EXPENSIVE BILLS!

How much energy do your electric devices consume?

In the age of technology, even our homes have become filled with electronic tools that help us in the kitchen and household chores, as well as for work and recreation. The situation seems ideal, except that the increase in the use of electronic devices also inevitably leads to increased spending in our utility bills. Moreover, the cost of electricity has been rising in recent times, and managing expenses is more complicated.
In this regard, is there any way to calculate and predict the consumption of our appliances to avoid unpleasant surprises in our electricity bills?

Overview "Expensive bills!"

Context
Everyday life
Finances

How to calculate the energy expenditure of electronic appliances ?

Cognitive processes
Analysing situations
Processing informations
Problem solving

Content
Quantity and number
Data and change

Target group (incl. necessary prior skills and competences)
Adults
X2

Dispositions
Self-confidence
(Experience and routine)
(Curiosity, Motivation)
Collaborations

Outcomes and results
Seize a method to calculate the expense
An answer to the question posed
[Ability to choose which home appliance to buy based on energy consumption once the value is understood]

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Main information

Content	Natural numbers Decimal numbers Units of measurement, quantities (electricity, money)
Target group	Adults who pay the bills Learners ▪ recognize and understand simple, common quantitative representations and use the information to make decisions ▪ cope with one-step, simple operations such as counting, performing basic arithmetic operationsto cope with everyday situations
Learning intention	Calculating for personal and private purposes
Duration	3 UE +
Material and resources	Picture cards (Electronic devices and related consumption) Fac simile of electricity bill to see the cost per kW/h
Group size	from 7 to 12 learners / small group work: 2 learners
Problem statement	Smart working, home life, or just plain fun: how muchdo our electrical appliances affect our utility bills? Is there a way to be conscious of spending and manage usage accordingly? Might it be useful to estimate the energy consumption of an appliance at the time of purchase?
Learning outcomes and results	Understand the value of the unit of electrical power by adding it to the time of use of the electronic device. Become aware of how long an electronic appliance is used. Predict the total expense based on the average expected cost (learners will then be encouraged to reason in concrete terms with their personal tariff). Finally, try to reason about the importance of choice when purchasing an electronic device based on relative energy consumption.

Working plan

Time (lessons)	Description of content/activities	Material	Methodical and didactic information[1]
30`	**1.Learn about** What is meant by electrical power?Some examples	Handouts Picture cards (Electronic devices and related consumption) – see appendix 1	**information** **Worked examples**
60' +	**2. Consumption analysis** Using picture cards learners are asked to estimate the personal usage times of the devices in question. Having the time and multiplying it with thepower of the appliance gives the relative energy consumption. **Time in the unit of measurement is expressed in hours, so learners need to beinstructed on how to convert it.** **It is left to each individual group to decide whether to estimate daily or whole month consumption**	*Picture cards* *Calculator*	***hands on learning*** ***Working in small groups*** ***HITS*** *Metacognitive strategies, Questioning, Collaborative learning*
60´+	**3. Cost forecast** Using a facsimile of an electricity bill, identify the line item for cost per kW/h. [Possibly an average cost can be identifiedby previously doing an online survey, deciding whether to choose a cost that is inclusive of electricity handling and transportation charges or by looking only for the cost per kW/h.] **It is left up to each individual group to decide whether to estimate daily or wholemonth expenditures** **Learners are asked to retrieve if possible one of their recent electricity bills for the next phase of the work**	Fac simile of an electricity bill Calculator	**calculation paths, hands on learning,** ***Working in small groups,*** **HITS** Explicit teaching, Worked examples, Collaborative learning

[1] for description and explanation of kinds of tasks, HITs and other background information please consult the teacher's/user's guide

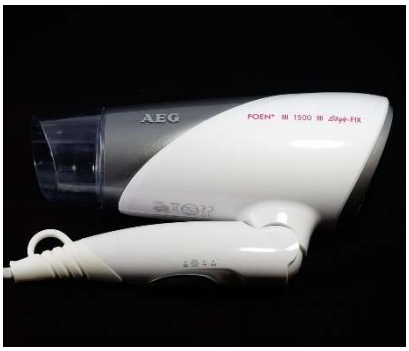
45'++	**4. Analysis of results** Learners are asked at this point to do individual work and ask themselves whether the results obtained are nearly inline with the expenses incurred. Looking at results and comparing them withtheir personal bill encourage them to reason about any differences (*was the rate different? is there an electronic appliance ormore than one that you use a lot in your home that was not among the examples in the cards? do you think the appliances you use at home consume more? ….*) The activity concludes with a time of sharing among the learners regarding theinvestigations conducted and any hypotheses regarding the differences possibly noted	Material worked out	**HITS:** Metacognitive strategies
45'	**5. Possible deepening/expansion** Using cards with examples of different energy-consuming appliances on the market, have learners evaluate whether choosing a different appliance would haveaffected the final expenditure	Picture cards	**HITS:** Metacognitive strategies

Appendix

Appendix 1: electronic devices and consumption (sources: www.pixabay.com)

Washing machine

2,1 kWh

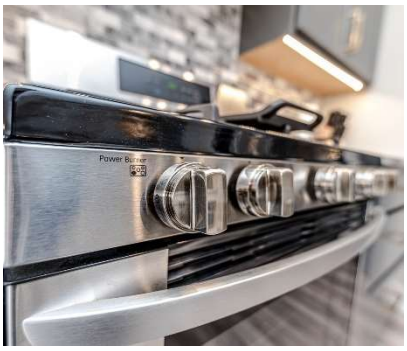


Hair dryer

2 kWh

Fridge

0,3 kWh

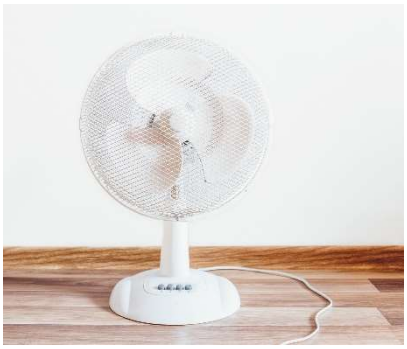


Oven

2 kWh

Water heater

1,8 kWh

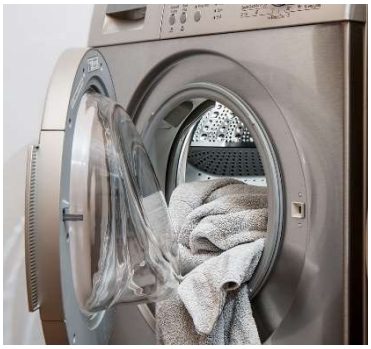


Fan

0,05 kWh

Vacuum cleaner

1,4 kWh

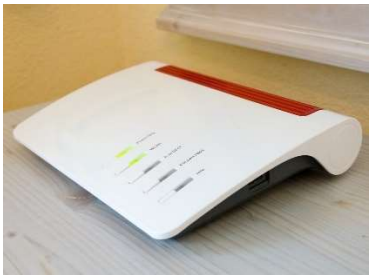


Dryer

3 kWh

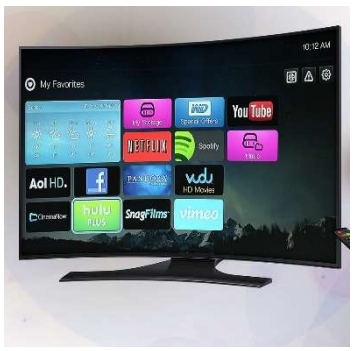
Microwave

0,7 kWh



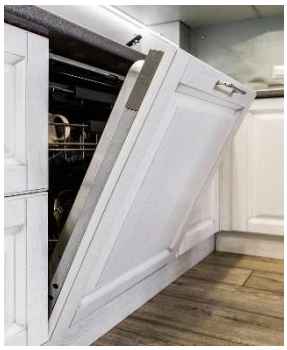
Router

0,01 kWh



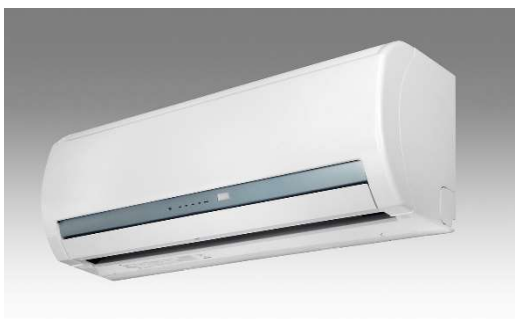
Television

0,15 kWh



Dishwasher

2,5 kWh



Conditioner

1,5 kWh

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