



SHINE A LIGHT ON SAVINGS

Goal(s):

The pupils understand:

- the role of lighting for their personal comfort;
- what type of light (lamps and bulbs) they have at home;
- how to measure the energy use of light bulbs;
- the cost implications of lighting a building;
- about the potential kWh savings that can be achieved primarily by switching to a more energy efficient type of light bulbs but also by simple changes in behaviour (and how this helps the planet).

General description of the activity:

Through discussion, shop visits and web search the pupils are made aware of the energy used for lighting purposes and the possibilities for limiting the amount of energy used.

Required materials:

- Energy labels for light sources
- Shops visits
- Calculators
- Household or school energy prices
- Optional – internet access.

Required pupil skills:

Knowledge of W & kWh, relationship of energy and heat, knowledge of how bulbs, LEDs and tubes work, use of calculators, , ability to draw and interpret tables and graphs, ability to read energy classification labels and know what they mean relationship of this lighting topic to the issue of global warming.

How does this activity fit into the curriculum:

This activity is well suited for lessons in Science, Geography, Mathematics and Literacy.

Safety issues:

The pupils should be made aware of the fact that mains electricity can kill and that some light bulbs become very hot and should not be touched.



Individual steps of the activity:

1. The pupils are given an introduction to the topic lighting. How much of our energy consumption is used on lighting? What types of lighting are commonly used and which were used in the past?
2. The pupils are introduced to the different classification of different types of light bulbs. This is best done by showing the pupils actual specimens in the class room so that they themselves can judge the light quality and the heat emanating from the bulbs (heat production equals wasted energy). What is the efficiency ratio between light sources (for example 1 compact fluorescent light (CFL) of 15 W = 60 W incandescent light bulb = 16 petroleum lamps = 48 candles). Your local energy agency or energy supplier can help with more information. They may even have a set of bulbs that you can borrow for testing and a meter to measure consumption with!
3. If internet is accessible the pupils can try to find information on light bulbs from various websites. Try for example, www.elsparefonden.dk [each partner will type in the relevant national sites].

Required time:

Introduction and experimentation
- 1/3-1 lesson



4. The pupils then visit various local shops to survey their selection of bulbs and their prices and expected lifetimes.	Shop visit – 1 lesson
5. Each pupil is then given as homework to survey the light bulb situation in their home. Alternatively the pupils can visit your home or a public office and survey their situation.	Homework or site visit – 1 lesson
6. Each pupil or groups of pupils calculate how much could be saved by the replacement of 'old fashioned' bulbs by energy efficient light bulbs at home or at the surveyed sites.	Reflection – 1 lesson
7. The savings are calculated as power input difference of two light bulbs with the same light production (Watt) x their use (hours) x price of electricity (EUR/kiloWatt-hour) / 1,000 (Watt/kiloWatt-hours).	
8. Each pupil prepares a report for their parents on the possibilities for saving energy used on lighting at home. In case the pupils have surveyed a common place, they can be divided into groups that each makes a presentation of the findings.	Preparation of presentation – 1 lesson

Suggestions for combination with other AL activities:

"Switches mapping" – The pupils make a map of the placing of every switch.

"Switch me off" – The pupils make energy stickers for placing near the light switches.

Variations:

Additional reflection: Dark Hour – turn all lights off for one hour at home and talk with parents and grand parents about what life was like many years ago, when electricity was not a common service and when very few appliances were used at home. In the 'Old Days', what did people do in the evenings and what did they talk about? What would the pupils miss the most?

Variation: What is the shape of the energy label for lighting? Where do we find out? What information can we obtain from it? Is it possible to calculate potential energy savings between the classic incandescent light bulb and the efficient compact fluorescent light bulb? What is the difference in the life time of these two lighting devices? Is the extra cost of the energy efficient light bulb paid back through the savings that it can achieve over its lifetime?

Expanding the activity: A competition among the classes on the best reports on energy efficient lighting.

Available aids:

None



Search words:

Energy end-use	General topic	Educational subject	Age level
Transport	General sustainable development	Science	6-8 years
Space heating & cooling	Renewable energy	Geography	9-10 years
Hot & cold water	Energy efficiency (saving)	Mathematics	11-12 years
Lighting	CO ₂ wise transport	Literacy	
Electric appliances			