



3055 BA SANGAM COLLEGE

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WORKSHEET 25

School: Ba Sangam College

Year/level: 10

Subject: Basic Science

NAME: _____

Strand 2	Energy
Sub Strand 2.1	Energy transformation, use and conservation
Content Learning Outcome	Investigate ways electricity is produced using simple electrical circuits and determine and calculate consumption of electrical energy in homes deriving ways to conserve this energy.

Lesson Notes - Energy Usage at Home

FORMULA FOR ESTIMATING ENERGY CONSUMPTION

Watts: Power, as measured in watts which is the amount of power required to operate an electrical appliance or device.

(Wattage × Hours Used Per Day) ÷ 1000 = Daily Kilowatt-hour (kWh) consumption

1 kilowatt (kW) = 1,000 Watts

Multiply this by the number of days you use the appliance during the year for the annual consumption in kWh per year.

ESTIMATING ANNUAL COST TO RUN AN APPLIANCE

Multiply the annual consumption in kWh per year (that you calculated above) by your local utility's rate per kWh (\$0.3484) consumed to calculate the annual cost to run an appliance.

EXAMPLES:

Light bulb:[in a month]

$(60\text{Watts} \times 4\text{ hours/day} \times 28\text{ days/month}) \div 1000$

$6.72\text{kWh} \times \$0.3484/\text{kWh}$

= \$2.34/month

Personal Computer and Monitor:

$[120\text{ Watts} \times 4\text{ hours/day} \times 365\text{ days/year}] \div 1000$

= $175.20\text{ kWh} \times \$0.3484/\text{kWh}$

= \$61.04/year

ELECTRICITY BILL

The following steps enable one to calculate the approximate monthly electricity bill for domestic customers.

Step 1: Calculate Electricity Cost

Units used (kWh) = Present Month's Reading – Previous Month's Reading

Electricity Cost VEP (VAT Exclusive) – Units used x \$0.3484cents*

Step 2: Add VAT for Total Bill

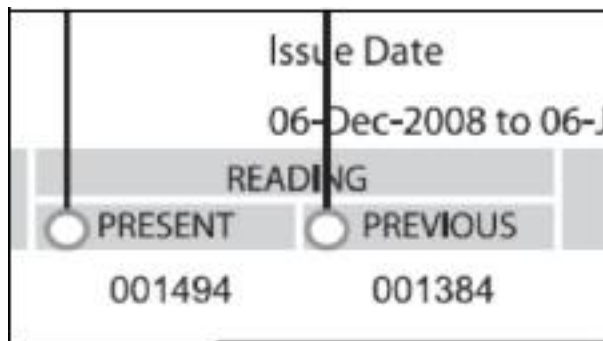
VAT = Electricity Cost VEP x 15%

Total Bill VIP (VAT Inclusive Price) = Electricity Cost VEP + VAT

Step 3: Total Amount Due

Total Amount Due = Total Bill VIP + Amount Overdue and Relating to Prior Bills

Calculation



Issue Date	
06-Dec-2008 to 06-J	
READING	
PRESENT	PREVIOUS
001494	001384

extracted from an FEA bill

Step 1: Calculate Electricity Cost

Units used = 1494kWh – 1384kWh = 110kWh

Electricity Cost = 110kWh x \$0.3484 = \$38.32

Step 2: Add VAT for Total Bill

VAT = \$38.32 x 15% = \$5.74*

Total Bill VIP = \$44.06 [\$38.32 + \$5.74]

Total Current Charges (VIP) \$44.06

Step 3: Add current charges to any Amount Overdue and Relating to Prior Bills to obtain Total Amount Due

OVERDUES		
Opening Balance	\$21.51	DR
Bal	\$21.51	DR

extracted from an FEA bill

Total Amount Due = \$44.06 + \$21.51 = **\$65.57**



How to Conserve Energy at Home

- ✓ Unplugging an item when it is not in use to prevent **phantom loads** (energy leakage). Appliances such as the TV, coffee maker and stereo draw power even when off, in standby or low power mode.
- ✓ Changing the settings or using the item less often
- ✓ Purchasing a new, more efficient product.

Exercise

1. An electric iron is rated 1200W. Clarke uses the iron for 5 hours per week. The electricity cost per unit is 35 cents.

Calculate the units of electricity used per week.

1 Unit = 1 kilowatt hour = 1000 watt

Units of electricity used per week _____

(2 marks)

2. State why the bulbs in a series circuit are dim.

(1 mark)

3. At Kavi's house five light bulbs are connected to the main electricity supply. Each light bulb is 40 watts. The light bulbs were switched on for 12 hours each night for 6 nights. Using the information provided calculate the total electricity consumed by 5 light bulbs in 6 nights. [Show your working]

(3 marks)

4. State two ways of conserving energy at your home.

(2 marks)

