Mr. Reznick's Kilowatt Caper – Solutions

The students should start by reading *The Case of the Kilowatt Caper*. This story will introduce the concepts and outline an approach to solving the problems on the worksheet.

For younger students, you may want to solve the problems as a class instead of individually.

Problem 1: 10,000 watts/1000 = 10 kW
10 kW x 15 hours = 150 kWh
5 hours per day x 3 days = 15 hours
150 kWh x $.10 = $15.00

Answer: Grandma spent $15.00 for the electricity to cook Thanksgiving dinner.

Problem 2: Regular bulbs
60 W/1000 = .06 kW
.06 kW x 3,650 hours = 219 kWh
$21.90 x 100 bulbs = $2,190.00/year for 100 bulbs
10 hours per day x 365 days = 3,650 hours
219 kWh x $.10 = $21.90/year each bulb

CFL Bulbs
20 watts/1000 = .02 kW
.02 kW x 3,650 hours = 73 kWh
$7.30 x 100 bulbs = $730.00/year for 100 bulbs
10 hours per day x 365 days = 3,650 hours
73 kWh x $.10 = $7.30/year each bulb

$2,190.00 - $730.00 = $1,460.00

Answer: Batman would save $1,460.00 per year by using CFL bulbs.

Problem 3: PS2
30 watts /1000 = .03 kW
3 kWh x $.10 = $0.30
.03 kW x 100 hours = 3 kWh

Xbox 360
165 watts /1000 = .165 kW
16.5 kWh x $.10 = $1.65
.165 kW x 100 hours = 16.5 kWh

$1.65 - $0.30 = $1.35

Answer: It would cost an extra $1.35 to play the Xbox 360.

Problem 4: 100 watts/1000 = .1 kW to watch TV
Now work back from the cost of a can of Coke:
$.050/$0.10 (cost of electricity) = 5 kWh
5 kWh/.1 kW (energy for watching TV) = 50 hours

Answer: Jenna could watch TV for 50 hours.