Train of Trainers (ToT) Manual

LEDsafari

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Why is LEDsafari manual different?

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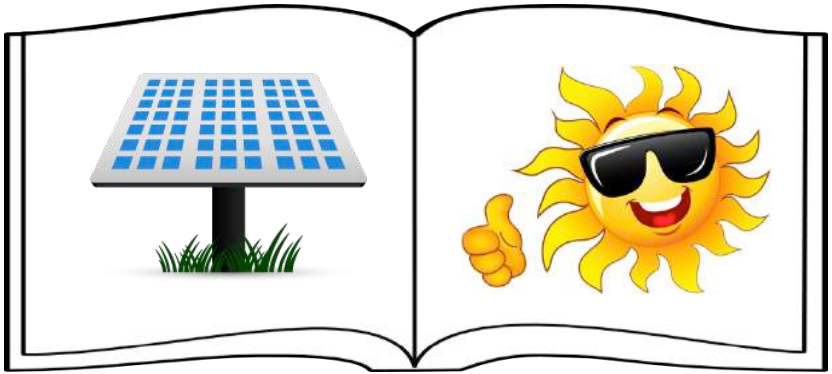
Much more than a simple manual!

- **Complete** → All the materials needed for a training on PV technologies
- **Full support** → It helps trainers at all stages of the training
- **Pedagogical** → Totally comprehensible for everyone



What am I going to find there?

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Pedagogical Theory
- Analogies
- Examples

Extra material
- Class Activities
- Practicals

Tips for Trainers
- Lesson Plans
- Handouts

Assessments
- Pre
- Post

Pedagogical Theory

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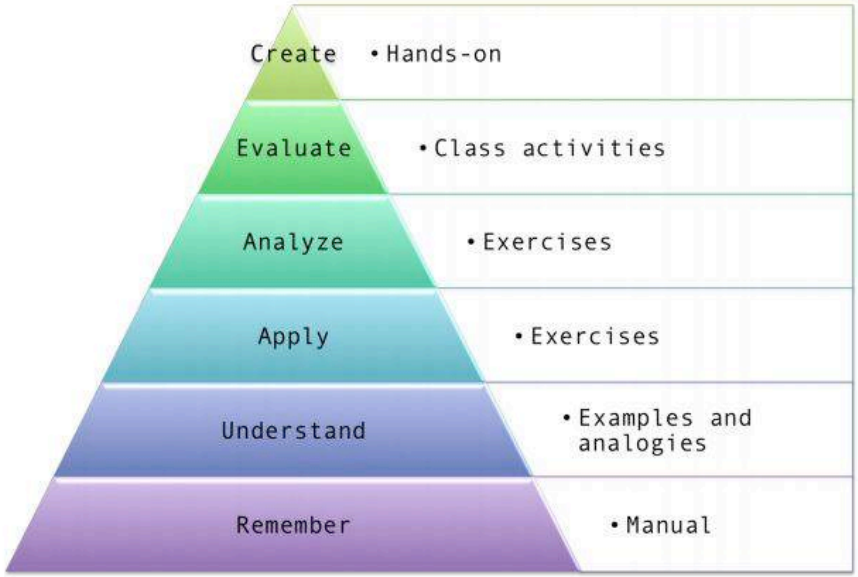
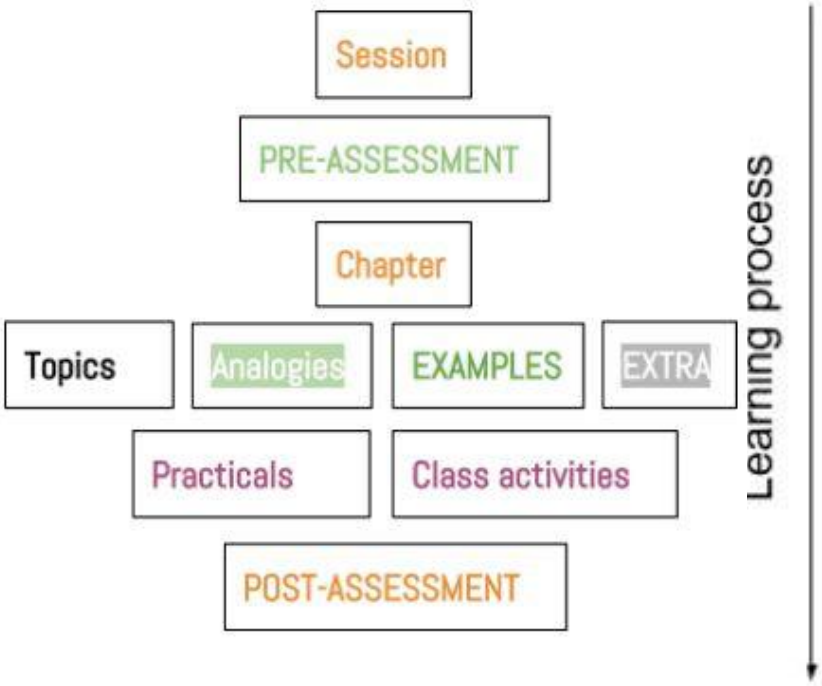
➔ **Based in the Bloom's Taxonomy theory of learning:**



➔ **The training session:**



Pedagogical Theory

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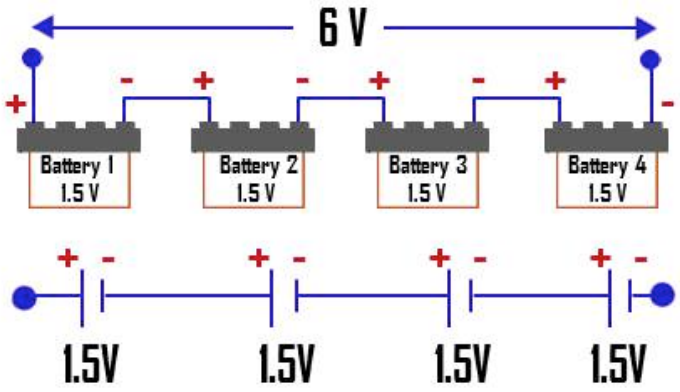
➔ **Examples:**

➢ Series Connection

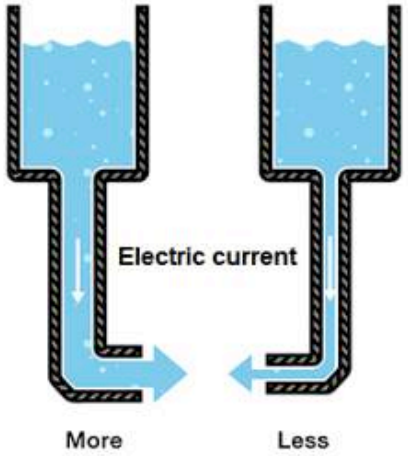


FOR EXAMPLE...

- If two 12 V batteries that can each produce 10 A are connected in series, 24 V is produced at 10 A.
- If three 6 V panels each producing 3 A are connected in series, 18 V at 3 A is produced.

ANALOGY !!!

When water moves through a pipe, it is said to flow. The volume of water that flows through a pipe in one unit of time is called the flow rate. When electricity moves through a wire, it is sometimes said to flow like water but it is usually said to have a current rather than a flow rate.



Extra material

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➔ **Class Activities: Games and exercises to motivate the trainees and fix the knowledge**

IT'S TIME TO PLAY !

➔ **Example:**

Chapter 11: Operation & Maintenance

Topic: Battery maintenance

Game: Save the battery

Material: cards

Time: 10-15 min

➔ ***Before starting:*** *Print out the cards*

Description:

- Each trainee picks a card from the deck
- Each card contains either a CAUSE (C), or a PROBLEM (P), or a SOLUTION (S)

Without showing their cards, the trainees have to form triplets:

- ❑ If a trainee has a C card, will look for his corresponding P and S
- ❑ If a trainee has a P card, he will look for a C and a S
- ❑ [...]

SOLUTION CARD:

ADD DISTILLED WATER

PROBLEM CARD:

STRATIFICATION

CAUSE CARD:

Operation at High Temperatures

PROBLEM CARD:

Electricity leakage

SOLUTION CARD:

Clean with abrasive paper & prevent

CAUSE CARD:

Rust & corrosion at the terminals

Extra material

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➔ **Practicals: Hands-on activities to engage the trainees in real-life situations**

➔ **Example:**

IT'S TIME TO USE YOUR OWN HANDS !!!

Chapter 1: Basics of Electricity

1.1 Voltage in PV panels

Learning Outcomes	Measurement of electrical parameters
Required equipment	Photovoltaic modules and multimeters.
Time allocation	20 minutes
Number of people	2 people
Advices for Trainers *If they need help, assist them during the measurements.*	
Activity ➔ Give a small PV module and a multimeter to each pair . ➔ Ask them to measure the voltage between the two terminals. ➔ Ask them to change the light condition on the panel surface by creating shadows or walking in the classroom.	

Tips for Trainers

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➔ **Lesson Plans: Suggestions for lesson plans to support the trainer**

➔ **Example:**

Time	Content	Learning outcome	Method	Material
8:00-8:30	Breakfast			
8:30-10:30	Review of previous class	//Review//	Dialogue with class / Quiz /	Post it, pen, papers…
	Photovoltaic technology	Explain how light is converted into energy	Frontal class	Whiteboard, Markers, hand-outs
		Explain relationship between solar cell, module and array	Frontal class	Whiteboard, Markers, hand-outs
		Explain the basic structure of a PV module	Frontal class	Whiteboard, Markers, hand-outs
		Classify PV modules based on technology	Frontal class	Whiteboard, Markers, hand-outs
			Demonstration of the different type of modules	Different type of modules
		Describe the characteristics of an IV curve	Frontal class	Whiteboard, Markers, hand-outs
			Activity/Game: "Who is the more efficient"	Datasheets of different PV panels
10:30 - 11:00	Break			

Tips for Trainers

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➔ **Handouts: Information provided in print-ready documents to facilitate the learning process**

➔ **Example:**

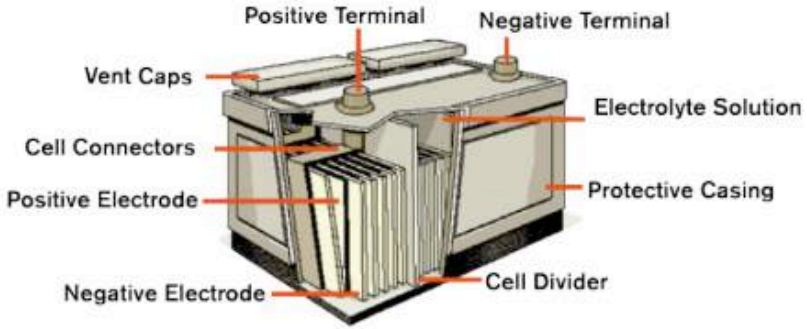
Summary: Chapter 5

BATTERY

➔ Features:

- Stores electricity produced by a solar panel for later usage.
- One of the most expensive parts of a PV system.
- Easily damaged by poor maintenance or incorrect usage.
- Short lifespan compared to other components.

➔ Lead-acid battery structure:



Assessments

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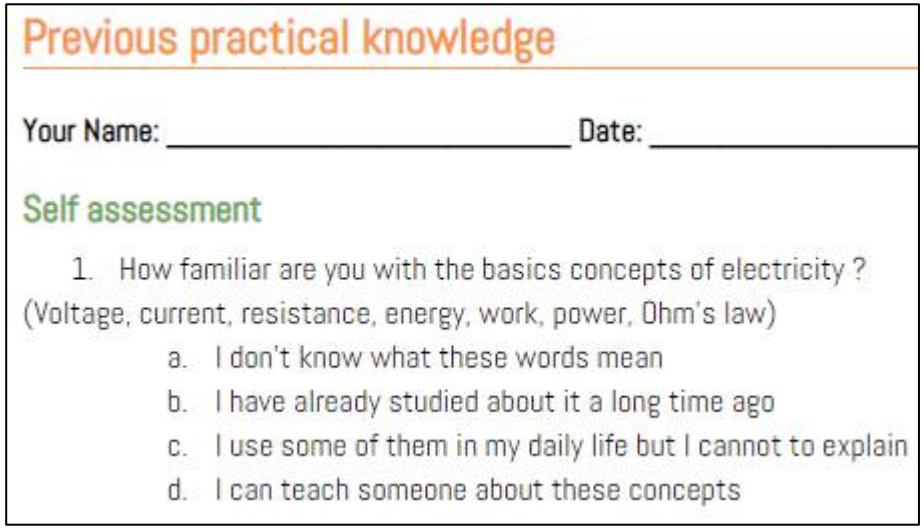
➔ **Pre-Assessments: Evaluate trainees' knowledge before the training**

➔ **Examples:**

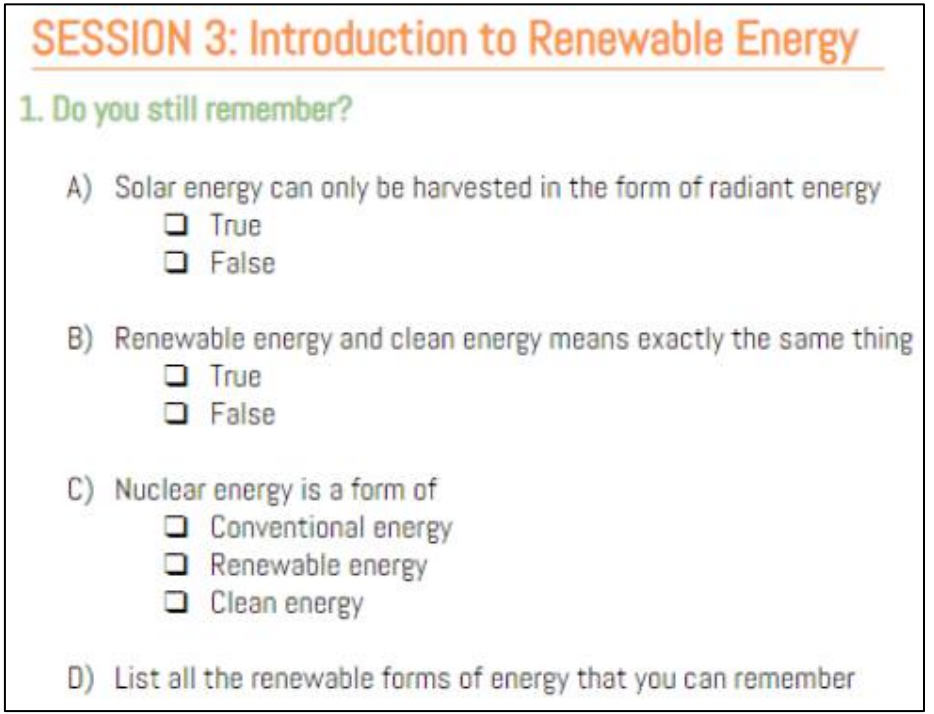


Previous practical knowledge

Your Name: _____ Date: _____

Self assessment

1. How familiar are you with the basics concepts of electricity ? (Voltage, current, resistance, energy, work, power, Ohm's law)
   a. I don't know what these words mean
   b. I have already studied about it a long time ago
   c. I use some of them in my daily life but I cannot to explain
   d. I can teach someone about these concepts



SESSION 3: Introduction to Renewable Energy

1. Do you still remember?

A) Solar energy can only be harvested in the form of radiant energy
- ❑ True
- ❑ False

B) Renewable energy and clean energy means exactly the same thing
- ❑ True
- ❑ False

C) Nuclear energy is a form of
- ❑ Conventional energy
- ❑ Renewable energy
- ❑ Clean energy

D) List all the renewable forms of energy that you can remember

Assessments

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➔ **Post-Assessments: Evaluate progress and knowledge acquired from the training**

➔ **Example:**

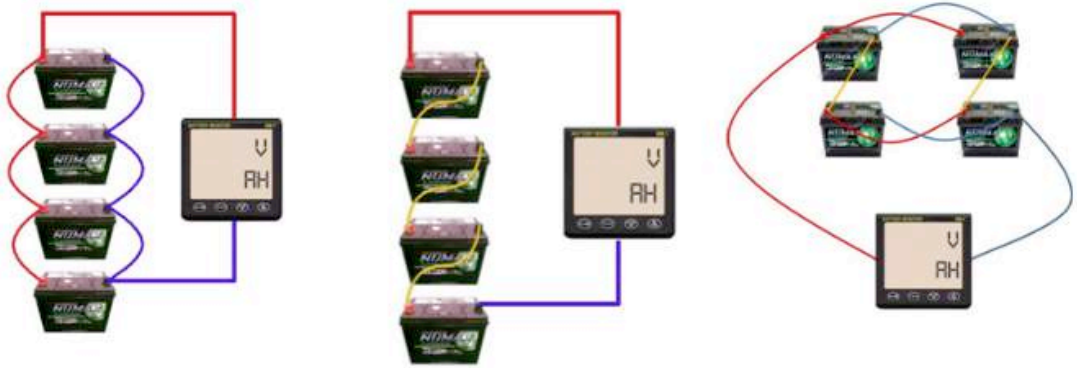
SESSION 1-2: Basic Electricals & Safety

Your Name: _____ Date: _____

Question 1.1 – 10 points

a) What is the mathematical law that defines the relationship between current, voltage and resistance? (4 points)

b) Each battery has 12 V and 100 Ah, complete the readings of the meters. (6 points)



THANK YOU !

Get in touch with us:

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