

Possibilities for use in competency-based lessons

Competencies that can be gained through building and working with the power station:

- building basic electric circuits
- how electric power works
- recognition of different methods of energy production and being able to describe their advantages and disadvantages
- technical principles that make work easier
- using tools and machines

Suggestions for the use of the materials in lessons:

1. The power station can be used for groups or for demonstration purposes. Depending on this it will either be built by the teacher or the students will follow the instructions and construct it as a group project, or in Design & Technology classes.
2. Students will do the experiments, following the instructions. They will write down their assumptions first.
3. Explanations follow at the end of the series of experiments. Here the explanation of use and meaning of correct terminology are especially important.
4. Extension: Comparison of light bulbs in electricity kits and LED; function of the generator (see additional material „Whiz-Kids“)
5. Alternative: If every child is supposed to build their own model to take home, we recommend OPITEC Functional Model Solar Windmill (art. 206794), which only shows how solar energy works, or C&TEC model Power Plant (art. 123987), which covers how solar energy and thermal energy works.
6. Inter-disciplinary task: write a non-fiction essay about different forms of energy; use the internet to find out more about energy-saving measures and implement them in your school; write informational text about this for other classes,...

Didactical background: Technical Education

On the subject of 'Energy' students have probably built simple electrical circuits already. The Power Station Solar-Wind-Water set can show relationships in a child-friendly way. The explanations don't have to be understood in detail. It is more important that children gain a first interest in and a playful approach to different forms of energy. It is important in terms of successful technology education that each time children express the knowledge they already have in assumptions and drawings. After the experiments these assumptions are compared and evaluated with the observations and results. An age-appropriate conceptualization deepens the newly-gained knowledge - especially with the power station.

Technical background: forms of energy, its production and conversion

Hydro power: turning the handle simulates a water wheel or turbine. A generator helps to convert the flow of water into electrical energy.

Solar energy: a solar cell helps to convert energy from the sun (solar radiation) into electrical energy. Instead of sunlight a powerful lamp can be used as well. In this case electrical energy is converted into electrical energy.

Wind power: with the help of a wind turbine wind energy is converted into electrical energy. Wind can be created by blowing or by using a hairdryer. The blades of the windmill rotate and drive a generator. The generator converts the rotations into electrical energy.

LED: short for light-emitting diode, this is a semi-conductor. It only lights up, when the current flows in the correct direction ('one-way-street-lamp'). In the kit the longer pole the plus pole (anode), and the shorter one is the minus pole (cathode). Connect plus with plus and minus with minus.