make ATP, name carbon dioxide and water as material products, and tell how carbon dioxide could leave the body.

PART 1 • READ AND MARK

Underline each phrase that tells what happens to glucose or released energy, and circle every named material product of cellular respiration, carbon dioxide, water, and ATP. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	What food molecule is used as fuel in cellular respiration, and what gas is used in the reactions?	Glucose is the fuel molecule, and oxygen is used in the reactions.
2	What happens to some of the usable energy released when glucose is broken down?	The cell uses some of the released energy to make ATP.
3	Describe the path carbon dioxide can take from a cell to the outside of the body.	Carbon dioxide moves from cells into the blood, travels to the lungs, and leaves when the person exhales.
4	Name the three material products in the passage. How is ATP different from released energy?	The material products are carbon dioxide, water, and ATP. ATP is a molecule made using some released energy, while released energy is not a material product.

PART 3 • YOUR TURN (SAMPLE ANSWER)

After lunch, a heart cell uses glucose and oxygen in cellular respiration. Breaking down glucose releases usable energy, and the cell uses some of it to make ATP. ATP, carbon dioxide, and water are material products, and carbon dioxide can move into the blood, reach the lungs, and leave when the person exhales.

Accept equivalent wording that identifies glucose as food fuel, oxygen as a reactant, and carbon dioxide, water, and ATP as material products. Students should clearly state that released energy is used to make ATP and is not itself a material product.