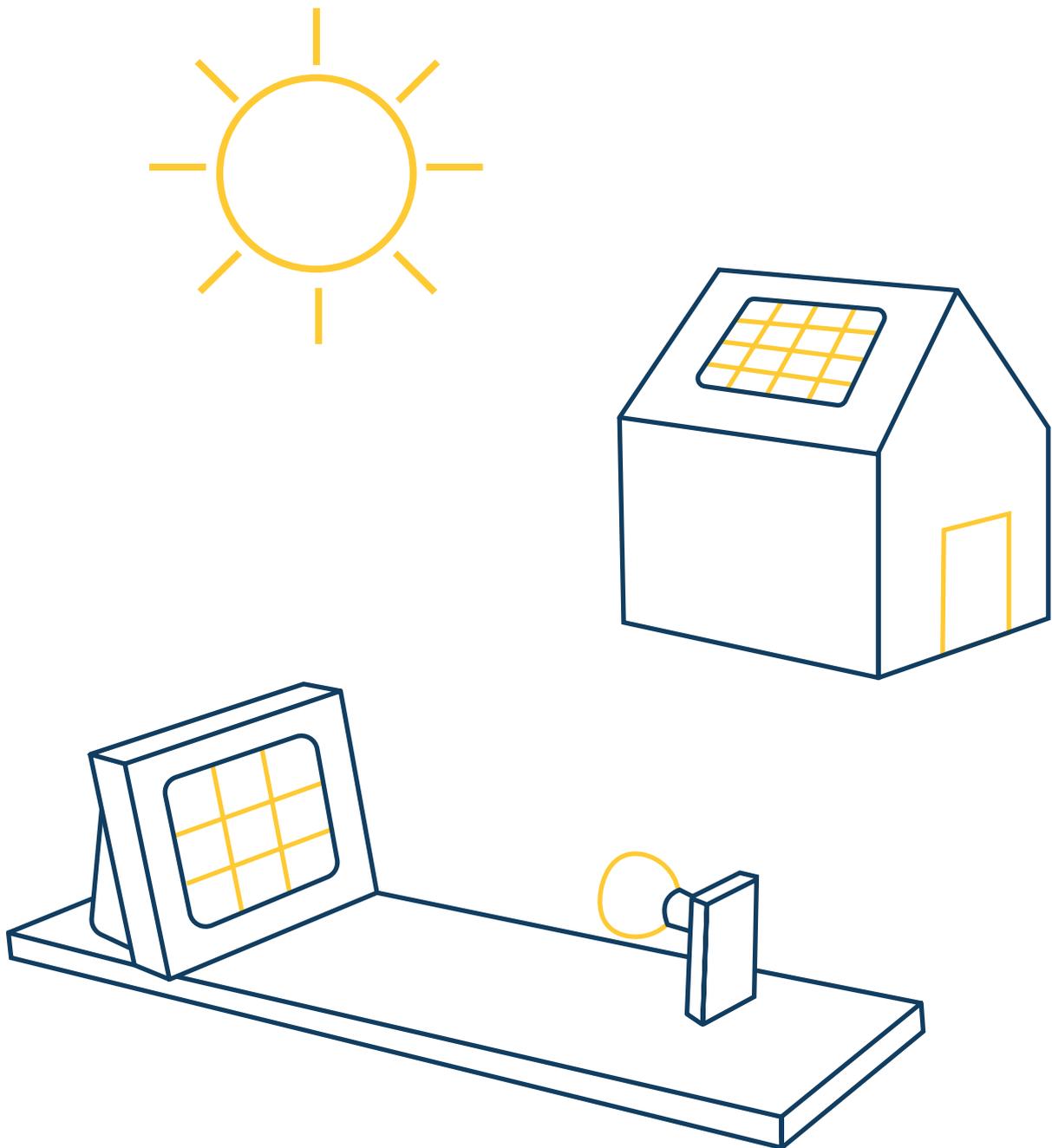


PV Experiment Set

Abstract



General information: PV Experiment Set

The photovoltaic experiment set of the non-profit Solar für Kinder Bildung gGmbH (SfKB), newly developed with the expertise of physics teachers and successfully presented at the German Physical Society, clearly teaches pupils how photovoltaics works.

Experiment 1 is basically suitable for all grades and can also be used in subjects such as geography or ethics. Experiments 2, 3 and 4 are intended for demanding physical experiments in grades 8 to 10. The extra-large PV modules, the ease of use and the solid construction provide security when experimenting, especially in lower grades.

The complete set is suitable for 16 students. It consists of 8 experiment stations, each of which allows two pupils to work at the same time. Each experiment is duplicated.

The experiment set is produced by the Caritas workshop for people with disabilities Fürstenfeldbruck, Germany.

In addition to operability, special emphasis was placed on recyclability and repairability in the selection of materials and components.

The experiment set is accompanied by detailed instructions for conducting the experiments as well as additional worksheets. These documents can also be found online in our library of teaching materials.

Schools that purchase the experiment set receive free access to the SfKB online teaching materials, the Pro version of our app and the opportunity to network with national or international "Solar for Schools" schools.



Experiment 1:

Optimal tilt angle between module and light source

Educational objective:

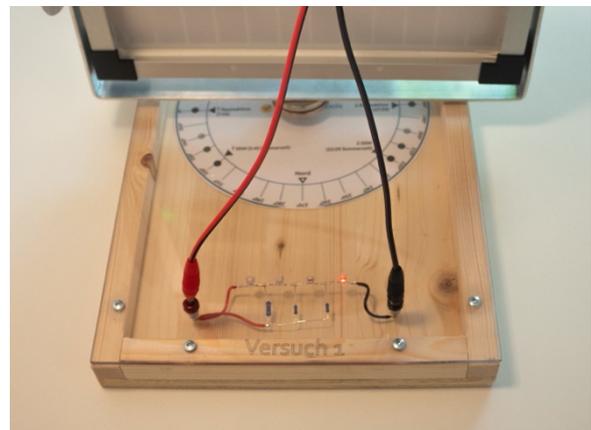
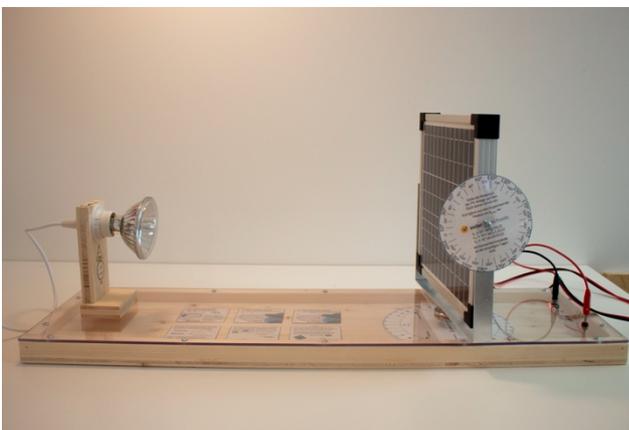
Optimal alignment of PV modules in theory and practice.

Description:

In this experiment, two angles are examined by means of a movable solar module. The aim is to determine the values of α and γ under which the module delivers the greatest performance.

Experimental setup:

- Base plate with integrated consumers (4 LED) and plugs
- PV module with bracket, movable in 2-axis including cabling
- Bulb holder, with spacer line
- LED bulbs
- Multimeters (1)
- Cables (2)



Experiment 2:

Series and parallel connection of PV modules

Educational objective:

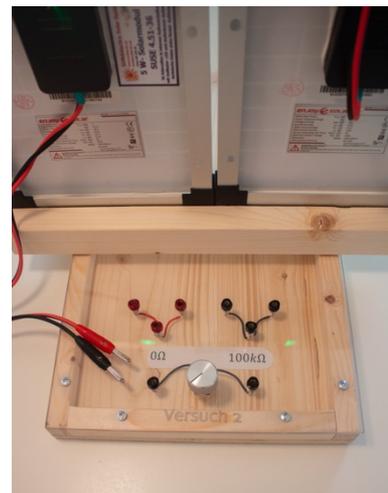
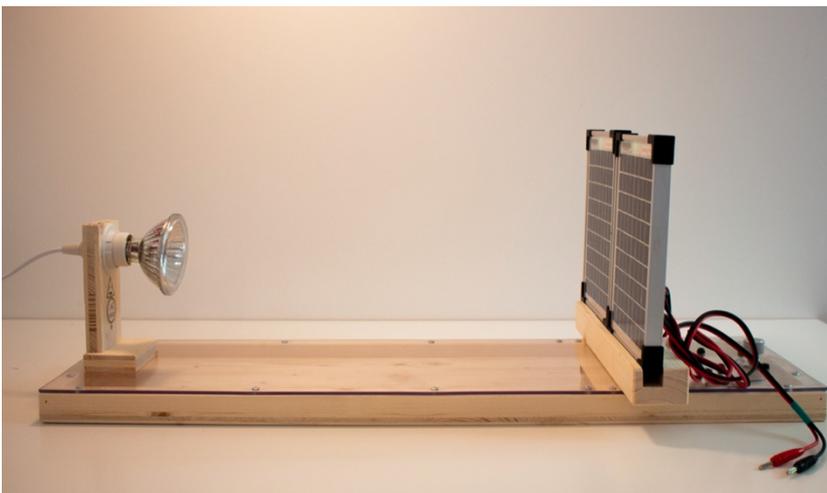
Confirmation of Kirchhoff's knot and mesh rules. Derivation of the optimal interconnection of the PV modules

Description:

Series and parallel connection with 2 PV modules. It should be confirmed that in series the terminal voltages U_n of the modules add up, the currents I_n remain the same, parallel the currents add up and the terminal voltages remain the same.

Experimental setup:

- Base plate with mounting for the PV modules and integrated potentiometer and connectors
- 2 PV modules including cabling
- Bulb holder
- Halogen bulbs
- Multimeters (1)
- Cables (2)



Experiment 3:

Maximum PowerPoint of a PV module

Learning curve:

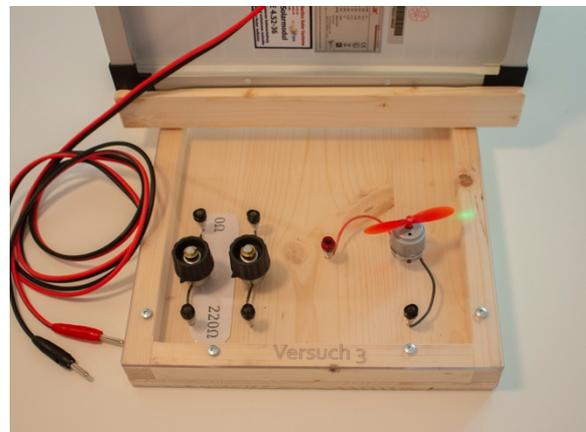
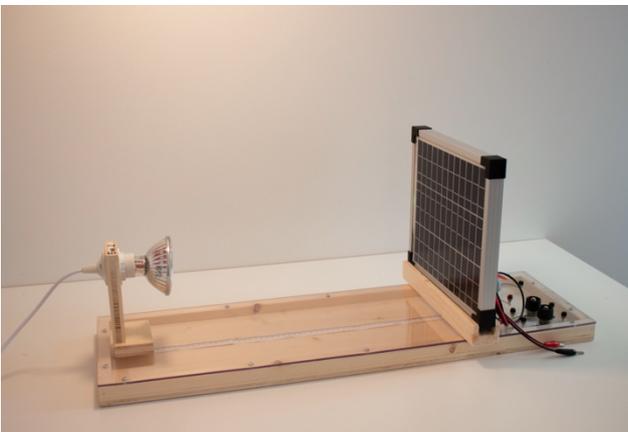
In this experiment, the I-V characteristic curve of the solar cells is to be drawn in order to determine the optimal operating point of a PV module, the "MPP".

Description:

A simple circuit with a PV module and a 100 k Ω potentiometer is built. By varying the resistance, the changes in voltage and current are to be noted simultaneously and the characteristic curves recorded.

Experimental setup:

- Base plate with mounting for the PV module and integrated potentiometers, fan and plugs
- PV module including cabling
- Bulb holder
- Halogen bulbs
- Multimeters (2)
- Cables (4)
- Mobile phone charger



Experiment 4:

Quality and efficiency of a PV module

Educational objective:

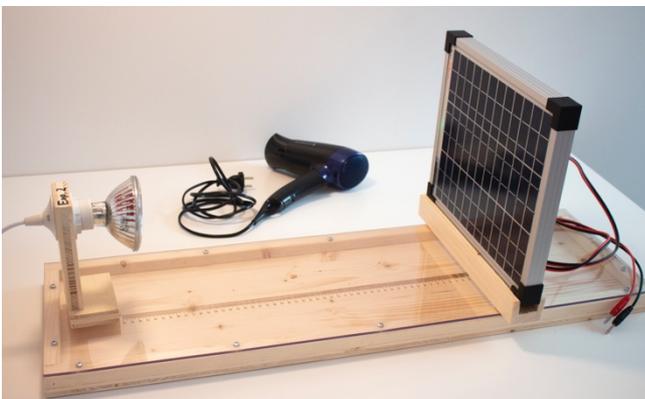
In this experiment, the maximum efficiency of a PV module will be determined and its change due to temperature increase will be investigated.

Description:

With a lux meter, a geotriangle/ruler and a multimeter, characteristic values of the module are to be recorded in the circuit and the efficiency of the module is to be quantitatively and qualitatively investigated by means of simple formulas.

Experimental setup:

- Base plate with mounting for the PV module
- PV module including cabling
- Bulb holder
- Halogen bulbs
- Multimeter
- Foehn



Costs, financing and delivery time

We offer the complete experiment set for a total price of 3,300 € (VAT not included).

The price is composed as follows:

- 2 times experiment 1, each 470,00 €
- 2 times experiment 2, each 410,00 €
- 2 times experiment 3, each 390,00 €
- 2 times experiment 4, each 390,00 €

We are happy to offer you support with financing, e.g. via the betterplace.org platform.

The delivery time is approx. 3 months from receipt of order.