LIGHT BULB INVESTIGATION

IN A GRAMMAR SCOOL
AUTHOR: EDITH SZOMBATI
SÁNDOR BAKSAY REFORMED GRAMMAR SCHOOL, KUNSZENTMIKLÓS, HUNGARY
ELTE, EÖTVÖS LORAND UNIVERSITY, BUDAPEST, HUNGARY

INTRODUCTION

Problem: The energy needs of the World is growing and the non-renewable energy sources are getting exhausted.

Solution: Finding new energy sources, making current energy consuption more efficient and being more responsible for our environment.

Who can solve this problem: The present and future engineers of the world, and all people who are sensitive to this problem.

Modern bulbs as an opportunity: It does not play a key role in a household, but it is much more important when we think about it globally.

Thanks: for my school, my students, and the Eötvös Loránd University.

PROJECT

When the project was designed, one hand it was important to have students gain insight into the world of physical research, on the other hand, to give them an opportunity to feel how their work is significant and useful for the whole society.

School: Sándor Baksay Reformed Grammar School, Phisycs group at advanced level.

Students: 16-17 age

The process of the project and the applied methods:

DESCRIPTION OF THE TOPIC AND ASSIGNING OF THE TASKS

↓

RESEARCH TASKS
WORKING IN GROUPS

↓

MEASUREMENT TASKS
WORKING ALL TOGETHER

↓

TASKS FOR CALCULATION
INDIVIDUAL WORK

↓

CLOSURE AND EVALUATION OF THE PROJECT

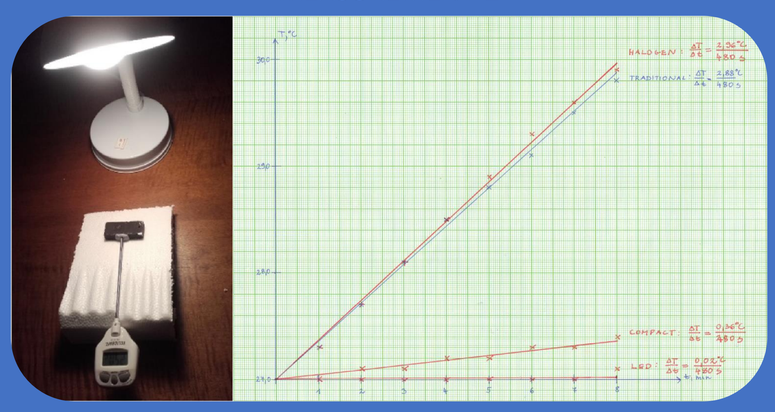
https://eoimages.gsfc.nasa.gov/images/imagerecords/0/896/earth_lights_lrg.jpg

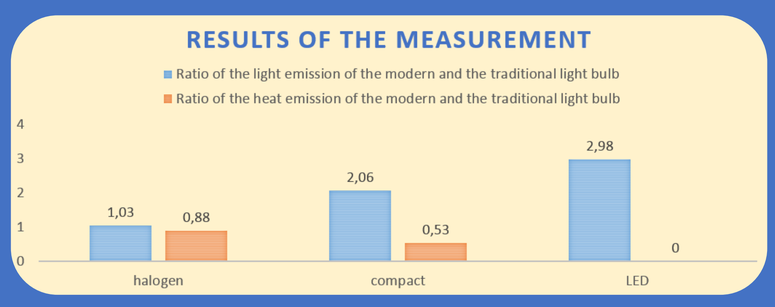
PRESENTATION

BULBS

MEASUREMENT-1

MEASUREMENT-2





UTILITY

TO SENSITISE STUDENTS FOR A GLOBAL PROBLEM → SCIENTIFIC RESEARCH WORK AND PROBLEM SOLVING → INCREASE IN AWARENESS OF A KIND OF GLOBAL ISSUES

WORKING IN GROUPS

Research tasks: The students were divided into two groups. The groups had to make a research on one of the given topics and to create a PPT, which they had to present to their classmates.

Titles of the topics:

1. Energy sources and energy use all over the Word.
2. Operation of various electric bulbs (traditional, halogen, compact and LED bulbs).

The performed PPT-s were evaluated jointly according to the predefined criteria.

INDIVIDUAL WORK

Task for calculation: Furthermore, the students calculated how much money can be saved in a year when the 4 millions Hungarian households exchange their traditional bulbs to compact or LED bulbs.

According to the results the saving is 981.12 millio Euro when using compact, and 1 012.77 millio Euro in the other option (LED).

Important remarks:

1. Only the households demand were calculated, we didn't take into consideration the demand of public institutions, factories, advertising lights either.
2. Hungary is a very small country with low light pollution.

WORKING ALL TOGETHER

Measurement tasks:

1. Comparing the relative light output of the modern (halogen, compact and LED) to the traditional bulbs by photometer.

Relative light output is a data for a particular bulbs, showing how much electrical energy can be converted to light energy by the bulbs.

2. Comparison of the relative heat output of the modern and the traditional bulbs by lightening the balck-painted metal body.

Relative heat output is a data for a particular bulbs, showing how much electrical energy can be converted to heat energy by the bulbs.