

Lesson 3: Energy Sources

WARM-UP ASSIGNMENT

In pairs, discuss the questions.

1. What are the most common sources of energy in Thailand?
2. Which energy sources cause environmental problems?
3. Which energy sources are environmentally "friendly"?

VOCABULARY

Match the picture to the types of energy

Biofuels	Fossil fuels	Geothermal energy
Hydro energy	Solar energy	Tidal energy



1.



2.



3.



4.



5.



6.

READING

Read the descriptions below of each type of energy and its generating process using the words learned from Activity 2.

1. _____ is the conversion of sunlight to electricity. For example, the sun's energy is focused to boil water which is then used to provide power, such as with the Stirling engine dishes which use a Stirling cycle engine to power a generator.

2. _____ generates electrical power through the use of the gravitational force of falling or flowing water. It is the most widely used form of renewable energy as this type of energy produces no direct waste, and has considerably lower output levels of carbon dioxide (CO₂) than fossil fuel powered energy plants.

3. _____ are formed by the decomposition of buried" dead organisms over billions of years. These fuels contain a high percentage of carbon and hydrocarbons. This kind of fuel is of great importance because it can be burned to produce significant amounts of energy.

4. _____ are a wide range of fuels (such as corn) which are in some way derived from biomass. The term covers solid biomass, liquid fuels and various biogases.

5. _____ originates from the original formation of the planet, from the natural decay of minerals, and from solar energy absorbed at the surface. Its heating and cooling system use the relatively constant temperature of the earth to heat and cool homes and businesses.

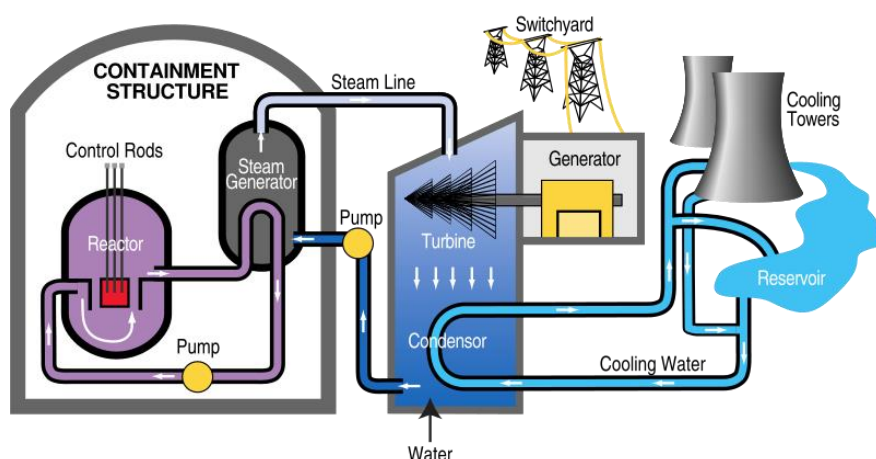
6. _____ is the only form of energy which is derived directly from the relative rotation of the Earth-Moon system, and from the Earth-Sun system. To generate electricity, the stronger the force, either in water level height or its current velocities, the greater the potential for electricity generation.

READING

Read the passage and answer the questions.

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103

To provide the power for a turbo-generator, nuclear power plants rely on the heat energy generated from nuclear fission. In this process, the nucleus of a heavy element, such as uranium-235 or plutonium-239, splits when it is bombarded by a neutron in a nuclear reactor. Next, the fission process for uranium atoms typically yields two smaller atoms called fission fragments; two or three neutrons, plus about 200 Million electron volts of nuclear energy in the form of radiation and heat. Because more neutrons are released from uranium fission, the reaction can become self-sustaining - a chain reaction - under controlled conditions. Thus, this event leads to producing a tremendous amount of energy. However, the nuclear reactor generally has automatic and manual systems to shut the fission reaction down once unsafe conditions are detected. While the energy is generated by uranium, fuel is transferred to ordinary water and is carried away from the reactor's core either as steam in the boiling water reactor (BWR) or as superheated water in the pressurized-water reactor (PWR). In the BWR, the water is boiled inside the reactor core before it is sent directly to the turbo-generator which drives an electric generator. In the PWR, after the superheated water in the primary cooling loop flows through a steam generator, the superheated water becomes the steam in a secondary loop that feeds the turbo-generator.



1. Write one or two words which tell what the text is about?

2. Which of the following statements best summarized the reading?

- a. nuclear weapons, the energy created when atoms break apart is released all at once. This causes terrible destruction.
- b. Nuclear power stations make huge amounts of electricity, but the leftover waste can harm living things, including people.
- c. During nuclear reaction, atoms are broken down. The energy produces heated water to make steam, which a turbine generator turns into electricity.

C. Read the following steps in the process of nuclear reaction. Then number the steps in the correct order.

_____ a. After the heated water and the steam are transferred into the loops flowing through a steam generator, the turbine generator creates electricity.

_____ b. Once the nucleus is broken apart, it releases a massive amount of energy.

_____ c. The nuclear reaction process begins when the atoms of uranium-235 or plutonium-239 are broken down in a stable way.

_____ d. Ultimately, the uranium produces energy just before ordinary water turns into heated water and steam in the heat exchangers.

LANGUAGE FOCUS

Subordinating conjunctions

A. Look at how the sentences below are structured.

a. Ultimately, the uranium produces energy just before ordinary water turns into heated water and steam in the heat exchangers.

b. After the heated water and the steam are transferred into the loops flowing through a steam generator, the turbine generator creates electricity.

c. Once the nucleus is broken apart, it releases a massive amount of energy

d. The nuclear reaction process begins when the atoms of uranium-235 or plutonium-239 are broken down in a steady way.

B. Complete the following statements.

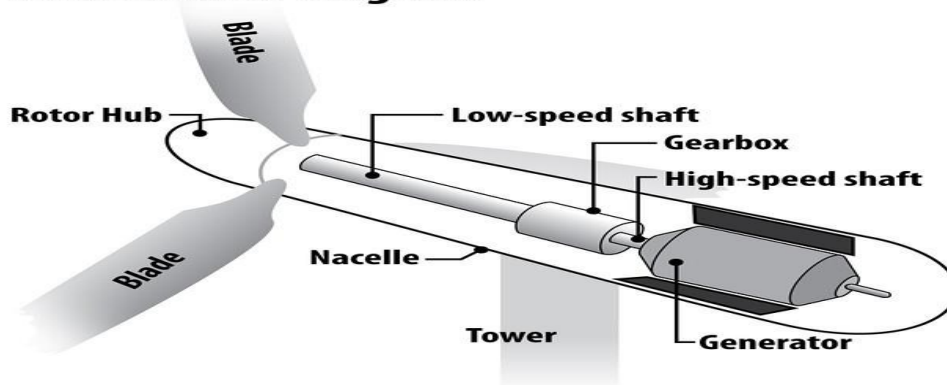
1. Each sentence contains **one clause / two clauses**.
2. The words before, after, once, and when which are called conjunctions appear in the **main clause / subordinate clause**.
3. The above-mentioned subordinating conjunctions can come / cannot come before or after the main clause.
4. The subordinating conjunctions; before, after, once, and when are related to **time / purpose** in a process.

C. Study the reading in Activity 3 (on page 103). Then underline the subordinating conjunctions.

WRITING

Read each pair of sentences describing how a wind turbine generates electricity. Determine their relationship to one another. Then use the subordinating conjunctions given to create a complex sentence.

Wind Turbine Diagram



1. The wind speed reaches about five meters per second. The computer starts the turbine.

_____ when _____

2. The wind power is transferred to the rotor hub attached to the low-speed shaft of the turbine.

The rotor blades of the turbine capture the wind.

Once _____

3. The power is sent to the rotor hub. The low-speed shaft transmits power from the hub to

gearbox.

After _____

4. The gearbox increase the speed of the rotor shaft by about 50 times. The power is transmitted from the low-speed shaft to the gearbox.

Before _____

5. The generator convert the mechanical energy into electrical power. The high speed shaft drives the electrical generator.

When _____

Unit 3

Technology and Society

Lesson 4: Safety first

WARM-UP ASSIGNMENT

Look at the photograph. What accident does the photograph show?



READING

Read the news and answer the questions.

Published on Tuesday, March 20, 2001 by Reuters

Eco-Nightmare

World's Largest Oil Rig Sinks

RIO DE JANEIRO, Brazil (Reuters) - Despite desperate rescue efforts, the world's largest offshore oil rig which had been hit by blasts sank on Tuesday and began spewing oil off the coast of Brazil five days after three powerful explosions ripped through the platform kitting 10 people of the 175 workers aboard. Less than an hour after divers had left the scene, the 40-story structure

tipped sideways and within 10 minutes sank below the waterline. Diesel oil bubbled to the surface creating an extensive but very fine slick. All 395,000 gallons (1.5 million liters) of crude and diesel stored on and under the rig are likely to spill into the ocean as pipelines rupture and tanks explode, and it could burst into the sea due to water pressure.

1. When and where did this incident take place?
2. How many lives were lost in the accident?
3. What do you think the causes of the explosions could be? Why?

VOCABULARY

A. Match the following notices to their instructions.

 a	 b	 c
 d	 e	 f
 g	 h	 i

_____ Please do not touch.

_____ Handle with care.

_____ Do not extinguish with water.

- _____ No access for industrial vehicles.
- _____ Safety helmets must be worn at all times.
- _____ Toxic hazard: avoid contact with eyes and skin.
- _____ Dangerous contents: careful handle is necessary.
- _____ Avoid contamination: wash hands before returning to work.
- _____ Radioactive materials: take extreme caution.

C. Match the words in the warnings to the meanings.

Words	Part of speech	Meanings
_____ handle	_____	a. a way of entering a place
_____ extinguish	_____	b. deal with
_____ access	_____	c. making a substance or place no
_____ hazard	_____	longer pure by adding a dangerous
_____ contents	_____	substance or disease
_____ contamination	_____	d. stop fire from burning
_____ radioactive	_____	e. sending out harmful radiation
		f. a thing that can be dangerous
		g. things that are contained in
		something

LANGUAGE FOCUS

Describing safety signs

A. Look at the warning notices in Activity 3A. Some warning notices contain some words to call special attention

Attention

B. Study the descriptions of the warning notices in Activity 3A again. Then fill in the blanks and answer the questions.

1. Most of the instructions are written in _____ structure.

2. Some warnings contain some instructions NOT to do things.

No _____

Do not _____

3. In term of grammatical structure, what are the differences between no, do not, and avoid?

No + _____ / gerund (V_{ing})

Do not + _____

Avoid + _____

Note: No + gerund (V_{ing}) are also used often, e.g. "No parking.", and "No smoking"

4. From the descriptions, which one is written in a passive sentence? Can you rewrite it into active sentences?

Passive: _____

Active: _____

5. From the sentence, "Careful handling is necessary", read the information in the box. Then rewrite using the structure given.

Gerund as subject	It is + adjective + to infinitive
Careful handling is necessary	It is necessary _____

6. The phrase 'it is necessary.....' gives more emphasis than 'it's important'. Apart from this, which of the following add more emphasis on the warnings, and which add less?

a. it's vital.....

b. it's preferable.....

c. it's crucial.....

WRITING

Write some warning notices using the phrases or the structures given.



Keep fire away from flammable material.

_____ is necessary.

It is necessary _____



It is against the law to smoke on these premises.

Avoid _____

It is vital _____



Please wear respirators on this site.

Respirators must _____

You must _____



This machine must not be operated without safety guards in position.

Do not _____

Avoid _____



Keep all cylinders secured and upright.

It is crucial _____

All cylinders must _____



Keep this area clear at all times

This area must _____

_____ is crucial.



Using mobile phones is prohibited.

Please _____

Avoid _____