

How Happy are You and Your Family with the Electricity Bill?



Teacher guide

The activity relates to:

- Reinforcing an appreciation of the electric energy demands in every day life
- Being familiar with electrical energy consumption in a house
- Educating energy – conscious citizens
- Introducing the concept of power

Lesson Learning Outcomes

Lesson 1

At the end of this lesson, students are expected to be able to:

- Look at an electricity bill
- Devise a questionnaire

Lesson 2

At the end of this lesson, students are expected to be able to:

- Analyse the questionnaire
- Determine appliances using most electricity
- Determine appliances used the most
- Read the electricity meter

Lesson 3

At the end of this lesson, students are expected to be able to:

- Understand the meaning of power and its units
- Understand the meaning of energy and its units
- Determining appliances that use much power

Developer: Jack Holbrook

Institute: International Council of Associations for Science Education (ICASE)
Country: UK

Lesson 4

At the end of this lesson, students are expected to be able to:

Reach a justified decision whether the household is happy with its electricity bill

Suggested Teaching Strategy

1. The lesson starts from the scenario and by brainstorming ideas by students
2. Students are divided into groups to plan the development of their project
3. While discussing the questionnaire design, students are guided to include questions such as the following, in order to cover all the mentioned objectives:
 1. How many and who are the members of the family (adults / children)
 2. Time spent at home
 3. Use of electric boiler, air-conditioner, etc Are they operating when no-one is at home?
 4. Coffee machine: how many hours is it on during the day?
 5. When you are on vacation do you turn off the T.V. completely?
 6. Do you forget the lights are on and leave them on even when there is no-one in the room?
 7. How often do you make use of the washing machine and the electrical iron?
 8. What do you think: saving electric energy at home plays a role in the protection of the environment ?
4. During the selection of the equipment by each group, students are guided to make sure there are different ones by considering the power ratings of the equipment. The teacher introduces the units of power and allows the students to undertake a series of exercises to ensure they understand the meaning of power and the units used.

Every group plans its own project according to the given Students' Guide
5. Discuss as a class about questions so as to develop the final form of the questionnaire
6. The teacher arranged for the completed questionnaires to be distributed, then discussed in groups and the findings are analysed and presented
7. Each group presents the investigation results and calculations to the class
8. The teacher guides the discussion of the outcomes from each group; as a class the students conclude, propose and finally decide about:
 1. reducing electric energy consumption in a family and at state level (giving special attention to power ratings)
 2. informing the members of their family about these matters
 3. highlighting the environmental protection

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Achieving the objectives

OBJECTIVES	To be achieved by
1 Decide, with justification, how to have a balanced electricity bill	Discussing within the group and recording the decision so as to present to the rest of the class
2 Designing a questionnaire (as a research process) to obtain data on the major costs on electricity bills	Students create the questionnaire as a group and administer it to families
3. Communicating by presenting the results in a tabular form / diagrams	Students draw their own diagrams, take part in the oral discussions and record justifications for decisions
4 Cooperating as member of a group carrying out an investigation project	Students cooperate in the group in carry out the project and in making the decisions
5 Explaining the meaning of power when used for electrical appliances, rather than mechanical machines, and the units used to measure power	Students undertake to complete a written record to explain the meaning of power
6 Determining the relationship between power and energy and be able to calculate energy consumption knowing the power of an appliance	Undertaking calculations of the electricity consumed by various appliances in the home

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