

## Activity 1 - electricity bill calculations

The electrical appliances in your home use electrical energy. Electricity bills are worked out based on how many 'units' of electricity have been used by the appliances in the household. The unit used is the kilowatt hour (kWh). One kWh is the amount of energy used by a 1kW appliance in 1 hour.

energy used (kWh) = power of appliance (kW) x time (h)

The amount of electrical energy used is measured by the electricity meter.

### Task

1. A group of friends are comparing their electricity bills. Complete the table below. The first row has been completed as an example.

name	previous reading (kWh)	recent reading (kWh)	units of electrical energy transferred (kWh)	price per unit (kWh)	charge
<i>Sophie</i>	<i>00100</i>	<i>00300</i>	<i>200</i>	<i>11p</i>	<i>£22.00</i>
Arthur	53000	53456	456		£91.20
Esme	3658	4424		10p	
Julia	2701	2759		18p	
Ella	49205	49901		12p	
Edith	10287	10459			£22.36
Lucille	00100	00201		11p	
Darcy	63499	64438		13p	

2. Write down a general equation to show the friends how to work out their own bills.

Activity 2 – electricity bill questions

1. Who paid the most for their electricity?

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2. Who do you think uses the same electricity company? Why?

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3. Edith and Sophie paid a very similar price. Who is getting the better deal? Why?

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4. Arthur is upset. He thinks that he uses less appliances than Esme and so his bill should be cheaper. Is he correct? Explain why Esme's bill is cheaper.

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*It isn't always possible to get the lowest 'unit price'. Sometimes, companies only offer the lowest prices for new customers, rather than their existing customers. A new company, 'Sparks', is offering customers a price of 25p for the first 100 units, with 9p thereafter.*

5. Should Lucille switch to 'Sparks'? Explain your answer.

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6. Should Esme switch? Explain your answer.

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7. Should Arthur switch? Explain your answer.

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8. Should anyone else switch? Explain your answer.

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9. Do you think it is right that:

a) Different companies offer different prices?

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b) A company offers different prices to new and existing customers?

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c) In some cases, the more units you buy, the cheaper they get?

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Activity 3 – letter writing

There are many ways to try and save money on your electricity bill. Jot down your ideas here.

Imagine that you work for the Energy Saving Trust giving advice to homeowners on how to reduce their energy costs. Write a letter to Darcy explaining how she could save money on her electricity bill. Tick off your ideas from above as you use them.

*In this activity you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.*

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## Teaching notes and answers

These activities are designed to introduce students to how domestic electricity bills are calculated. For background information on how to reduce electricity bills go to the website <http://www.energysavingtrust.org.uk/Electricity> .

All students will need a calculator. It would be prudent to check answer to Activity 1 before proceeding to Activity 2.

**Activity 1 – electricity bill calculations**

1.

Name	previous reading (kWh)	recent reading (kWh)	units of electrical energy transferred (kWh)	price per unit (kWh)	charge
<i>Sophie</i>	<i>00100</i>	<i>00300</i>	<i>200</i>	<i>11p</i>	<i>£22.00</i>
Arthur	53000	53456	456	20p	£91.20
Esme	3658	4424	766	10p	£76.60
Julia	2701	2759	58	18p	£10.44
Ella	49205	49901	696	12p	£83.52
Edith	10287	10459	172	13p	£22.36
Lucille	00100	00201	101	11p	£11.11
Darcy	63499	64438	939	13p	£122.07

2 cost of electricity = electrical energy transferred (kWh) x cost of 1 kWh

**Activity 2 – electricity bill questions**

1. Darcy
2. Sophie and Lucille (same cost per unit – 11p) and Edith and Darcy (same cost per unit – 13p)
3. Sophie is getting a better deal because she actually used more units (200, as opposed to 172) but paid 36p less. This is because she is paying 2p less for every unit of electricity.
4. Arthur does use less electricity (766 – Esme, 456 – Arthur). However, his bill is correct – he is paying more because he pays more per unit. He actually pays twice the cost for every unit (20p, rather than the 10p that Esme pays).
5. Lucille shouldn't switch to Sparks. Based on the 101 units that she used, she would have paid £25.09 (25p x 100, 9p x 1) instead of £11.11.

6. Esme shouldn't switch to Sparks. Based on the 766 units that she used, she would have paid £84.94 (25p x 100, 9p x 666) instead of £76.60. The cheap rate for the later units is only 1p less than her current rate that she pays for every unit, whereas the 25p for the first 100 units is a lot more.
7. Arthur should switch to Sparks. Based on the 456 units that he used, he would pay £57.04 (25p x 100, 9p x 356) instead of £91.20.
8. Sophie shouldn't switch – she doesn't use enough electricity to justify the cheaper cost after 100 units.

Julia definitely shouldn't switch – she doesn't even use 100 units so wouldn't benefit from the cheaper price.

Ella would benefit as she uses quite a lot of electricity and currently pays 12p per unit. She would pay £78.64 instead of the current £83.52, but she'd have to be sure that she was going to use less electricity next time or it might be best to stay on the deal she's on.

Edith shouldn't switch – she doesn't use enough electricity to justify the cheaper cost after 100 units.

Darcy would benefit as she uses quite a lot of electricity and currently pays 13p per unit. She would pay £100.51 instead of the current £122.07.

*There are no right or wrong answers to Question 9 and you may wish to run it as a debate. You could put YES and NO at each end of the classroom and ask students to stand somewhere between the two based on their opinion – then ask students to justify a response. Ideas are below.*

9.
  - a) Offers competition, but can be confusing.
  - b) Some customers may not realise they can get better prices or find it easy to switch companies.
  - c) Rewards customers who spend more, but may discourage customers reducing their energy use.

### Activity 3 – letter writing

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- switch electricity provider
- turn the thermostat down 1°C
- insulate home (e.g. double glazing, draught excluders, loft insulation, cavity wall)
- wear warmer clothes / cooler clothes rather than turning up the heating or air conditioning
- turn off lights and other appliances in non-occupied rooms/houses
- don't leave appliances on standby – turn things off when not in use!