

Discipline: Science and Technology
Standards Category: Biological Sciences
Lesson Focus: Energy of the cell

Suggested Level:
 High School

PA Standard(s):	Related TESOL Standard(s):
3.3.10B: Describe and explain the chemical and structural basis of living organisms. Explain cell functions and processes in terms of chemical reactions and energy changes.	Goal 2: To use English to achieve academically in all content areas. Standard 2: Students will use English to obtain, process, construct and provide subject matter information in spoken and written form.

Lesson Focus:
 Energy cell

Teaching Strategies:
 Whole group instruction

Key Objectives in Accordance with TESOL Level:

Pre-Conversational/ Beginning	Intermediate	Advanced
Students will be able to: <ul style="list-style-type: none"> • Illustrate why organisms need a supply of energy. • Illustrate and trace a cells' source of energy. • Trace the process of the break down of cell energy as a comparison to making change from large paper currency. • Illustrate various uses of cell energy. 	Students will be able to: <ul style="list-style-type: none"> • Be able to label and diagram the chemical changes that occur in a cell. • State basic reasons why organisms need a supply of energy. • Label and match examples of energy produced by cells. • Recall vocabulary related to cell energy. 	Students will be able to: <ul style="list-style-type: none"> • Explain to a peer why organisms need a supply of energy. • Diagram and describe writing the chemical changes that occur in the exchange of energy within a cell. • Describe three ways cells display the use of energy. • Define the chemicals that react in a cell.

Assessment
Strategies:
 Illustrations

Label and match

Science learning log

Materials:

1. Various food items
2. Paper currency and equivalent coins
3. Human body template worksheet depicting major internal organs, including, brain, heart, digestive track, a cell
4. Vocabulary word cards
 Cells, Molecules, glucose, fructose, sucrose, water, adenosine, Phosphate, triphosphate, diphosphate, bond, nerves, ions

5. Energy releasing activity cards, depicting activity typical of nerve cells, muscle cells,
6. Posters of chemical diagrams displaying the release of energy in a cell

Procedures: (ESL Suggestions in Italics)

1. Display food items to indicate that organisms receive energy from consuming food
2. Act out making change from a large currency bill as comparison to the body breaking down food in the digestive track, to cells breaking down Adenosine Triphosphate (ATP) stored energy to Adenosine Diphosphate (ADP) to release energy
3. Brainstorm ways that living organisms use energy
Utilize activity cards to illustrate and translate information to ESL students
4. In cooperative groups choose a living organism and list all the possible ways it can use energy
5. Create a large wall chart displaying the organisms energy use
Include a diagram of the chemical changes that occur within a cell
Place beginning ESL students in a group where they can get language support from a peer if possible.

Assessment:

Beginning

1. Illustrate in Science Learning Log
 - a. why living organisms need energy
 - b. trace a cells source of energy on human body worksheet
 - c. illustrate a living organism use of energy
 - d. draw a comparison illustration of making change and chemical changes in a cell

Intermediate:

1. Record in Science Learning Log
 - a. diagram the chemical changes that take place in a cell labeling and matching with the correct science vocabulary
 - b. explain in basic terms why organisms need energy to survive
 - c. correctly label activity cards of living organisms using energy
 - d. read aloud the names of the chemicals involved in cell energy use

Advanced:

1. Describe to a peer why a living organism needs a supply of energy
2. In Science Learning Log
 - a. Diagram, label and describe the process of energy exchange in cells
 - b. Choose a living organism and describe at least 6 ways it may use energy