

Solar Experiments



How does a solar module come into being? This is the main question which this product answers practically. On the one hand the setting-up of this module helps in training various skills of the students. On the other, a fully functional solar model is ready for use which can be used for operating gadgets or conducting experiments.



1108 leXsolar-PraxiSol complete kit
(inclusive of consumable supplies)

PraxiSol contains in a sturdy stackable box not only the necessary tools and templates as well as material required for the construction of a 10 W_p solar module.

Contents:

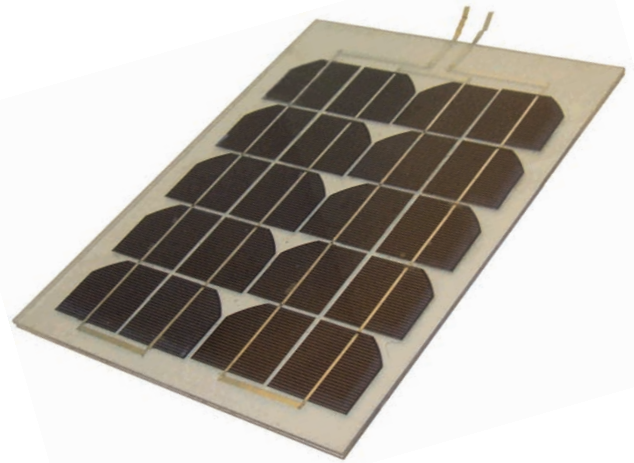
- ☞ Box including containers for materials in use and consumables
- ☞ Soldering station
- ☞ Multimeter
- ☞ Templates for assembly of solar cells
- ☞ Safety glasses
- ☞ Instruction manual

Procedures for the beginner

- ☞ Solder the solar cells
- ☞ Attach cells to strings
- ☞ Connect strings to a module
- ☞ Characterize the solar module

Areas of application

- ☞ Technical and project lessons
- ☞ ages 13 to 18
- ☞ High school, secondary school



Example of a solar module created with
leXsolar-PraxiSol

Extras:

1109 PraxiSol consumable supplies

Once you have procured PraxiSol, you only need the PraxiSol consumables for every new model.

Package contains:

- ☞ 2 Acrylic glass panels
- ☞ 22 solar cells and solder wire
- ☞ Solar cell fragments for soldering exercises
- ☞ Brazing solder
- ☞ Flux (liquid)
- ☞ Joint sealing compound
- ☞ Miscellaneous vessels and gloves

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leXsolar-Experiment Medium

Joy of learning through one's own experience

The students can learn the basics of solar energy without any problems with exciting and experiential experiments with solar cells. Numerous experiments dealing with electricity and optics make the system an inseparable part of physics and natural sciences classes for the ages 10 - 15.



1102 leXsolar-experiment Medium

Experiments:

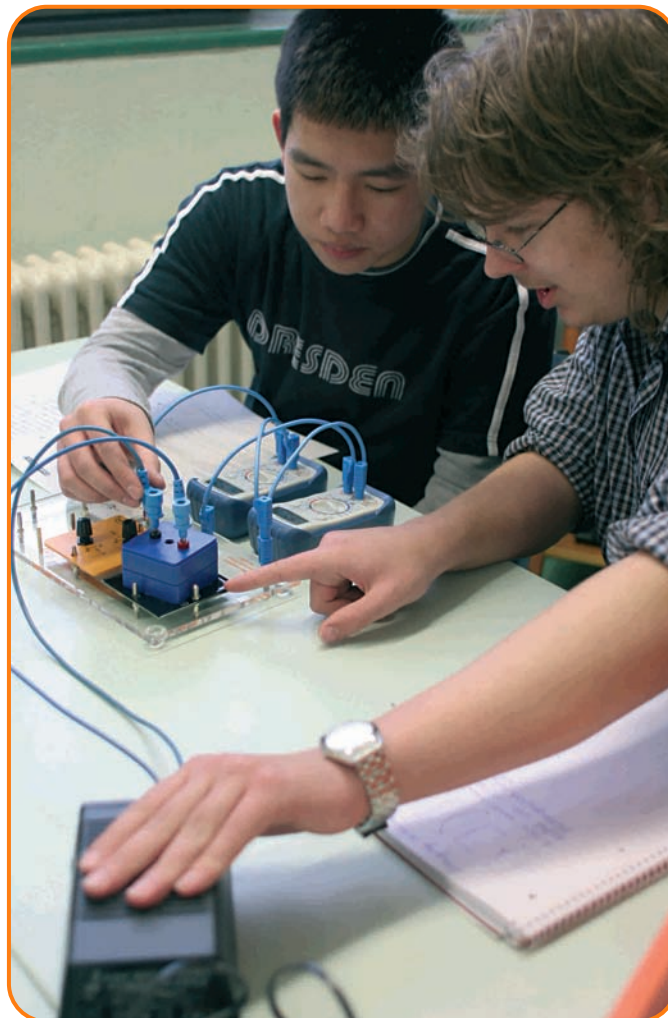
Part 1: Solar energy + electricity lesson

The characteristics of differently sized solar cells + series and parallel connection of solar cells + shadowing effects of solar cells + series and parallel connection of glow lamps + rotational direction of the motor + starting current and operating current of the motor etc. (around 15 trials in all with detailed instructions)

Part 2: Optics

Differences in brightness + tilt of the solar cells + diffused radiation + direct radiation + albedo radiation + color characteristics + color mixtures + optical illusions (around 12 trials with detailed instructions)

The students' manual contains 27 trials in all. Around 20 of these are of pure qualitative nature and can be carried out without multimeter. These experiments are especially for ages 10 to 13 and sometimes for the secondary school.



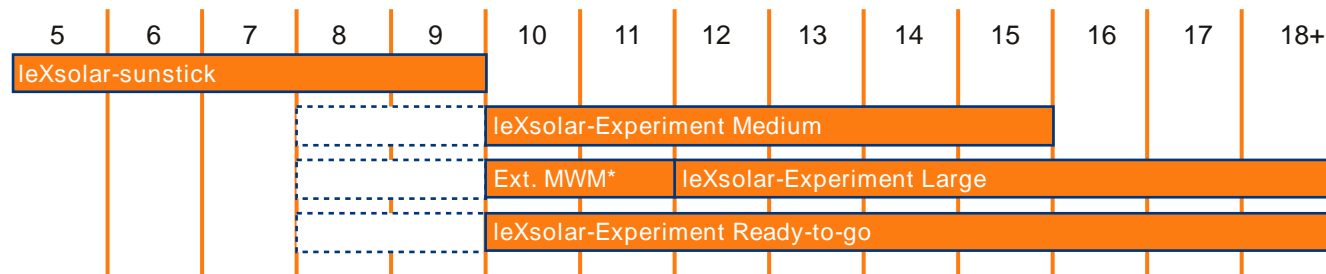
Additionally available

- 📖 3101 Students' Manual
leXsolar-Experiment Medium

Required additionally

- 📏 2 multimeter (e.g. 2102)
- 📏 4 measuring lines (e.g. every 2x 2107 and 2108)

The types of leXsolar Experiment (pertinent according to age)



* Extended measurements without measuring tools



1103 leXsolar-Experiment Large

Correlating school physics with practical usage of the photovoltaic cells is a specialty of this system. These unique didactic innovations are the first choice when it comes to experiments related to solar energy, since it has won the Worlddidac Award being the only experiment system in photovoltaic cells.

Experiments:

Series and parallel connection of solar cells + Dependence of the power on area of the solar cell + dependence of the power on the angle of incidence + dependence of power on level of illumination + determination of efficiency ratio of energy conversion + internal resistance of solar cell + dark characteristic curve of solar cell + inhibiting and conducting direction in illumination and darkness + IV characteristic and fill factor of the solar cell + IV characteristic of the solar cell in dependence on the level of illumination + dependence of the solar cell power on temperature + shadowing effect of solar cells in series connection + shadowing effect of solar cells in parallel connection + the solar cell as transmission measure + dependence of solar cell power on the frequency of the incident light

The students' manual contains 17 trials in all with detailed instructions and questionnaires for results.

The system has been conceived in a way that most experiments can be conducted in normal room lighting. An external current is not necessary for these experiments. The leXsolar lighting module included along with is required only for a few experiments, which can be operated with students' power supply.

Additionally available

- ∞ Students' manual for leXsolar Experiment Large
- ∞ Extension fuel cell
- ∞ Extension measurements without measuring tools (additionally helps the experiments in leXsolar Experiment Medium)

Required additionally

- ∞ 2 Multimeter (e.g. 2102)
- ∞ 6 measuring lines (e.g. every 2X 2107 – 2110)
- ∞ Power supply (e.g. 2105)
- ∞ Lab thermometer (e.g. 2111)

Alternatives



1104 leXsolar Experiment Eco line

The Eco line has the same contents available and hence the same experiment contents. The basic raw material is wood. Basic unit and modules are made of robust beech wood. The eco line is delivered in a sturdy wooden box.



1105 leXsolar Experiment Ready-to-Go

This type also includes all necessary ancillary equipments like measuring equipment and is delivered in a plastic case with heavy-duty foam inserts.

Extensions for leXsolar-Experiment Large

The modular design of leXsolar experiment enables the extension of the system and hence customization according to individual needs according to age bracket and topic. There is adequate space for both the extensions available in the box that delivers the leXsolar Experiment Large.

Extension measurements without measuring tools:

The scope of all experiments from leXsolar Experiment medium can be extended with this extension. With it the leXsolar Experiment Large turns into a comprehensive photovoltaic experiment system for all age groups.



1106 Extension measurements without measuring tools
(also available as eco line - article no. 1107)

Extension fuel cells:

This extension covers the topic of fuel cell technology. The extension includes two reversible alkaline fuel cells and a large solar module for producing hydrogen.

Fuel cells (1200 – 01) and solar module (1100 - 04) are also available individually.



Experiment installation with fuel cell extension
(measuring tools and cables not included)

Media:

Students' manual CD

The students' manual CD is included in every experiment system. It consists of the students' manuals (Word and pdf) as well as the teachers' manual as pdf documents (read-only).

Teachers' manuals

The teachers' manuals are available as bound notebooks:

- ☞ 3104 Solar energy (approx. 70 pages)
- ☞ 3105 Fuel cell (approx. 60 pages)

Students' manuals

The students' manuals are available as bounded notebooks with instructions and tables for solutions. They additionally contain a short introduction to the relevant topic.

- ☞ 3101 leXsolar Experiment Medium
- ☞ 3102 leXsolar Experiment Large
- ☞ 3103 Fuel Cell



Comparison of leXsolar-Experiment Systems

	leXsolar Experiment Medium	leXsolar Experiment Large	leXsolar Experiment Eco Line	Ext. Measurements without measuring tools	Extension Fuel Cells	leXsolar Experiment Ready-to-Go
Article no.	1102	1103	1104	1106 1107 (Eco series)	2x 1200-01 1x 1100-04	1105
Target Group: (Age)	Academic high school Lower secondary +secondary school Elementary school (8-15)	Academic high school Lower secondary (12-18)	Academic high school Lower secondary (12-18)	Academic high school Lower secondary (8-15)	Academic high school Lower secondary (13-18)	All school types All age groups
Subjects	Physics, Project, Technology, interdisciplinary	Physics	Physics	Physics, project, interdisciplinary	Physics, Chemistry, interdisciplinary	Physics, project, technology, interdisciplinary
Topics	Solar energy, electronics, optics	Photovoltaic, electronics, semiconductor physics, fuel cell tech.*	Photovoltaic, electronics, semiconductor physics, fuel cell tech.*	Solar energy, electronics, optics	Fuel cell technology	Solar energy, photovoltaic, electronics, optics, semiconductor physics
Contents Packaging	Plastic box	Plastic box	Wooden box	-	-	Case
Inserts	1	2	2	1	-	2
Instructions on CD included	1	1	1	-	-	1
Students' manual	(1)	(1)	(1)	(1)	(1)	(1)
Teachers' manual	(1)	(1)	(1)	(1)	(1)	3
Solar module small	3	3	3	-	-	1
Solar module big	-	1	1	-	-	1
Main Board	1	1	1	-	-	1
Connection diagram	1	1	1	-	-	1
Lighting module	-	1	1	-	-	1
Diode module	1	1	1	-	-	1
Resistance module	-	1	1	-	-	1
Potentiometer module	-	1	1	-	-	1
Gear motor module	-	1	1	-	-	1
Solar cell cover	4	4	4	-	-	4
Color filter	-	3	3	-	-	3
Glow lamp module	1	(1)	(1)	1	-	1
Buzzer module	1	(1)	(1)	1	-	1
Motor module (without gear)	1	(1)	(1)	1	-	1
Color screens+mount	1	(1)	(1)	1	-	-
Fuel cells alkaline, reversible	-	(2)	(2)	-	1	-
Solar module for fuel cells	-	(1)	(1)	-	1	-
Power supply unit	-	-	-	-	-	1
Digital multimeter	-	-	-	-	-	2
Measuring lines	-	-	-	-	-	6
Lab thermometer	-	-	-	-	-	1

Entries in brackets indicate: Product is extendable to these components, relevant free spaces have been made in the padding and box accommodates further padding.

* Extensions are necessary for this topic