



CLIL LESSON

cenario

03

electrical engineering
energy storage-battery



Erasmus+

The European Commission's support for the production of this publication does not constitute an endorsement of the contents, which reflect the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

1 Topic of Today

- Write the topic of today on the blackboard
- Accessing the existing knowledge

Energy Storage – Battery

2 Key Words

- Write up any key word from the text and give the translation in the mother tongue or explain the words in English. Ask students to listen and repeat in English.

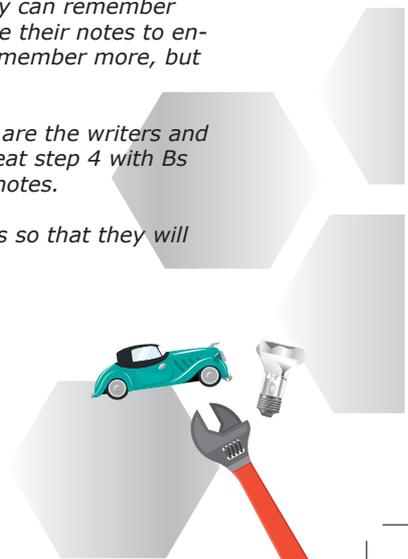
rechargeable - zinc-carbon - potassium hydroxide - inject - discharged and recharged - lead dioxide - sulfuric acid solution - fuel cells - catalysts - internal-combustion engine - environmentally friendly

3 Co-operative listening

- prepare a talk on the topic you want to tell your students about.

- 1) Call the front row A and the row behind them B. Repeat this sequence with the remaining rows. All the students must be facing you.
- 2) Tell the class that you are going to give them a talk. The A rows are the listeners and must not write anything down. The B rows are the writers and can take as much notes, as they like.
- 3) Give half your talk.
- 4) When you have finished tell the A rows to turn their chairs round to face their group B partners. The As tell the Bs what they can remember from listening to the talk. The Bs listen carefully and use their notes to enhance the As memories. They need to help the As to remember more, but they must not just read out their notes.
- 5) Now ask the students to change roles so that the As are the writers and the Bs are the listeners. Give the rest of your talk. Repeat step 4 with Bs recalling what they heard, helped by the As from their notes.
- 6) Working in their pairs they now reconstruct the notes so that they will be a useful reference.

Page 2



7) When they have finished ask them to discuss the difference between listening and taking notes, and listening without taking notes. What are the advantages and disadvantages of each?

Prepared Talk:

Energy Storage–Battery

Batteries provide us with a mobile source of power that makes many modern conveniences possible. Without batteries everything that needed electricity had to be plugged in.

Basic principles

Different metals have different affinities for electrons. When two dissimilar metals are put in contact through an electrolyte, there is a tendency for electrons to pass from one material to another. The metal with the smaller affinity for electrons loses electrons to the material with the greater affinity, becoming positively charged. The metal with the greater affinity becomes negatively charged. (1)

The positive charged electrode is called anode and the negative charged electrode cathode. (2)

Primary batteries

Primary batteries are not easily rechargeable, and consequently are discharged and then disposed. Many of these are “dry cells” – cells in which the electrolyte is not a liquid but a paste or similar. The electrochemical reaction is not easily reversible and the cell is operating until the active components in the electrodes are exhausted. Generally, primary batteries have a higher capacity and initial voltage than rechargeable batteries. (3)

- **Zinc-carbon battery:** The zinc-carbon chemistry is common in many inexpensive dry cell batteries. The anode is zinc, the cathode is manganese dioxide, and the electrolyte is ammonium chloride or zinc chloride.
- **Alkaline battery:** The cathode is composed of a manganese dioxide mixture, while the anode is zinc powder. It gets its name from the potassium hydroxide electrolyte, which is an alkaline substance. (4)



Secondary batteries

The original active materials on the two electrodes can be reconstituted chemically and structurally by the application of an electrical potential between the electrodes to “inject” energy. These batteries can be **discharged and recharged** many times. (5)

- **Lithium-ion battery:** Lithium chemistry is often used in high-performance devices, such as cell phones, digital cameras and even electric cars. A variety of substances are used in lithium batteries, but a common combination is a lithium cobalt oxide cathode and a carbon anode.
- **Lead-acid battery:** This is the chemistry used in a typical car battery. The electrodes are usually made of **lead dioxide** and metallic lead, while the electrolyte is a **sulfuric acid solution**. (6)

The future

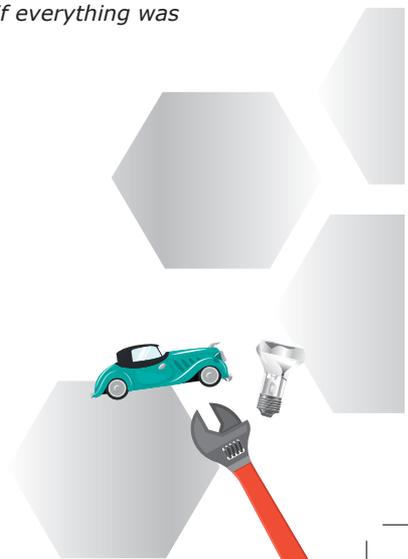
The future of battery technology now lies in the concept of **fuel cells**. A fuel cell, like a battery is an electrochemical cell. It has an anode and a cathode. When an oxidation reaction and a reduction reaction occur, the electrodes act as **catalysts**, and are not used up in these reactions. Instead, the reactions take place within a “fuel,” which provides the source for the electrons. This is a very efficient method of producing electricity up to 85% more efficient – that’s over three times as efficient as an **internal-combustion engine**. They are also very environmentally friendly – the most **environmentally friendly** cells produce only water and heat. (7)

Sources:

- (1)(2) https://www.doitpoms.ac.uk/tlplib/batteries/basic_principles.php
- (3) <https://www.doitpoms.ac.uk/tlplib/batteries/primary.php>
- (4) <https://electronics.howstuffworks.com/everyday-tech/battery.htm>
- (5) <https://www.doitpoms.ac.uk/tlplib/batteries/secondary.php>
- (6) <https://electronics.howstuffworks.com/everyday-tech/battery.htm>
- (7) <https://www.doitpoms.ac.uk/tlplib/batteries/future.php>

4 Conclusions

- Prepare a copy of your text for each student.
- Point out your keywords.
- Ask your students’ text related questions to examine if everything was well understood



Subject: Electrical Engineering
Title of the Lesson Plan: Wind Power

Course / Level: 11th grade (3rd Class HTL)
L2 level for students/teacher: B2

1. Learning outcomes	Knowledge: to know how Wind Power works Skills: to be able to talk about the advantage and disadvantage of Wind Power
2. Subject Content	Wind Power
3. Language Content / Communication	
Vocabulary /Structures	Technical subject-specific language General English BICS
Discourse type	description, argumentative
Language skills	B2
4. Contextual (cultural) element	Added value of studying how Wind Power works through the medium of English – Content and Language skills get improved
5. Cognitive (thinking) processes	remembering, identifying, defining things
6. Activities	1) "Key Word" speaking, remembering 2) "Text circles" asking and answering questions, ordering words, getting new information, working in groups, reading
7. Methodology	
Organization and class distribution / timing	1) Whole class / 15min 2) Group work / 20 min 3) Pair work / 40 min 4) Whole class / 25
Resources / Materials	Set of vocabulary, Slips of prepared text, Text
8. Evaluation Criteria	Learners should be able to know facts about Wind Power in L2 language
9. Evaluation Instruments	Be able to make questions about the given text; Answering text related questions

