

## *Cellular Respiration Harvesting Chemical Energy Answer Key*

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**Cellular Respiration Harvesting Chemical Energy**

Chapter 09 - Cellular Respiration: Harvesting Chemical Energy. These molecules enter the citric acid cycle as acetyl CoA. A gram of fat oxides by respiration generates twice as much ATP as a gram of carbohydrate. The metabolic pathways of respiration also play a role in anabolic pathways of the cell.

**Chapter 09 - Cellular Respiration: Harvesting Chemical Energy**

- NADH, the reduced form of NAD<sup>+</sup> passes the electrons to the electron transport chain. – energy is released when electrons “fall” from hydrogen carrier to oxygen.
- If electron transfer is not stepwise a large release of energy occurs. – this energy is released in the reaction of hydrogen and oxygen to form water.

**Cellular Respiration: Harvesting Chemical Energy**

Oxidative phosphorylation. is the metabolic pathway in which the mitochondria in cells use their structure, enzymes, and energy released by the oxidation of nutrients to reform ATP.

**Chapter 9: Cellular Respiration: Harvesting Chemical Energy**

- Cellular respiration includes both aerobic and anaerobic respiration but is often used to refer to aerobic respiration
- Although carbohydrates, fats, and proteins are all consumed as fuel, it is helpful to trace cellular respiration with the sugar glucose:  $C_6H_{12}O_6 + 6 O_2 \rightarrow 6 CO_2 + 6 H_2O + \text{Energy (ATP + heat)}$

**Cellular Respiration: Harvesting Chemical Energy**

Two types of phosphorylation occur in cellular respiration... Substrate-level phosphorylation: direct transfer of a phosphate to ADP by an enzyme Glycolysis Krebs Cycle Oxidative phosphorylation: the energy released at each step of ETC is used to make ATP through redox rxns. and ATP synthase accounts for 90% of generated ATP during respiration

**Cellular Respiration: Harvesting Chemical Energy**

Chapter 9 Cellular Respiration: Harvesting Chemical Energy. You should be able to: 1.Explain how redox reactions are involved in energy exchanges 2. Name and describe the three stages of cellular respiration; for each, state the region of the eukaryotic cell where it occurs and the products that result ... ATP powers most cellular work Heat ...

**Cellular Respiration: Harvesting Chemical Energy - ETH Z**

BIOLOGY I. Chapter 9 – Cellular Respiration: Harvesting Chemical Energy. Stages of Cellular Respiration: (1) Glycolysis. □When oxygen is available, the end product of glycolysis, pyruvate, enters the mitochondria, where it undergoes further breakdown.

**Chapter 9: CELLULAR RESPIRATION: Harvesting Chemical Energy**

Chapter 9: Cellular Respiration: Harvesting Chemical Energy . Overview: Before getting involved with the details of cellular respiration and photosynthesis, take a second to look at the big picture. Photosynthesis and cellular respiration are key ecological concepts involved with energy flow. Use Figure 9.2 to label the missing parts below.

**Chapter 9: Cellular Respiration: Harvesting Chemical Energy**

Stepwise Energy Harvest via Electron Transport Chain 1. Controlled rxns (a) Uncontrolled reaction  $H_2 + 1/2 O_2$  Explosive ATP release of heat and light energy (b) Cellular respiration Controlled release of energy for synthesis of  $2 H^+ + 2 e^-$   $2 H^+ + 1/2 O_2$  (from food via  $O$  NADH)  $1/2 O_2$

**Cellular Respiration: Harvesting Chemical Energy - MCCC**

- Photosynthesis generates oxygen and organic molecules that the mitochondria of eukaryotes (including plants and algae) use as fuel for cellular respiration.
- Cells harvest the chemical energy stored in organic molecules and use it to regenerate ATP, the molecule that drives most cellular work.

## **CHAPTER 9 CELLULAR RESPIRATION: HARVESTING CHEMICAL ENERGY**

HARVESTING CHEMICAL ENERGY: CELLULAR RESPIRATION Chapter Outline 8.1 OVERVIEW OF CELLULAR ENERGY METABOLISM Coupled oxidation and reduction reactions produce the flow of electrons for energy metabolism Electrons flow from fuel substances to final electron acceptors In cellular respiration, cells make ATP by oxidative phosphorylation

### **HARVESTING CHEMICAL ENERGY: CELLULAR RESPIRATION - Biology**

A chemical cycle involving eight steps that completes the metabolic breakdown of glucose molecules begun in glycolysis by oxidizing pyruvate to carbon dioxide; occurs within the mitochondrion in eukaryotic cells and in the cytosol of prokaryotes; the second major stage in cellular respiration

### **Chapter 9- Cellular Respiration: Harvesting Chemical Energy**

Cellular Respiration: Harvesting Chemical Energy. Overview: Life Is Work ... ATP powers most cellular work Heat energy ATP. Fig. 9-1 Some animals, such as the giant panda, obtain energy by eating plants, and ... energy (b) Cellular respiration Controlled. release of. energy for.

### **Cellular Respiration: Harvesting Chemical Energy**

- Cells harvest the chemical energy stored in organic molecules and use it to regenerate ATP, the molecule that drives most cellular work.
- Respiration has three key pathways: glycolysis, the citric acid cycle, and oxidative phosphorylation.
- The arrangement of atoms of organic molecules represents potential energy.

## **CHAPTER 9 CELLULAR RESPIRATION: HARVESTING CHEMICAL ENERGY**

Study Chapter 9 - Cellular Respiration: Harvesting Chemical Energy flashcards from 's class online, or in Brainscape's iPhone or Android app. Learn faster with spaced repetition.

### **Chapter 9 - Cellular Respiration: Harvesting Chemical ...**

- Catabolic pathways like cellular respiration yield energy through the transfer of electrons during chemical reactions – Relocation of electrons releases energy stored in organic molecules
- This energy is ultimately used to make ATP – Chemical reactions that transfer electrons from one reactant to another are called

### **Cellular Respiration: Harvesting Chemical Energy**

Chapter 9: Cellular Respiration: Harvesting Chemical Energy!! Concept 9.1 Catabolic pathways yield energy by oxidizing organic fuels!! 1. Explain the difference between fermentation and cellular respiration. ! 2. Give the formula (with names) for the catabolic degradation of glucose by cellular respiration. ! 3.

### **Chapter 9: Cellular Respiration: Harvesting Chemical Energy**

CELLULAR RESPIRATION: HARVESTING CHEMICAL ENERGY . Learning objectives: The Principles of Energy Harvest. 1. In general terms, distinguish between fermentation and cellular respiration. 2. Write the summary equation for cellular respiration. Write the specific chemical equation for the degradation of glucose. 3. Define oxidation and reduction. 4.

## **CHAPTER 9 CELLULAR RESPIRATION: HARVESTING CHEMICAL ENERGY ...**

It is important to understand that the energy released and transferred in cellular respiration has its origin in the process of photosynthesis (and, of course, originally in the sun's energy). Links: Biology Book - Harvesting Chemical Energy An excellent overview of cellular respiration and fermentation with lots of graphics.

### **Harvesting Chemical Energy - Cellular Respiration**

Chapter 9: Cellular Respiration and Fermentation 1. Explain the difference between fermentation and cellular respiration. Fermentation is a partial degradation of sugars or other organic fuel that

occurs without the use of oxygen, while cellular

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