Power Bill Analysis

Objective

-To become familiar with energy bills and how consumption is measured by a utility company.

Materials

-Electric bills (for past year or several months)
-Graph paper
-Rulers
-Calculators
-Paper and pencil

Question

-One bill that adults pay each month is for the electricity used in their home. Do you think your power bill stays the same each month? Does everyone have the same power bill? What factors might help determine the size of a power bill?

Preparation

-1. Copy or print one year’s electricity bill for your area. (Most power companies allow you to view and print one year’s history online.) Be sure to use actual cost bills, rather than budgeted averages for the year.
-2. Instruct students to bring in a copy of their own power bill. Print or request a copy of your own bill or an average bill for students who cannot produce their own. (This can also be used for the whole class.)
-3. Project or copy the analysis questions you will use to assess your students.

Procedure

-1. Review with students the best type of graph to show the cost of electricity for a year, steering them towards a bar graph. If needed, review how to decide on the range for your vertical axis.
-2. Have students graph each month’s data and work on the questions. Depending on the level of your students, you may want to make this a partner activity, pairing students of differing ability levels.

Analysis

-1. During which months was the power bill the highest? What factors might cause this?
-2. During which months was the power bill the lowest? What factors might cause this?
-3. Do you think the power bill in other areas of the country would look the same as this one? Why or why not?
-4. Find the mode of your data.
-5. Find the median of your data.
-6. Find the range of your data.
-7. Find the mean of your data.
-8. A family is moving to your area and is curious about the power bills they will be paying. Would the mode, median, range, or mean be the best measure to give them? Why do you think that is the best measure to tell them about a typical power bill for your area?
-9. Do you think this is the best measure no matter where you live in the country? Explain.
-10. Is there anything you could do to lower your power bill? Make a plan to show your parents.
Extensions

1. Give students two different power bills to make a double bar graph.
   • What patterns do you notice about the two bills?
   • What might account for these patterns?
   • These bills are not identical, but are both for our area. What might explain the differences in the bills?

2. Go to www.weather.com. Enter your zip code. Click on “Monthly” on the left menu. Select “Averages” from the bottom tabs. This will give you a month by month line graph for the high and low temperatures for your zip code. Make a handout for the students or write the information on the board in chart format. You may choose to give them handouts of the line graphs or have them create their own, depending on student levels. Direct your students to either put the two line graphs (high and low temperatures for your area) on top of their bar graphs or on a separate sheet of graph paper.
   • What patterns do you notice when you compare the temperature graph with the power bill graph?
   • Try to explain these patterns.
   • You cannot change the outdoor temperature. Is there anything you can do to work with the outdoor temperature to lower your power bill?
# Sample School Electric Bill

**Nov 27, 2010**  
**Customer Bill**  
ABC Elementary School  
Anytown, USA

## Billing and Payment Summary

- **Account # 000-1234**  
- **Due Date:** Jan 02, 2011  
- **Total Amount Due:** $7,462.61  
- To avoid a Late Payment Charge of 1.5% please pay by Jan 02, 2011.

- **Previous Amount Due:** $8,152.93  
- **Payments as of Nov 27:** $8,152.93

## Meter and Usage

- **Current Billing Days:** 34
- **Billable Usage**
  - **Schedule 130**  
    - **10/23 - 11/26:** 12192
    - **Total kWh:** 69888
  - **Schedule 130**  
    - **10/23 - 11/26:**
      - **Total kWh:** 69888
      - **Dist Demand:** 272.0
      - **Demand:** 259.0

## Usage History

- **Meter:** 000-1234  
- **Current Reading:** 4147  
- **Previous Reading:** 4020  
- **Total kWh:** 12192  
- **Current Reading:** 60
- **Demand:** 57.60
- **Multiplier:** 96
- **Meter:** 111-4567  
- **Current Reading:** 51746  
- **Previous Reading:** 51382  
- **Total kWh:** 69888
- **Current Reading:** 1.35
- **Demand:** 259.20
- **Multiplier:** 192

## Explanation of Bill Detail

- **Your Electric Company**  
  1-800-123-4567
- **Previous Balance:** 8,152.93
- **Payment Received:** 8,152.93
- **Balance Forward:** 0

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<tr>
<th>Service Description</th>
<th>Amount</th>
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<td><strong>Total Account Balance</strong></td>
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</tbody>
</table>

For service emergencies and power outages, call 1-800-123-4567.

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Please detach and return this payment coupon with your check made payable to Your Electric Company.

## Payment Coupon

- **Bill Date:** Nov 27, 2010
- **Payment by:** 01/02/2011
- **Amount Enclosed:** $7,463.54
- **Account #: 000-1234**

Send payment to:

ABC Elementary School  
123 Main Street  
Anytown, USA 98765

Your Electric Company  
PO BOX 123456  
Anytown, USA 98765

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Sample School Natural Gas Bill

ABC Elementary School
Anytown, USA

Account Number 000-12345678
Billing Date Nov 15, 2010
Next Meter Reading Dec 3, 2010

Credits & Charges Since Your Last Bill
Payments Received - Thank You $1,302.60 CR
Outstanding Balance $0.00

Current Charges
General Service
Delivery 282.14
Gas Supply 1,377.91
Total Current Charges $1,660.05
Total Account Balance $1,660.05

Monthly Usage Comparison
Heating Degree Days For This Billing Period
2008 160 9
2009 51
NORMAL 138

Gas Use in CCF
Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov
0 1091 2182 3273 4364

Billing Period and Meter Readings
Date Read Type Reading
October 30, 2010 Actual 70320
October 01, 2010 Actual 68985

CCF used in 29 days: 1335
Meter Number 123456

For Gas Leaks, call 1-800-123-4567

Please pay by Dec 10, 2010, To Avoid A Late Charge of 1.5% Per Month

EnergyShare has helped customers pay heating bills of all kinds. You can help by adding $1, $2, $5, $10, $15, or $20 to your gas bill payment.

Your Gas Company
PO Box 123456 Anytown, USA 98765

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Anytown, USA 98765

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