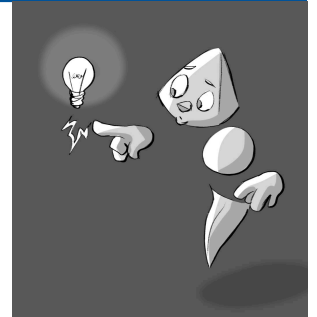


Your school in a better light

How many lamps are there at your school? Do they show your school in a 'good' light?



What is a 'good' light source? This depends on various factors. As technology progresses, the optimal light source from yesterday might no longer be the best choice today. So, the goal of this class project is to check the lighting concept of your school. Could your school use more environmentally friendly light sources? Where and when is more lighting needed? And, what can be done to save energy? Could better light improve the atmosphere at your school?

If at the end of this project you see the potential to improve your school's lighting concept, please don't hesitate to write a letter to the principal with your findings, practical suggestions, and convincing arguments.

1 Research

Before you can give any recommendations on how to improve the lighting concept of your school, you – as a class – will need to gain the required expertise. This does not mean that everybody has to know everything, but rather that everybody contributes some of the required knowledge and that as a class you succeed in gathering together the total expertise needed.

Preparation: This project requires you to perform some research. It is recommended that you divide the work among several teams. First read through the whole worksheet, get an idea of what needs to be done, and then discuss and decide in your class: Who will be responsible for what? And how will you ensure that all teams work together and that the job gets done?

The following questions may serve you as a guide and help in your research. Please do not just try to find answers to the questions. Keep in mind that you are collecting information to make the class discussion a success. Before you start your research, think ahead, and try to estimate what level of detail you will need for this project. An important part of research work is to find out when the relevant information is gathered and how to process it for the given task.

Research questions:

- ▶ What different types of light sources (not specific products) are available on the market? How do they work? Some examples would be fluorescent light tubes, LEDs, sulphur or sodium-vapour lamps.
- ▶ What are the approximate costs of purchasing and using a certain type of light source? How much electricity does it take and how often does a lamp need to be replaced?
- ▶ What impact does the use of the light source and its eventual disposal have on the environment? Could some of the material used in the lamp harm people's health?
- ▶ What special properties do some light sources have and in what situations would these be relevant? (For instance, some light sources can be dimmed or have a specific colour.)
- ▶ What does the unit "lumen" mean? And how is it linked to the human eye? Why would this information matter when choosing a light source?
- ▶ What types of light sources are used at your school? Roughly how many lamps of each type are installed? (You could ask your facility manager or go out and make a small inventory yourself)
- ▶ How and when are the different lights in your school switched on and off?

2) Criteria for 'good' light

Define a catalogue of *specific* criteria for which you will measure the different light sources to identify the best solution. This is a very important part of the work and you should give it sufficient attention. Not all criteria can be measured in physical units. For instance, how will you assess aesthetic and environmental aspects?

To ensure that all of you have the same understanding about each criterion, note down a short description for each criterion and why it is relevant. Here is an *example*:

Criterion: Efficiency

Description: To generate light, other forms of energy like electricity have to be transformed into light. Usually, only a part of the energy is transformed into light, the rest of the energy is lost for the targeted purpose. The lighting efficiency is the ratio between the generated visible light and the used (e.g. electric) energy. Usually it is displayed on the light source in the unit lm/W.

Relevance: Wasted energy is bad for the environment and costs money, e.g. on the electricity bill.

Once you have decided on all relevant criteria, please set priorities and order your criteria accordingly.

3) The best light at the right spot and at the right time

The best lamp to illuminate a blackboard might not be the best lamp to illuminate the schoolyard. Please identify the most important lighting situations at your school. Then list them in the following table on the blackboard. What kind of light source is optimal in each situation according to the criteria you defined? How can you manage the light in an optimal way? That is, when do you switch it on and off, and, when do you dim it or only switch some of the lights on? What lighting effects could make your school a nicer place, make people feel better, or increase security?

lighting situation	currently used light source	optimal light source	current light management	optimal light management
classroom				
corridors				
schoolyard				
...				
...				

4) A letter to the school principal

Are you surprised by your results? If you had to give your schools lighting concept a mark, what would it be?

If you could identify points where your school should improve its lighting concept, please do not hesitate to write a letter to the principal of your school and explain your findings to her or him. Provide evidence for your statements and make your suggestions along with convincing arguments. For instance, if you suggest that lamps be replaced with another type of light source to save energy, you should calculate how many of the new lamps are needed, how much energy they would save over their lifetime, and if the money saved on the electricity bill would cover the possibly higher costs of the new light sources compared to the old one.

