

Integrando Energia Sustentable en la Escuela

Materialles Educativos



Caribbean Energy Education
and Awareness Programme



Porque los temas de energia en las escuelas?



- * Se aprende sobre los estandares de ciencias y matematicas
- * Se abarcan mitos y concepciones erroneas sobre energias renovables
- * Se promueve el interes por las ciencias, tecnologia, ingenieria y las matematicas con un fin social
- * Se aprende sobre las posibles carreras y profesiones a nivel academic y tecnico en el tema de energia. removable.
- * Educar para la participacion ciudadana en la generacion y el consumo de energia.

Consultations with stakeholders/Partners



Government



NGOs

Utility



Academia

Media



Aprendiendo de las campañas de comunicación



- Use of mascots
- Use of digital media



Aprendiendo sobre Energia en los omnibuses





Audiencia
Objetivo

Audiencia
Secundaria

Estudiantes

Maestros

Padres

Oficiales de
Ministerios de
Educacion

Otros Educadores



Materialles





Guia del Maestro



Teachers' Resources Booklet for Integrated Instruction in Sustainable Energy (Grades 5-7)



Organization of
American States

Module 4. RENEWABLE ENERGY SOURCES LESSON 1. DEFINITION OF SOLAR



1.1. General objectives

- Develop an appreciation for the environmental effects of using of solar energy.
- Develop a working knowledge of the advantages and disadvantages of using the sun as an energy source in the Caribbean.

1.2. Specific objectives

- Explain how solar energy can be harnessed and utilized.
- Explain how living organisms use solar energy in natural processes.
- Identify ways in which the sun can be used to produce electrical and heat energy.
- Explain why solar energy is classified as a renewable source of energy.

1.3. Process skills

- Observation, investigation, and discussion.

1.4. Content summary

- Solar energy is the radiant heat and light energy produced by the sun. Along with secondary solar-powered resources such as wind and wave power, this energy accounts for the majority of Earth's renewable energy.
- Solar technologies are characterized as either passive or active depending on the way the energy is captured, converted, and distributed. Active solar techniques use photovoltaic panels (solar panels) and solar thermal collectors (solar water heaters) to harness the energy. Passive techniques include orienting a building to the Sun, selecting materials with thermal mass properties, and using materials with light dispersing properties.

Although solar energy is a clean, renewable source, it has disadvantages. Unlike the non-renewable energy sources we have studied, these disadvantages are concerned with reliability, not environmentalism. For instance, the amount of sunlight that reaches Earth's surface daily is not consistent. It varies depending on geographical location, time of day, time of year, and weather conditions.

The environmental impacts associated with solar power can include land use and habitat loss, water use, and the use of hazardous materials in manufacturing, though the types of impacts vary greatly depending on the scale of the system and the technology used — photovoltaic (PV) solar cells or concentrating solar thermal plants (CSP).

How solar energy works:

Solar energy is generated during the day by the sun's powerful rays.



Source: www.greenmountain.com/resources/environmental/renewable-energy-101

- 1 Photovoltaic solar panels, built from silicon, absorb the sun's rays and convert them into energy
- 2 A control device converts the energy from direct current electricity to alternating current electricity, capable of powering electrical items
- 3 This electricity is added to the electricity grid which powers local homes and businesses, but also can be stored in batteries for future use

1.5. Materials you will need

- Learn and Save Interactive DVD

1.6. Activities

1. Ask students to draw a flow chart to show how energy that starts as heat and light from the sun can be harnessed and used to power a refrigerator in a home. Ensure that students annotate the flow chart to describe the energy changes that take place.
2. If possible, take students to a place where solar panels or heaters are installed. Point out the main components of the devices and explain how they work. After this exercise, have students create an annotated diagram of a solar panel or heater.
3. Divide students into groups and have them compete for a prize rewarding a representation of the most creative solar-powered device.
4. Allow students to watch the Learn and Save DVD to find out more about the topic.

LESSON 2. DEFINITION OF HYDRO POWER

2.1. General objectives

- Develop a working knowledge of the advantages and disadvantages of hydropower plants for the societies in which they exist.
- Develop a working knowledge of the use of hydropower in the Caribbean.
- Demonstrate familiarity with the issue of the viability of hydropower as an alternative energy source in the Caribbean.

2.2. Specific objectives

- Identify the phases of the water cycle.
- Explain how we can extract energy from moving water.
- Explain how hydroelectric plants work.
- Explain why water is classified as a renewable source of energy.

2.3. Process skills

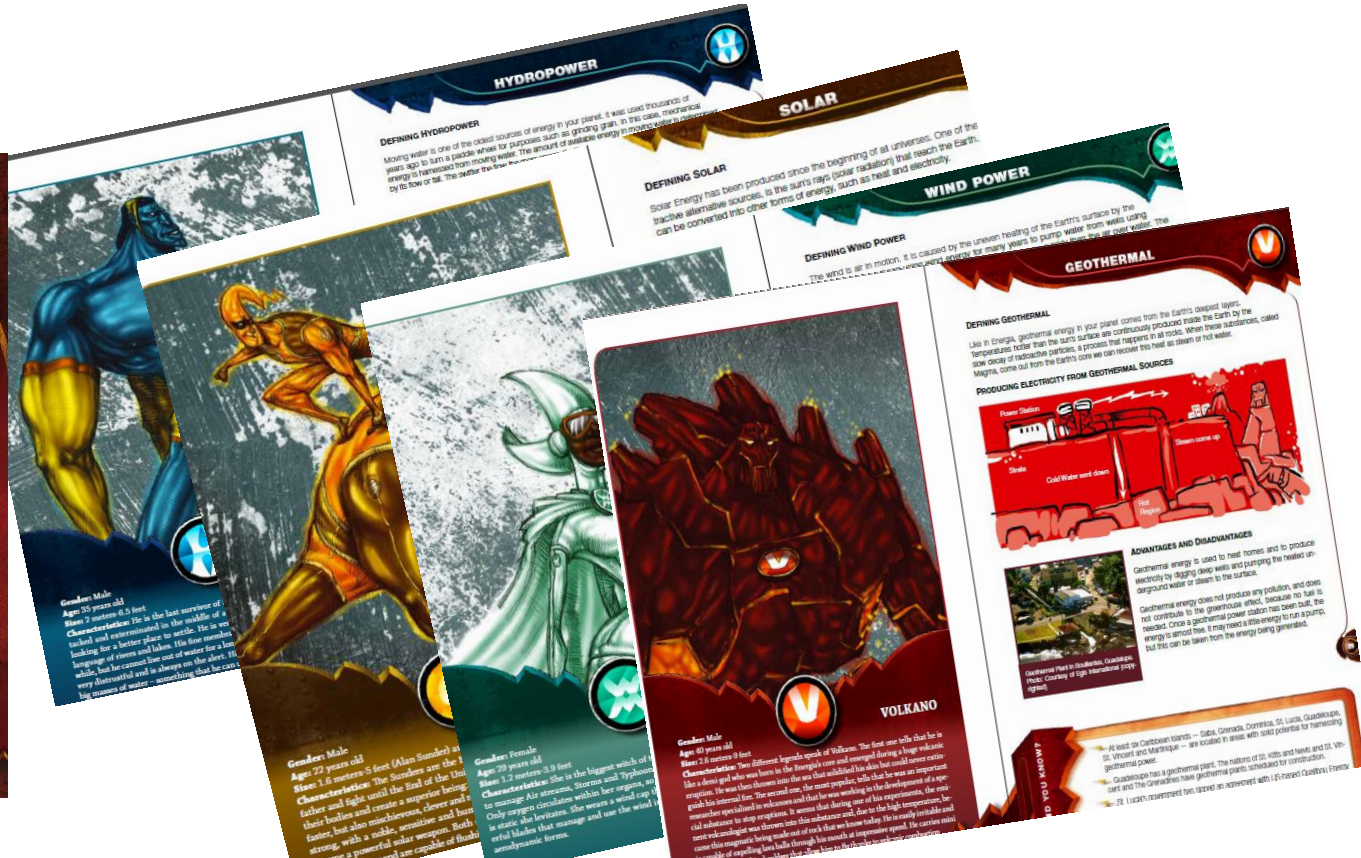
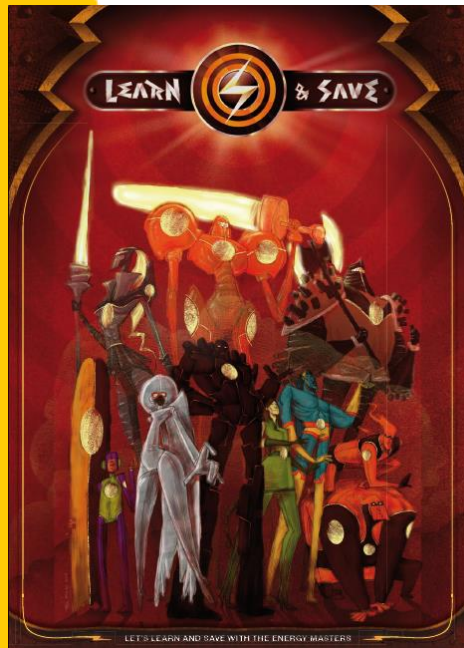
- Observation, investigation, and discussion.

2.4. Content summary

- An understanding of hydropower must be preceded by an understanding of the water cycle.
- Hydropower is one of the oldest sources of energy. It was used thousands of years ago to turn a paddle wheel and power important processes like grain production.
- Moving water offers the opportunity to harness mechanical energy.
- The amount of available energy in moving water is determined by the water's rate of flow or fall. The higher the water head and the stronger the river's flow, the more energy is available.
- When hydroelectric energy is produced, water is accumulated in reservoirs created by dams, and then released (i.e. set into motion) as needed. The potential energy contained in the water that was held back by the dam and then released is converted into kinetic energy as the water falls down a penstock, where it turns turbines (using mechanical energy, a type of kinetic energy) to generate electricity.
- Although hydropower (hydroelectric) generators do not themselves emit air pollutants, hydropower dams, reservoirs, and the operation of generators are associated with some negative environmental effects.
- A reservoir and dam can alter natural water temperatures, chemistry, flow characteristics and silt loads, all of which can lead to significant changes in ecological systems (i.e. systems of living organisms and their relationship with the environment) as well as in rock and land formations both up and downstream of the river.
- Greenhouse gases and methane may form in reservoirs and be emitted into the atmosphere.
- Dominica generates 52.9% of its electricity from hydroelectric sources. Suriname, Jamaica, and St. Vincent and the Grenadines also generate hydroelectric power, but on a smaller scale.



Texto para Estudiantes





Juego de Mesa



WHY ARE SOLAR, WIND, GEOTHERMAL, BIOMASS AND HYDROPOWER CALLED RENEWABLE SOURCES?

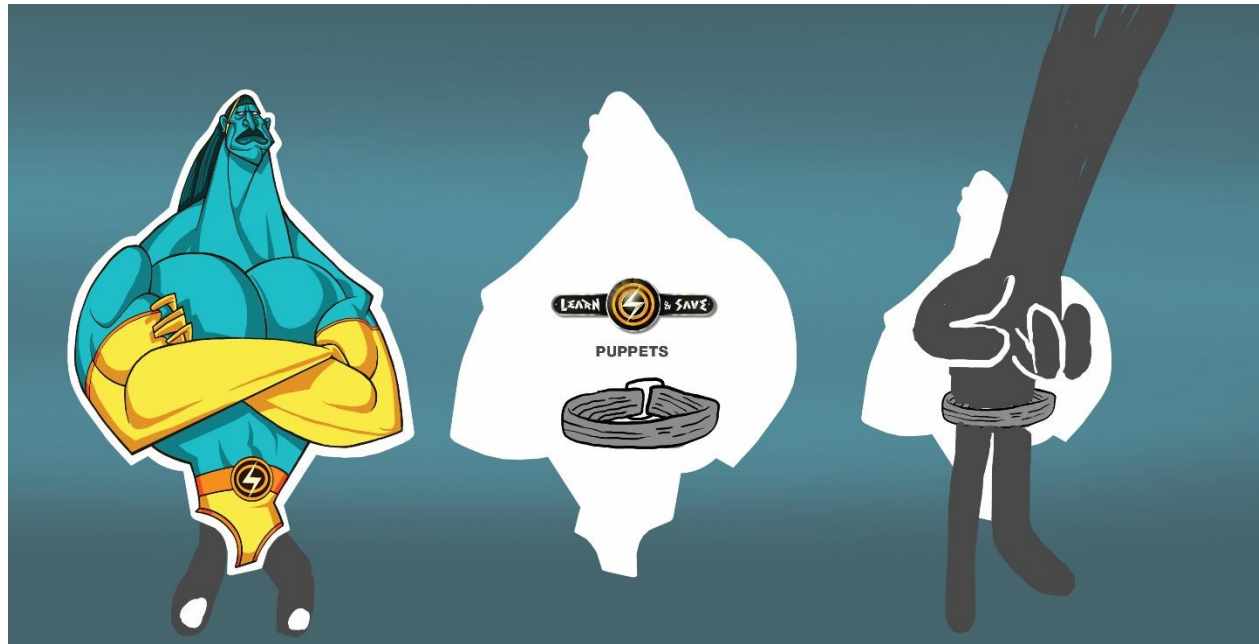
WHAT DOES THE SENTENCE "CONSERVATION OF ENERGY" REFER?

ENERGY FORMS CAN BE RANGED IN TWO BIG GROUPS. COULD YOU LIST AND EXPLAIN THEM?





Títeres





DVD Interactivo





DVD Interactivo



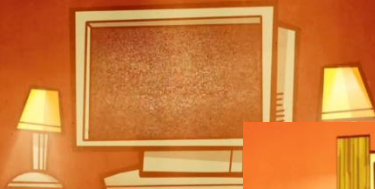
01

REPLACE INCANDESCENT BULBS BY
COMPACT FLUORESCENT LIGHT BULBS



02

TURN OFF THE TV AND LIGHTS
WHEN YOU ARE NOT USING THEM



03

USE NATURAL VENTILATION AND
LIGHT AS MUCH AS POSSIBLE



LET'S LEARN AND SAVE WITH THE ENERGY MASTERS

Haciendo molinos de viento...





Estudiantes usando materiales



Vide Bouteille Combined School, Saint Lucia

Otras Iniciativas



OEA

EducaSTEM

www.educastem.org/es

ITEN

www.oas.org/es/ried

Becas

www.oas.org/es/becas