



Science Virtual Learning

LEP Science

April 10, 2020



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Lesson: April 10, 2020

Objective/Learning Target: I can describe Metabolism and calculate my own resting metabolism.

Let's get started by calculating how many calories your body burns just by sitting around.

Follow the link below to input data to calculate your BMR (Basal Metabolic Rate or your resting metabolism)-- Or if you want to practice some math you can use the formula listed here:

Men **$BMR = (10 \times \text{weight in kg}) + (6.25 \times \text{height in cm}) - (5 \times \text{age in years}) + 5$**

Women **$BMR = (10 \times \text{weight in kg}) + (6.25 \times \text{height in cm}) - (5 \times \text{age in years}) - 161$**

To help with conversions: 1kg = 2.2 lb and 2.4cm = 1 in

[BMR Calculator](#)

Lesson: What does your BMR really mean?

Copy the notes below and fill in the blanks as you watch the video.

_____ is the sum total of all controlled chemical reactions that occur inside a cell.

Our body is thought of as a _____. You are a continuous flow of

_____ and _____.

_____, water, and _____ are consumed while _____ like carbon dioxide, is _____ by breathing or other means.

Cellular metabolism has 2 pathways: _____ that join molecules and

_____ that break molecules apart

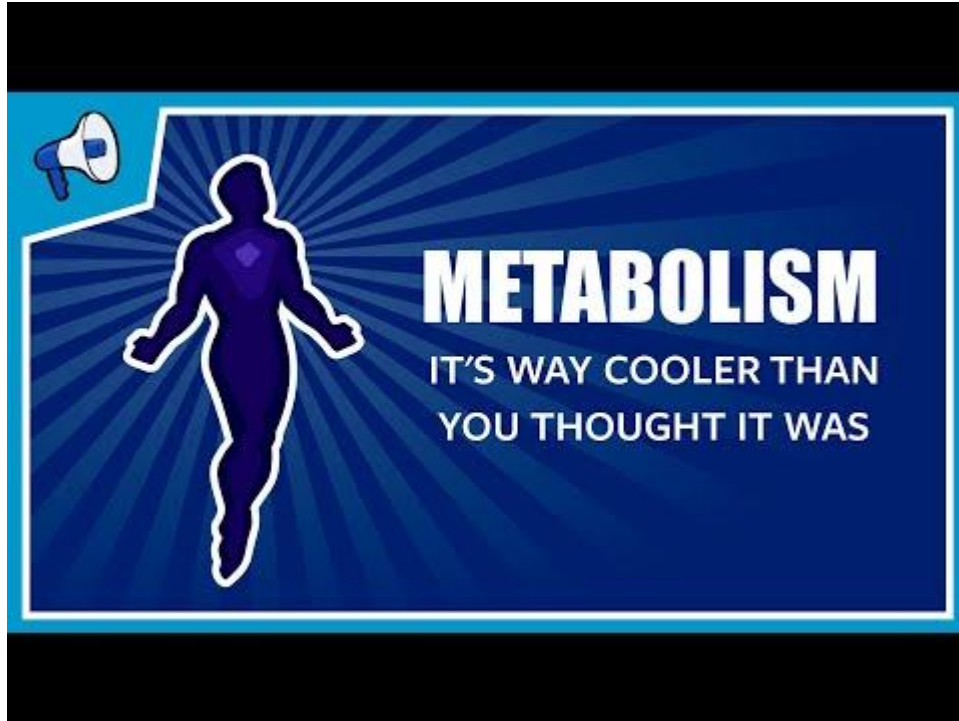
Scientists studying the origin of life have discovered that the _____ acid cycle exists in almost all species studied so far. It is extremely _____ and extremely _____.

The Citric Acid Cycle is the _____ of life

What goes into the citric acid cycle? (3 things)

What comes out? (2 things)

Watch the video and complete your notes.



How did you do?

Cellular Metabolism is the sum total of all controlled chemical reactions that occur inside a cell.

Our body is thought of as a whirlpool. You are a continuous flow of energy and matter.

Food, water, and oxygen are consumed while waste like carbon dioxide, is expelled by breathing or other means.

Cellular metabolism has 2 pathways: anabolic that join molecules and catabolic that break molecules apart

Scientists studying the origin of life have discovered that the citric acid cycle exists in almost all species studied so far. It is extremely old and extremely important.

The Citric Acid Cycle is the core of life

What goes into the citric acid cycle? (3 things) Fats, sugars, amino acids

What comes out? (2 things) carbon dioxide, water

Quick review

Metabolism

Metabolism is a set of chemical reactions that interconnect in a series of pathways. It is a balancing act between the building and breakdown of molecules in the body.

Type of metabolism	Process	Energetics	Example
Anabolism	Builds complex molecules from simple ones	Endergonic	Production of new body tissues
Catabolism	Breaks down complex molecules into simpler ones	Exergonic	Digestion of food

Metabolic pathways

Anabolic: Small molecules are assembled into large ones. *Energy is required.*



Catabolic: Large molecules are broken down into small ones. *Energy is released.*



Do these practice questions- immediate feedback is given

[practice questions](#)

More practice

Look at the equations below. Decide if they are: Anabolic or Catabolic

1. Water + carbon dioxide make glucose
2. Glucose is broken down to release ATP energy
3. Water + carbon dioxide + sunlight = glucose + oxygen
4. Glucose + oxygen = water + carbon dioxide + ATP
5. Photosynthesis
6. Cellular Respiration

How did you do?

1. Water + carbon dioxide make glucose **Anabolic because glucose is being made**
2. Glucose is broken down to release ATP energy **Catabolic because glucose is broken down**
3. Water + carbon dioxide + sunlight = glucose + oxygen **Anabolic because glucose is being made and oxygen is a waste product**
4. Glucose + oxygen = water + carbon dioxide + ATP **Catabolic because glucose is broken down into water and carbon dioxide waste with ATP energy**
5. Photosynthesis **Anabolic because the formula is: $\text{CO}_2 + \text{H}_2\text{O} + \text{sunlight} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2$**
6. Cellular Respiration **Catabolic because the formula is: $\text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O} + \text{ATP}$**

Food for Thought

Now that you know what metabolism is, do you think you can change your BMR that you calculated at the beginning by exercising or eating differently?

Why do you think it is important to know about metabolism?

Additional resources for information

[Khan Academy](#) video

[article about Metabolism and organisms](#)