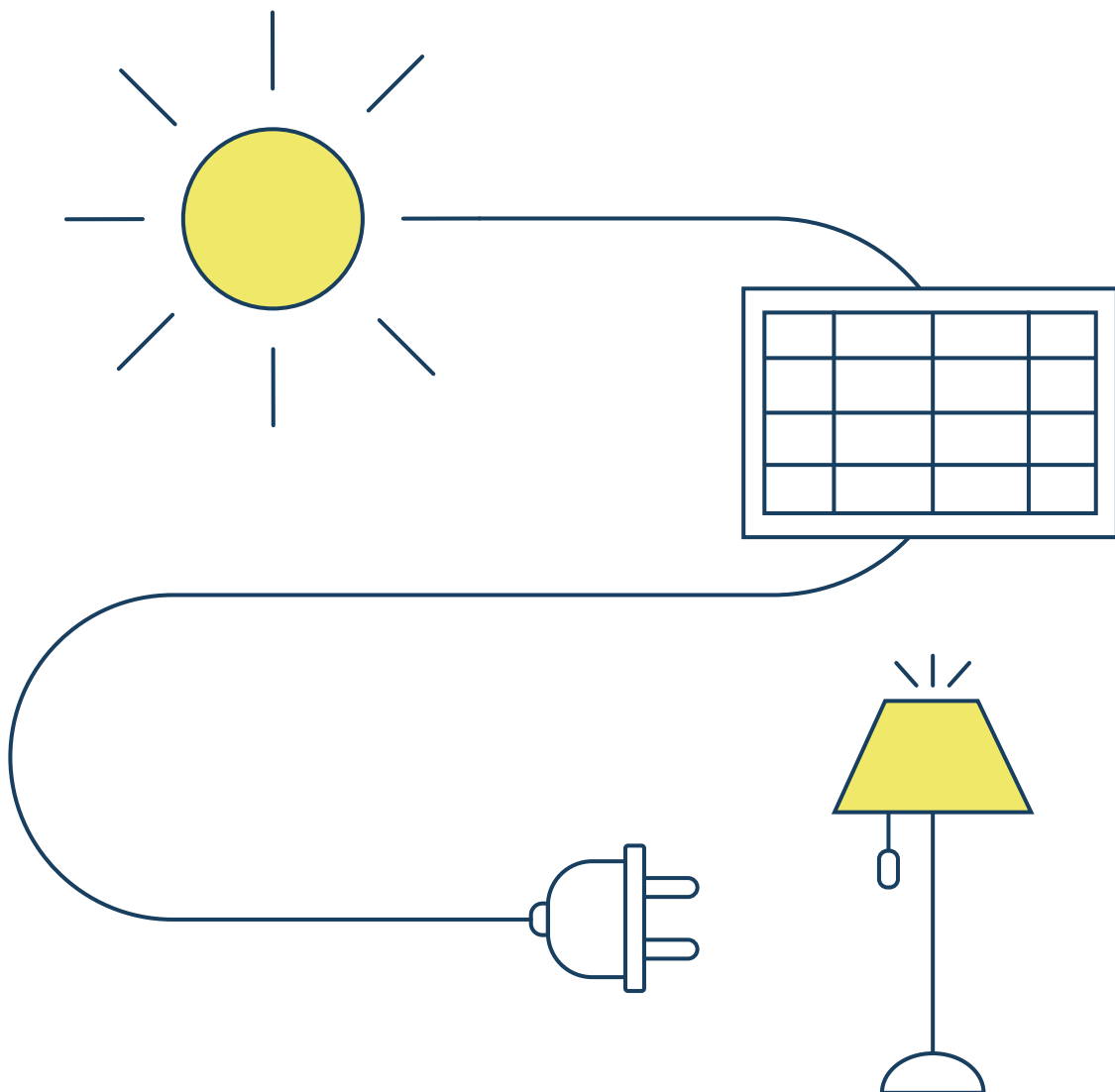


Explorer kit – Module 1: “From sun to electricity”



Module 1: “From sun to electricity”

Topic:	Solar energy
Year:	From Year 1
Curriculum reference:	Science, nature and environment, energy, weather
Duration:	20-45 minutes (customisable)
Summary:	Module 1 "From sun to electricity" is the basic module of the explorer kit. The pupils learn that electricity can be produced from sunlight using a PV system. The explorer kit simulates the incidence of sunlight at different times of the day on a PV module, which in turn converts the sunlight into electricity. This is visualised using an LED light box connected to the PV module.

Learning goals:

- The pupils describe their prior knowledge about the power of the sun by collecting associations with the sun (heat, light, ...).
- The pupils experience that electricity can be produced from sunlight by simulating the drive of the LED lamp using sunlight together with the teacher and verbalising their observations.
- The pupils recognise the times of day when the most electricity can be generated from the sun. (Optional)
- The students understand what a PV module is by deducing its function in the conversion of sunlight to electricity together with the teacher.
- The students reflect on their newly acquired knowledge by repeating it orally in class discussions or by recording it in writing/pictures.
- The students can experiment and gain experience themselves.

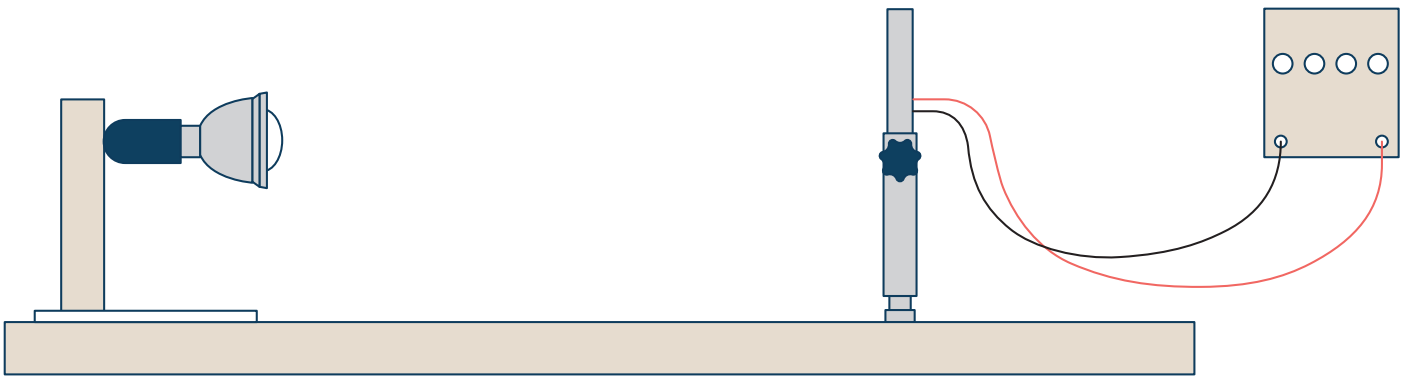
Implementation

Preparation by the teacher:

Install the module on the console (power socket required) and check that all the necessary accessories (check installation plan) are present.

Assembly plan:

Base plate with PV module, LED sun lamp, LED lamp box



Lesson plan

1. Start and activate prior knowledge: The teacher (instructor) shows the pupils (students) a picture of the sun as an impulse / hangs it on the board. Together with the teacher, the students collect associations with the sun. These could be, for example the sun warms, the sun makes light, the sun dries laundry, the sun tans the skin, etc. The collected associations can be written down on the board.

2. Inform: Based on the collected associations, the teacher leads over to the learning game, which is already set up on the desk. The transition could look like this: "The sun can do even more. We're going to find out together today, I've prepared something for that here."

The teacher shows the pupils the explorer kit and names the individual parts: sun lamp, PV module and LED lights. They then demonstrate the explorer kit: The sun is rising (teacher switches on the sun lamp) and now shining. The LED lights visibly light up red. Now the sun sets (teacher switches off the lamp) and no longer shines. The LED lights are off.

Remark: When the PV module is connected to the LED lamp box, one of the four small LED lamps lights up - this is because it is bright in the classroom and the PV module generates electricity as a result. This should also be discussed with the pupils.

In the next step, the 'sun' can be moved from the east (the sun rises), via the south (midday) slowly to the west (the sun sets). More/less LED lights slowly light up over the course of the day.

In a further step, the LED sun lamp can be placed on the base plate and the PV module is rotated and tilted. Depending on the angle, more or fewer LED lamps light up. When optimally aligned, the PV module is perpendicular to the LED sun lamp and all four LED lamps light up.

The students observe the experiment and verbalise their observations. Together with the teacher, they make assumptions about what they have observed and come to the following conclusion: The sun's rays hit the PV module. This converts the sunlight into electricity. The electricity powers the LED lights and they light up. (Addition: More or less electricity can be produced at different times of day, i.e. at different positions of the sun). Electricity is therefore generated from sunlight. The teacher can support this process by asking stimulus questions or by repeating the learning game step by step.

3. Processing and reflecting: There are various ways to process and reflect on what you have learnt. These can of course be combined.

Option 1: The students and the teacher repeat what they have learnt orally by carrying out the experiment again and accompanying it verbally.

Option 2: The students and teacher work together to create a model sketch on the board and explain the individual parts and the experiment.

Option 3: The students work together on a worksheet for module 1. The teacher uses the enclosed graphics to create a worksheet. These can be found in the document "Explorer kit worksheet – Module 1". The teacher can select the relevant graphics and add text, blank lines etc. depending on the grade's level and requirements. In the simplest case, the pupils can colour in the LED lights when the sun is shining.

Option 4: The students carry out the experiments previously presented by the teacher one by one independently, so that each student has the opportunity to experiment and gain experience.

Lesson phase	Content and Activities	Media Materials and	Suggested timing
Get started and activate prior knowledge	Impulse Sun Students collect associations with the sun	Picture of the sun on the blackboard	5 min
Inform	Realisation of the explorer kit: Version 1 with LED lights Addition: "Sun" move east to west Set up the learning game on the desk Instructor names the individual parts and demonstrates the explorer kit. Pupils observe and verbalise their observations Pupils make assumptions about what they have observed. Target conclusion: A PV module is used to generate electricity from sunlight.	Explorer kit	10-30 min
Process and reflect	Option 1: Students and teacher repeat what they have learnt orally by carrying out the experiment again and accompanying it verbally	Explorer kit	5 min
	Option 2: Model sketch on the blackboard	Blackboard	5-10 min
	Option 3: Worksheet	Worksheet	5-10 min
	Option 4: Pupils experiment on their own	Explorer kit	15 min
Optional	Teacher and students repeat the learning game (version 1) in the playground with the real sun.	Explorer kit, real sun	