

## Details



**Completion Time:** 1 period

**Permission:** Download, Share, and Remix

## Ecological Cycles Part 3 – Draw the Energy Non-Cycle

### Overview

In this activity, students diagram the flow of energy through the Earth's ecosystems. A lot of the concepts presented here are necessary in order to fully understand the greenhouse effect and global warming. This lesson is presented as an activity to do before embarking on a study of the greenhouse effect and global warming. Unlike water or carbon, energy on Earth does not cycle. The second law of thermodynamics prevents this.

### Objectives

- Students understand that the total amount of energy in the universe is constant.
- Students understand that sunlight is by far the most important source of energy for processes on Earth.
- Students understand that the Second Law of Thermodynamics means that energy is constantly being transformed from more organized forms to less organized forms.
- Students understand that because of the Second Law, energy on Earth cannot make a cycle.
- Students understand that for every 100 Watts of sunlight absorbed by the earth, 100 Watts of infra-red light are emitted out into space.

### Lesson Preparation

Since the energy non-cycle is related to the carbon cycle, it is a good idea for students to have previously studied the carbon cycle. This lesson can be done before, during or after a unit on the laws of thermodynamics.

### Procedure

- Show the Power Point
- Pass around hand samples of coal, peat, crude oil, gasoline.
- Discuss

## Materials

- Handouts
- Hand samples of coal, peat, crude oil, gasoline.
- Power Point
- Examples of student work
- 11" x 17" sheets of paper
- Colored pencils, pens, crayons



- Read through the handout
- Show student work
- Turn students loose to complete the diagram

### **Extension**

This assignment together with the carbon cycle diagram are good ways to lead into a study of the greenhouse effect and global warming.

### **Resources**

[http://drake.marin.k12.ca.us/academics/rock/ROCK\\_Documents.htm](http://drake.marin.k12.ca.us/academics/rock/ROCK_Documents.htm)

### **Assessment**

The diagram is graded holistically. Emphasis is given to the clarity with which the concept of energy “flow” is graphically expressed. Questions on a unit exam test specific content knowledge. For instance “Which source of energy does not originally come from the sun: a horse-drawn cart, coal, the heat from a volcano, a candy bar, wind?”

### **Credits**

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**National Science Education Standards (NSES):**

**Content Standards, Grades 9-12**

Content Standard B: Physical Science

e. Conservation of energy and increase in disorder

Content Standard C: Life Science

e. Matter, energy, and organization in living systems

Content Standard D: Earth and Space Science

a. Energy in the earth system

Content Standard F: Science In Personal and Social Perspectives

c. Natural resources

**Other Standards:**

N/A