

The value of our electricity

Intermediate Phase (Grade 4)

Learner activity sheet

Mathematics





Energy Education



Dear Learner,

Electricity is produced from fuel such as coal, water, diesel and uranium which are limited resources. Building new power stations to increase the supply of electricity is costly, time consuming and is only one of the possible solutions towards producing more electricity. Increased use of electricity means we use up our limited natural resources and means we pollute more.

An immediate solution is to change the way in which we use electricity – that is using electricity wisely without wasting.

Eskom kindly asks you, the learner, to please put into practice different ways of using electricity wisely. You are going to learn a lot in energy education. Some of the things you will learn are:

- the changes in technology (use energy-saving lights instead of the traditional old lights),
- how to use technology more wisely (using the switch to switch off remote controlled appliances instead of the remote),
- other energy-wise saving tips,
- and how using energy wisely helps to care for our environment – our earth.

Do not worry, the energy education will be part of your school work. Be alert and become an example of how to use energy wisely. Share all that you learn with your friends, family and community. Remember to be energy-wise wherever you are – at home, at school and in other places.

Thank you for taking care of our earth.





Activity 1: Comparing the use of energy

Comparing light bulbs

Incandescents are the old type of bulb that homeowners used often in days gone by. Nowadays people are encouraged to use CFLs (energy savers). The older bulb uses most of its energy producing heat and a small amount producing light. This makes them much warmer and using them causes us to waste valuable, scarce electricity. Energy savers cost you more to buy initially, but they last much longer than the older bulb. This means that you will buy many more older lamps before the new ones have reached the end of their life span. Buyer more lamps more frequently wastes money. Buying fewer lamps that use less energy saves you money. Opening your curtains and using the natural light the sun provides us during the day, is of course the best way to save money on lighting costs.

Caution: Energy savers use mercury vapour whereas incandescents use a filament. When an energy saver has reached the end of its lifespan, most of the mercury vapour is used up. Even though the mercury vapour is used, it is still advised that spent (uses) energy savers are disposed of correctly. Wherever possible they should not be put in the normal rubbish but should be disposed of using the collection points offered by municipalities and retailers. If they cannot be handed in for collection at these points, as a last resort, they can be wrapped in newspaper and placed in a sealed bag and disposed of in the rubbish. Single energy savers in the rubbish do not cause anyone any harm, but if millions and millions of energy savers collect in landfill sites over many years, it could eventually cause ground water to be contaminated.



Activity 1: Which lights should we use?



1. Write down the differences between pictures A and B.



Picture A



Picture B

Picture A	Picture B
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.
6.	6.
7.	7.
8.	8.



2.1 How much is the electricity account in picture A? _____

2.2 How much is the electricity account in picture B? _____

2.3 Work out the difference between the electricity accounts.

2.4 Give reasons why the amounts on the electricity accounts are different. _____

3. Do you think the lady in picture B is doing the right thing by leaving the lights on until 8.00am? Give reasons for your answer. _____

4. Give 2 differences between the energy-saving light (compact fluorescent light – CFL) and the old light bulb (incandescent light).

A



B



Energy-saving light (compact fluorescent light – CFL)	Old light bulb (incandescent light)
1.	1.
2.	2.

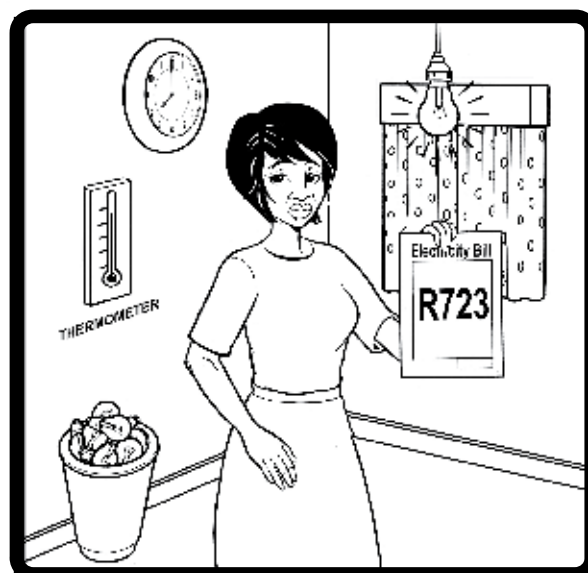


Activity 2: The cost of using energy-saving lights or old light bulbs

1. Study the TWO light bulbs and answer the following questions.



Picture A



Picture B



1.1 If the lady's electricity account in picture A is R5 using 1 energy-saving light for the month, complete table 1 to show her electricity account if she uses 2,3,4, 5 or 6 energy-saving lights:

Number of energy-saving lights used for the month	Electricity account
1 energy-saving light (CFL)	R5
2 energy-saving lights (CFLs)	
3 energy-saving lights (CFLs)	
4 energy-saving lights (CFLs)	
5 energy-saving lights (CFLs)	
6 energy-saving lights (CFLs)	

Table 1. Cost of using energy-saving lights



1.2 If the lady's electricity account in picture B is R10 using 1 old light bulb for the month, complete table 2 to show her electricity account if she uses 2,3,4,5 or 6 old light bulbs.

The light bulb in picture A was on for the same amount of hours as in picture B:

Number of old light bulbs used for the month	Electricity account
1 old light bulb	R10
2 old light bulbs	
3 old light bulbs	
4 old light bulbs	
5 old light bulbs	
6 old light bulbs	

Table 2. Cost of using old light bulbs


Lower wattage saves you money. Sometimes a lower wattage bulb can be used instead of a higher wattage bulb eg the light needed in a passage does not have to be as bright as the light needed to read by. Using a lower wattage bulb means you save energy.





- 2 Draw a pictograph to show the information in table 1. One picture should represent one unit of money in the pictograph.

Number of energy-saving lights						
Cost						

Cost of using energy-saving lights. One unit (5) = 



- 2.1 Draw a bar graph to show the information in table 1. Label your graph. [Show the cost on the Y-axis and number of energy saving light bulbs on the X-axis]

Example template for Table 2. Cost of using energy-saving lights

Y-axis: Cost in rands

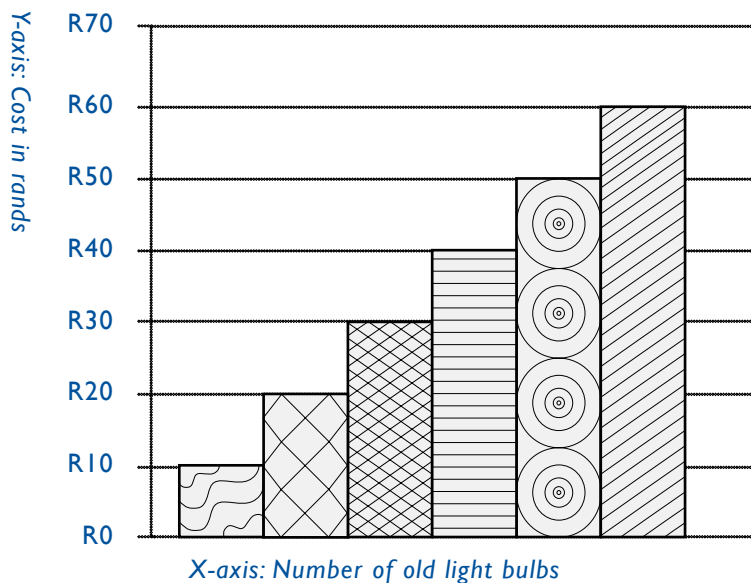
X-axis: Number of energy-saving light bulbs





3. Complete table 3 using the information from the graph to show the cost of using old light bulbs.

Cost of using old light bulbs



Number of old light bulbs used for the month	Electricity account
1 old light bulb	
2 old light bulbs	
3 old light bulbs	
4 old light bulbs	
5 old light bulbs	
6 old light bulbs	


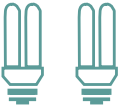





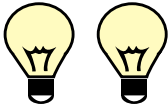
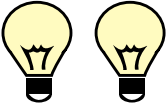
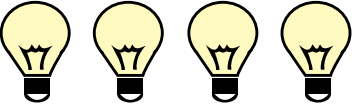
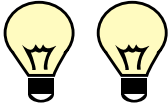
Table 3. Cost of using old light bulbs

4. What conclusions can you make about the cost of electricity from the information in tables 1 and 3? _____
5. Even if you have energy-saving lights, how can you use them in a way that will help to use energy wisely? _____



Activity 3: Survey – The use of lights at Sipho's house

A survey was done at Sipho's house. The following is a floor plan of Sipho's house showing the number, kind of lights and the watt value of the lights. The old light bulbs are 60W and the energy-saving lights are 15W.

Bedroom 1  	Bedroom 2  	Passage 
Kitchen 	Lounge 	Toilet 
Bathroom 	Outside 	Garage 



- 1.1 How many old light bulbs (incandescent light bulbs) are there altogether in Sipho's house? _____
- 1.2 How many energy-saving light bulbs (compact fluorescent light bulbs) are there altogether in Sipho's house? _____



2. Use tally marks to complete the following tally table for the number of old light bulbs and the number of energy-saving light bulbs.

Type of bulbs	Tally marks	Total
Old light bulbs		
Energy-saving lights		



3. Altogether how many energy-saving lights (compact fluorescent lights) are used in the bedrooms and passage?

4. Altogether how many old light bulbs (incandescent lights) are used in the garage, lounge and kitchen? _____

5. Draw a pictograph showing the tally marks on the previous page.

Energy-saving light bulbs								
Old light bulbs								
Sets of lights								





6. There are 2 lights in the passage and 2 lights in the toilet.

6.1 Add the watt values of the lights in the passage.

6.2 Add the watt values of the lights in the toilet.

6.3 Which lights are using more energy? _____

6.4 Calculate the total watt value of the old light bulbs
(incandescent lights) in the house _____

7. Calculate the total watt value of the energy-saving lights
(compact fluorescent lights) in the house.


8. Sipho found that his electricity account is very high. Give Sipho
some advice on how he can bring down his electricity account.



Activity 4: Using energy wisely – The television (TV)



1. Gather the relevant information from your class by completing the survey form below.

Survey: Television (TV)			
Date of survey:			
Survey conducted by:			
Grade:			
Total number of learners in class:			
No.	Item	Number	Percentage
1.	How many learners are there in class?		
2.	How many learners have a television (TV) at home?		
3.	How many learners do not have a television (TV) at home?		
4.	How many learners switch the television (TV) on and off using a remote control?		
5.	How many learners switch the television (TV) on and off using the switch on the television (TV)?		
6.	How many learners switch the television (TV) on and off sometimes using the switch on the television (TV) and sometimes with the remote?		

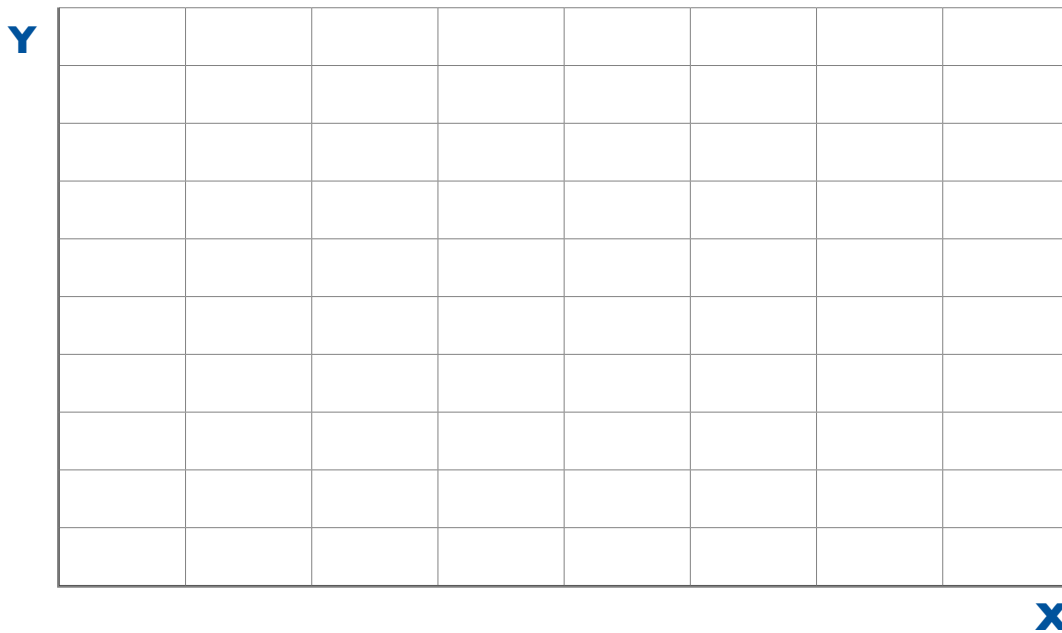
2. Why is it important to find out how many learners do not have televisions (TVs) at home? _____

3. Sometimes not having a television (TV) is an advantage. List some of the advantages of not having a television (TV).


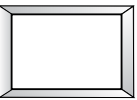

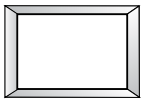


4. Draw a bar graph to show the information for questions 4, 5 and 6 of the survey questionnaire. [Show number of learners Y-axis and method used to switch TV off X-axis]

Number of learners who switched the TV on and off



5. Complete the pictograph to show the information for questions 4, 5 and 6.

Remote 		
TV switch 		
Remote & TV switch  		
TV on and off – remote or switch or both		





6. What can you say about the way learners switch the television (TV) on and off? _____

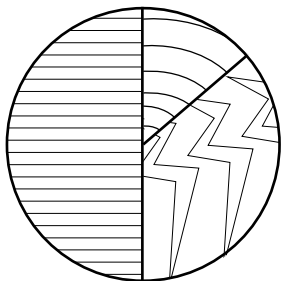
7. What is the cost effective way of switching the television off?

8. Write down the **golden rule** for the use of electricity.

Activity 5: Which appliance uses the most electricity at home?

Read the information in the pie chart and answer the questions.
The pie chart shows the amount of energy used by 3 appliances.

Keep in mind that as long as energy is flowing through or a light is on you are using electricity and have to pay for it. **You pay for the electricity you use.**



Standby - remote
control television (TV)
Fridge
Geyser

Of the appliances in the home, the geyser uses the most electricity, second is the fridge and third is a tv in stand by mode (this means the tv was switched off with a remote control).





1. Which 3 appliances are shown in the pie chart?

2. Which appliance do you think uses the most amount of energy in a house if switched on continuously? _____

3. Which appliance uses the second most amount of energy in a house if switched on continuously? _____

4. Which appliance uses the third most amount of energy in a house if switched on continuously? _____

5. The table shows the fraction of energy used by the different appliances.

5.1 Complete the fraction energy used by the geyser.

Appliance	Time left on for the day	Energy used	Cost
Fridge	24 hours	$\frac{2}{6}$	R16
Television (TV) on standby (switched off with the remote control)	24 hours	$\frac{1}{6}$	R8
Geyser	24 hours		R24



[illegible]





