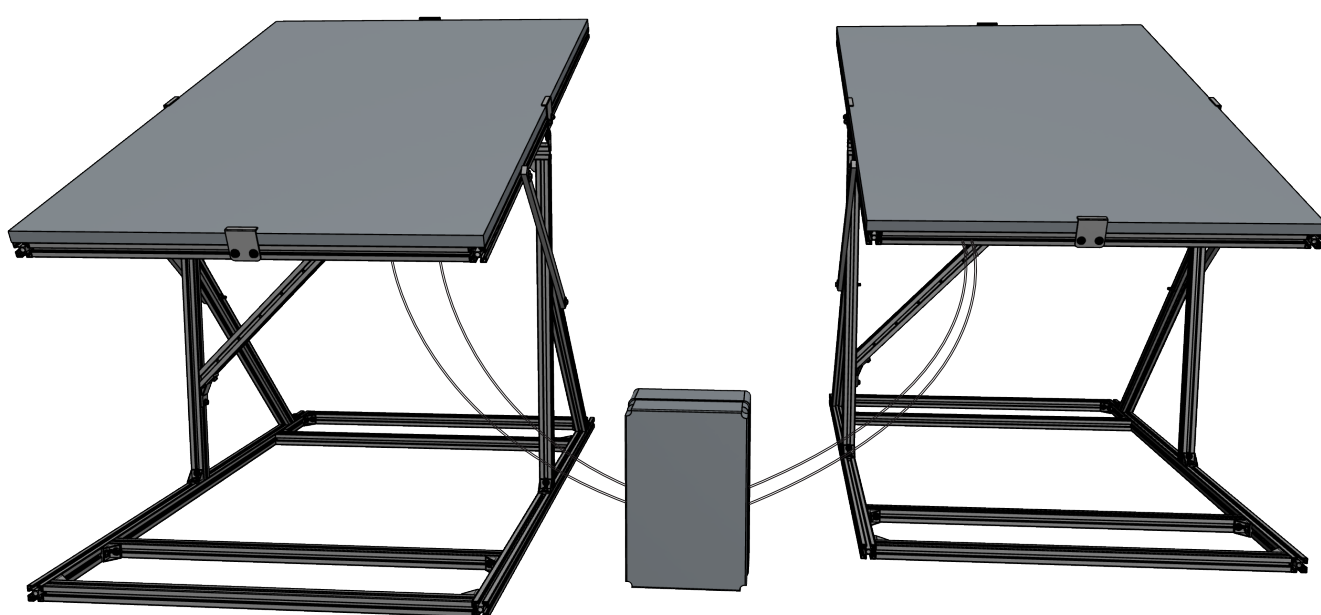




Teacher's script

Educational PV system

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Educational PV-System

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Dear teachers and solar enthusiasts,

This brief description provides comprehensive information about Solar Bildung's educational PV system. Please read this description carefully before using the system for the first time.

The scope of delivery includes the assembly and operating instructions, general assembly instructions, and this teaching guide. If you have any questions, need to order spare parts, or have suggestions for didactic design, please do not hesitate to contact us.

This teaching guide contains:

1. Preparation
2. Introduction to the topic: Stand-alone/grid-connected operation
3. General operating instructions
4. Safety and warning instructions
5. Material checklist
6. Tool checklist

We are delighted that you have chosen the educational PV system learning unit from Solar Bildung and are thus promoting sustainability in energy and education with us.

Have fun!

01 Preparation

Before you start

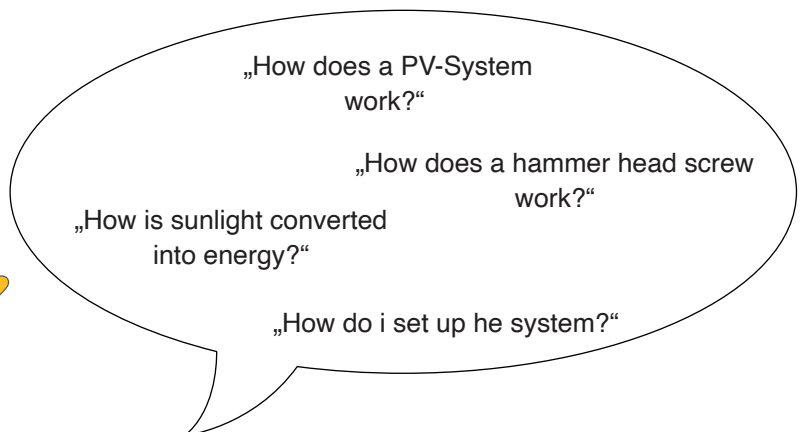
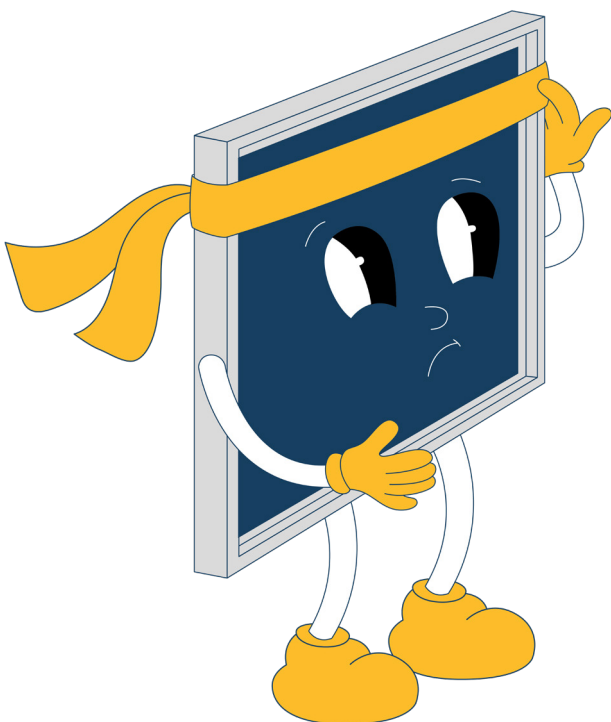
The educational PV system is designed for children and young people aged ten and above, under the supervision of at least one adult.

Observe all safety and warning instructions and ensure that the system is assembled safely within the working groups. Before each use, check that all individual parts are intact to prevent injuries. Also ensure that the surface is level.

The teaching and learning potential is best realized during the assembly of the system, especially in group work. Each system consists of: a base, a stand, and a table. With a class size of 30, it is best to form six groups of five people each. Each group receives the relevant part of the assembly and operating instructions and the general assembly instructions. It is advisable to go through the general assembly instructions with the young people before or during assembly, as they contain important tips and tricks for assembly. Each group now begins assembly of the base, stand, and table. The bracket, PV module, and electrical box are then assembled together with all groups under your supervision.

The construction of the educational PV system combines the topic of solar energy with practical, manual work. In the digital age, this promotes haptic perception in young people through tactile stimuli and at the same time focuses attention on renewable energies.

You can customize the learning unit to suit your learning group and expand it to include various learning objectives.



02 Island and grid-connected operation

Solar Education offers several packages in its scope of delivery. The basic package includes an electrical box for island operation as standard. The Plus package also includes an electrical box for grid-connected operation for your teaching unit. While stand-alone operation is particularly suitable for an introduction to the topic and demonstrates 1:1 consumption on a sample device, grid-connected operation allows you to explore more complex issues in greater depth with older groups of students. Below is a brief overview of both areas.

1. Island operation

In island mode, a power generation system operates independently of the public power grid. The system supplies a separate, island-like network—typically a facility, building, or local power grid that has no access to the public power grid or continues to operate independently in the event of a power failure. Examples include mountain huts or buildings in areas that experience recurring power outages.

2. Grid-connected operation

In grid-connected operation, the power generation system is connected to the public power grid. The energy generated is fed into the public grid or used to cover the user's own needs, while the power grid acts as an additional supply and maintains frequency and voltage.

3. In comparison

Feature	Island operation	Grid-connected operation
Connection to the grid	None (independent)	Exists (parallel)
Frequency	Self-regulating	Synchronized with mains frequency
Areas of application	Rural areas, emergency operation	Grid feed-in, own consumption with grid connection
Advantages	Independence	Stability, feed-in option
Challenges	High stability requirement	Synchronization with mains frequency required

03 General operating instructions



When using the system, observe DIN VDE 0105-112 (VDE 0105-112):2008-06 for experimenting with electrical energy in classrooms or designated areas.



The system can be used either in island- or grid-connected parallel operation.



The system is not intended for continuous operation.



The system has different levels of inclination angles in its alignment in order to absorb light optimally.



The system can be installed in an east-west or south orientation to exploit its full potential.



Always store the system under cover to prevent damage from the weather.



When setting up, ensure that the ground is level and that weather conditions are suitable. The system should not be set up in rain or snow.



Only use the tool provided.



During assembly, repeatedly check that the individual parts have been fitted correctly and are securely tightened.



Wear sturdy shoes when assembling. No open shoes, such as sandals or flip-flops.



When operating in parallel with the mains, secure the cable route to prevent injuries.



To avoid injury, check for sharp edges on individual parts each time you use them.



When installing the electronic components, check the cable for damage and ensure proper use to avoid injury from electric shock.



To prevent injuries, always carry heavy components together.

05 Component checklist

Component	Number per system	Tested yellow	Tested orange
Aluminium profile (176.5cm)	2x		
Aluminium profiles with holes (176.5cm)	2x		
Aluminium profile (106cm)	7x		
Aluminium profile (114cm)	1x		
Aluminium profile (100cm)	2x		
45° (100cm) Aluminium profile with holes	3x		
4-sided profile with holes (short)	2x		
Hammer head screw M8 x 20	60x		
Collar nut M8	64x		
Hexagon socket head cap screw M8 x 15	8x		
Hammerhead nut M8	8x		
Hexagon head screw M8 x 80	4x		
Washer	4x		
90° Bracket	20x		
135° Bracket	6x		
Pivot joint	4x		
Mounting bracket	4x		
Solar panel	1x		
Electrical box: Island operation or grid parallel operation	1x		
Y-cable (for parallel operation)	2x		

06 Tool checklist

Tool	Number per system	Tested yellow	Tested orange
Ringwrench 13	5x		
Socket wrench	1x		
Allen key	2x		