Unit 4: Cellular Energy

Content Area: **Science**
Course(s): **AP Biology**
Time Period: **Semester 1**
Length: **3 weeks**
Status: **Published**

Standards

SCI.9-12.5.1.12	All students will understand that science is both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The four Science Practices strands encompass the knowledge and reasoning skills that students must acquire to be proficient in science.
SCI.9-12.5.2.12.B	Substances can undergo physical or chemical changes to form new substances. Each change involves energy.
SCI.9-12.5.2.12.D	The conservation of energy can be demonstrated by keeping track of familiar forms of energy as they are transferred from one object to another.
SCI.9-12.5.3.12	All students will understand that life science principles are powerful conceptual tools for making sense of the complexity, diversity, and interconnectedness of life on Earth. Order in natural systems arises in accordance with rules that govern the physical world, and the order of natural systems can be modeled and predicted through the use of mathematics.
SCI.9-12.5.3.12.A	Living organisms are composed of cellular units (structures) that carry out functions required for life. Cellular units are composed of molecules, which also carry out biological functions.
SCI.9-12.5.3.12.B	Food is required for energy and building cellular materials. Organisms in an ecosystem have different ways of obtaining food, and some organisms obtain their food directly from other organisms.
SCI.9-12.5.3.12.C	All animals and most plants depend on both other organisms and their environment to meet their basic needs.
TECH.8.2.12.C.CS3	The role of troubleshooting, research and development, invention and innovation and experimentation in problem solving.

College Board AP Biology Big Ideas

Big Idea 2: Biological systems utilize free energy and molecular building blocks to grow, to reproduce, and to maintain dynamic homeostasis.

Enduring Understanding - College Board AP Biology

Enduring understanding 2.A: Growth, reproduction, and maintenance of the organization of living systems require free energy and matter.

Enduring understanding 2.C: Organisms use feedback mechanisms to regulate growth and reproduction, and to maintain dynamic homeostasis.

Enduring understanding 2.D: Growth and dynamic homeostasis of a biological system are influenced by changes in the system's environment.

Essential Questions

How do organisms capture and store energy?

How do environmental factors affect the capture of light energy?

How is stored chemical energy made available to do cellular work?

Knowledge and Skills

Essential knowledge 2.A.1: All living systems require constant input of free energy.

Essential knowledge 2.A.2: Organisms capture and store free energy for use in biological processes.

Essential knowledge 2.A.3: Organisms must exchange matter with the environment to grow, reproduce, and maintain organization.

Assessments

https://docs.google.com/document/d/1wR7bQF-8AQoRrt0g4C3hKja0yjwDjC9_BiAmONWbTcI/edit

Modifications

https://docs.google.com/document/d/1ODqaPP69YkcFiyG72fIT8XsUIe3K1VSG7nxuc4CpCec/edit

Resources

AP Investigations 5 and 6: Photosynthesis and Cellular Respiration