

Energy Transformation and Metabolism



تم تحميل هذا الملف من موقع المناهج الإماراتية

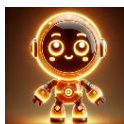
موقع المناهج ← المناهج الإماراتية ← الصف الحادي عشر العام ← علوم ← الفصل الثالث ← ملفات متنوعة ← الملف

تاريخ إضافة الملف على موقع المناهج: 22:36:07 2026-07-01

ملفات اكتب للمعلم اكتب للطالب ا اختبارات الكترونية ا اختبارات ا حلول ا عروض بوربوينت ا أوراق عمل
منهج انجليزي ا ملخصات وتقارير ا مذكرات وبنوك ا الامتحان النهائي للمدرس

المزيد من مادة
علوم:

التواصل الاجتماعي بحسب الصف الحادي عشر العام



صفحة المناهج
الإماراتية على
فيسبوك

الرياضيات

اللغة الانجليزية

اللغة العربية

التربية الاسلامية

المواد على تلغرام

المزيد من الملفات بحسب الصف الحادي عشر العام والمادة علوم في الفصل الثالث

منهج انسباير درس التنفس الخلوي

1

الدرس الثاني البناء الضوئي الجزء الثاني منهج انسباير

2

الدرس الثاني البناء الضوئي منهج انسباير

3

How organisms obtain energy

4

كن مستعدا مراجعة نهاية الفصل 2026م غير محلول

5

Main Takeaway

This lesson explores how living organisms acquire and transform energy, focusing on the fundamental principles of energy transfer, metabolism, and cellular energy production.

Transformation of Energy

- Cellular activities require **energy** (the ability to do work)
- **Thermodynamics** → the study of the flow and transformation of energy in the universe. (sun → Plants → Animals → Humans)

Laws of thermodynamics

First law (conservation of Energy)

- Energy can be converted from one form to another
- Energy cannot be created or destroyed

Second law

- Energy cannot be converted without losing usable energy
- Entropy:
 - Measure of energy dispersal
 - Represents disorder or unusable energy

Energy sources in living organisms (Autotrophs and heterotrophs)

Types of organisms

• Autotrophs

- Make their own food
- use energy from: sun (Photoautotrophs)
- Inorganic substances (Chemoautotrophs)

• Heterotrophs

- obtain energy by ingesting food
- Depend on external sources of organic compounds.



- * Nearly all life energy originates from the sun
- * Energy decreases at each trophic level in food chains/webs
- * Some energy is lost as heat (second law)

Metabolism

- * All chemical reactions within a cell

Types of metabolic Pathways

Catabolic

- Break down large molecules
- Release energy

Anabolic

- Build large molecules
- use energy

Photosynthesis:

- Anabolic pathway
- Converts light energy to stored chemical energy

Cellular Respiration:

- Catabolic pathway
- Breaks down organic molecules to release cellular energy

ATP : cellular Energy unit

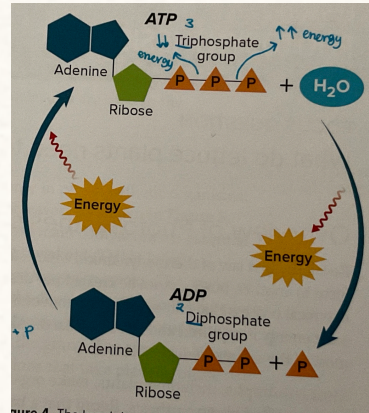
Structure

Nucleotide composed of

- Adenine base
- Ribose sugar
- Three Phosphate Groups

Function

- Releases energy when bond between second and third Phosphate group is broken
- Primary mechanism for storing and releasing chemical energy in cells.



Which process is described as the breakdown of organic molecules to release energy for use by the cell?

Cellular respiration

ATP synthesis

Anabolism

Photosynthesis

Which of the following best describes heterotrophs?

Organisms that convert inorganic substances to energy

Organisms that make their own food using sunlight

Organisms that produce energy without external sources

Organisms that ingest food to obtain energy

Which type of organism would a lettuce plant be classified as?

Chemoautotroph

Photoautotroph

Heterotroph

Carnivore

What is a metabolic pathway?

The movement of ATP within a cell

The process of breaking down ATP into ADP

A series of chemical reactions where the product of one is the substrate for the next

The flow of energy between organisms in an ecosystem

What concept explains why energy is lost as heat as we move up trophic levels in a food chain?

First Law of Thermodynamics

Second Law of Thermodynamics

ATP synthesis

Conservation of Energy

According to the Second Law of Thermodynamics, what happens when energy is converted?

Energy is destroyed

Energy is created

Energy becomes more ordered

There is a loss of usable energy

What happens to the amount of usable energy as we move up each trophic level in a food chain?

It decreases

It increases

It remains constant

It fluctuates randomly

What is the structure of ATP?

A nucleotide made of an adenine base, a ribose sugar, and three phosphate groups

A nucleotide made of a guanine base, a deoxyribose sugar, and two phosphate groups

A protein made of amino acids linked by peptide bonds

A carbohydrate made of glucose molecules

How does cellular respiration differ from photosynthesis in terms of metabolic pathways?

Both are catabolic pathways

Cellular respiration is anabolic while photosynthesis is catabolic

Both are anabolic pathways

Cellular respiration is catabolic while photosynthesis is anabolic

What is the primary source of energy for nearly all life on Earth?

The Sun

ATP

Inorganic substances

Glucose

What is the study of the flow and transformation of energy in the universe called?

Thermodynamics

Photosynthesis

Metabolism

Entropy

When does ATP release energy?

When the bond between the second and third phosphate groups is broken

When the adenine base is modified

When the bond between the first and second phosphate groups is broken

When the ribose sugar is broken down

Photosynthesis is an example of what type of metabolic pathway?

Heterotrophic pathway

Entropy pathway

Anabolic pathway

Catabolic pathway

What is the main unit of cellular energy?

ADP

ATP

Ribose

Glucose

What term describes all of the chemical reactions in a cell?

Metabolism

Cellular respiration

Photosynthesis

Thermodynamics

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