# Watt's the Cost?

**Topics Covered:** kilowatt hours, energy usage estimates

### Procedure

Do all of the following in your lab book.

1. Set up a data sheet NEATLY in your notebook or create one on a separate sheet of paper and fasten in your notebook.
2. With your parents permission and assistance, write in COLUMN A all the electrical appliances in EACH room of your house. Don't forget light bulbs!! In COLUMN B, write the wattage of each appliance based on the plates located on the back, side, etc. If you cannot get at it (refrigerators, air conditioners, etc), you may use the data table handout. UNPLUG ALL APPLIANCES before searching for tags. Tags will either say WATTS or W or possibly kW (if you are lucky!) It will look something like 400W.
3. Convert the Watts to Kilowatts by dividing the wattage by 1000. Therefore:  
   2,500 W = 2.5 kW  
   350 W = 0.35 kW  
   25 W = 0.025 kW etc  
   Record this answer in COLUMN C.
4. Calculate the average cost of electric (kWh) To do this, look at your parents' electric bill. Divide the total cost by the kW used. Record this rate in COLUMN F (will be the same for all appliances.)   
   **Example:** bill is $86.88 and 724 kW used, the cost is $86.88/724 = $0.12per kWh   
   If you do not receive an electric bill and your building manager or a friend cannot help you, then use $0.175. Sanitize or electric bill and paste a copy into your notebook (remove all notices, etc)
5. In COLUMN D, write the number of days per month that EACH appliance is used (if you have more than one of any given appliance, you count each separately). In COLUMN E, write down the hours per day that the appliance is used. Use a decimal for fractions (such as 15 minutes = 0.25, 6 minutes = 0.1 etc) You may have to estimate how long it takes an electric coffee pot to brew or a toaster to pop bread. Don't forget that it may be many times a day! Don't forget to include the number of people in your house using the appliance! Note: Refrigerators and freezers don't operate continuously --calculate these as 10 hours per day --not 24.
6. Calculate the cost per month for each appliance. Multiply columns C x D x E x F. Enter your cost in COLUMN G.  
     
   **Samples Calculation:**   
   a 200W color television watched 3 hours per day each month at $0.12 kW

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Column A** | **Column B** | **Column C** | **Column D** | **Column E** | **Column F** | **Column G** |
| Color TV | 200W | 0.2 kW | 3 hours | 90 hrs | 0.12 | $10.80 |

1. When you are done, add up COLUMN G and write the total at the bottom. This is your calculated cost. When you are done with this, create a [second data table](http://enviroliteracy.org/article.php?id=139).   
   Total the cost in COLUMN G for each entry in a given category (column H) and record on the appropriate line in COLUMN J.  
   Example: 2 TV sets = 10.80 and 3.51; a DVD costs 0.84 and the computer costs 1.01. The total on that line in COLUMN J would be $15.15.
2. Divide each entry in COLUMN J by the total cost (total COLUMN G) and multiply by 100%. Enter these percentages into COLUMN K.
3. Multiply each entry in COLUMN J by the percentages at the top of COLUMNS L-N. This would be the dollars saved each month if you reduced usage by that amount.

### ****Answer the following questions:****

1. Compare your results from Data Sheet 1 with your actual electric bill. If you are off by more than 10%, how can you explain the difference?
2. Construct a pie graph or a bar graph of your energy usage by categories.
3. If you cut back your electrical use for the single top energy user in your home by 5%, how much energy money would your family save each month?
4. List the 3 most necessary electrical uses in your home. Tell why each is so necessary and if there are any alternatives.
5. List the 3 least necessary electrical uses in your home. Tell what you would do without each.
6. Based on your answers to questions 3 and 4, discuss this statement: "We can reduce electrical use in our homes by 15% and still maintain good lifestyles." How much money would be saved if the bill was reduced by 15% and what could your family do with that money?
7. How can saving energy in the home help the environment?
8. Discuss these statements:
   1. If we cut back on air conditioning, we don't have to conserve lighting.
   2. If we eliminate 3 of our smaller electricity users, that's enough.
   3. Why should I conserve if other people won't?
   4. There's nothing that I can do because my parents pay the bill.

1. Predict your next month's electric bill. What can you do to try and lower it?

# Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# Period\_\_\_\_\_

# Watt's the Cost?: Data Sheet 1

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **A** | **B** | **C** | **D** | **E** | **F** | **G** |
| Appliance | Watts | kW | Hours used per Day | Hours Used Per Month | Avg. Rate Per kWh. (in $) | Cost Per Month (in $) |
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Total cost per month \_\_\_\_\_\_\_\_\_\_\_\_\_

Total KW per month\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Total KW per day \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |  |
| --- | --- | --- | --- |
| **Appliance Type** | **Watts/Hour** | **Appliance Type** | **Watts/Hour** |
| Coffee pot (10 cup) | 1200 | DVD Player -Off/Play | 5 / 300 |
| Sink waste disposal | 450 | Stereo | 300-500 |
| Blender | 300 | Phone charger | 8-40 |
| Microwave | 600-1500 | Satellite dish | 50 |
| Waffle iron | 1200 | Clock radio | 15-25 |
| Frying pan | 1200 | Electric clock | 10-20 |
| Range Burner | 800 | Dishwasher / (Drying cycle) | 200 /1200 |
| Electric Oven | 2000-2500 | Electric water heater | 3800 |
| Washing machine | 950 | Vacuum cleaner  - upright  - hand | 600-1100  100 |
| Toaster | 1400 | MP3 charger | 5-40 |
| Clothes dryer  - electric - gas heated | 4000 300-400 | Video Games + TV | 150-450 |
| Iron | 1000 | Furnace blower | 300-1000 |
| Garage door opener | 350 | Ceiling fan | 10-50 |
| Table fan | 10-250 | Electric blanket | 200 |
| Blow dryer | 1000+ | Shaver | 15 |
| Waterpik electric toothbrush | 15-100 | Electric mower | 1500 |
| Computer  - laptop  - pc  - printer-inkjet/laserjet/ | 20-50  80-220  50/600 | TV  -46” wide screen - 32" color  - 19" color TV or monitor | 250-350 150-300  70-140 |
| Lights  - 100w incandescent  - 25w compact fluor.  - 50w DC incandescent  - 40w DC halogen  - 20w DC compact fluor.  -LED Lights (small) | 100  28  50  40  22  .5 | Compact fluorescent  incandescent equivalents  - 40watt equiv.  - 60watt equiv.  - 75watt equiv.  - 100watt equiv. | 11  16  20  30 |
| Hedge trimmer | 450 | Electric weed trimmer | 500 |
| 1/2 HP well pump | 500-900 | 3" belt sander | 625-1000 |
| 8 1/4" circ. saw | 1800 | 1/2" drill | 450+ |
| Electric Space Heater | 1000-1500 | Electric Furnace | 10,000-26,500 |
| Air conditioner (energy hogs) - room  - central  -Evaporative cooler | 1000-1500  2500-4500  400 | Refrig/freezer  -Energy Star (15 hours) - 20cf (15 hours) | <200 540 |
| Sunfrost (figure running 7hrs/day typically) - 16cf DC  - 12cf DC | 112  70 | Freezer (figure running 10hrs/day typically) - 14cf ff (15)  - 14cf (14) | 440  350 |