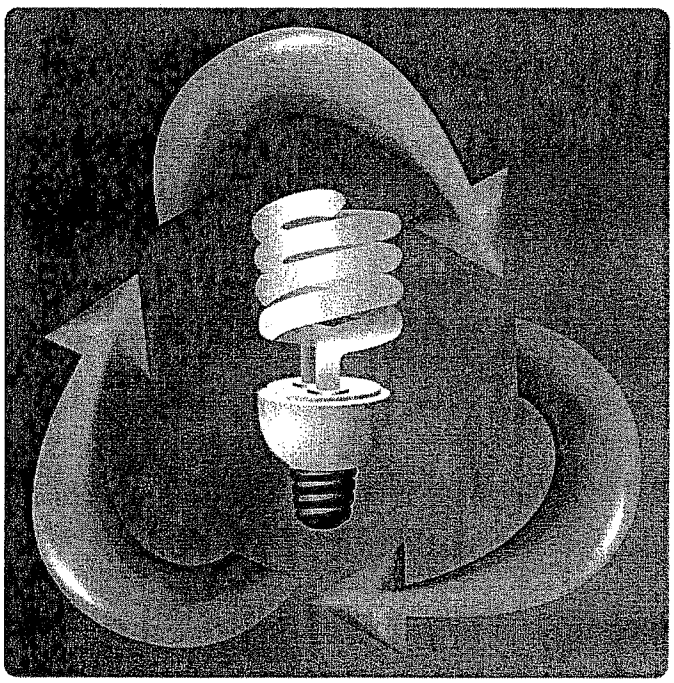
Exploring Earth Systems
George Stevens Academy Energy Audit

Selected Studies and Recommendations

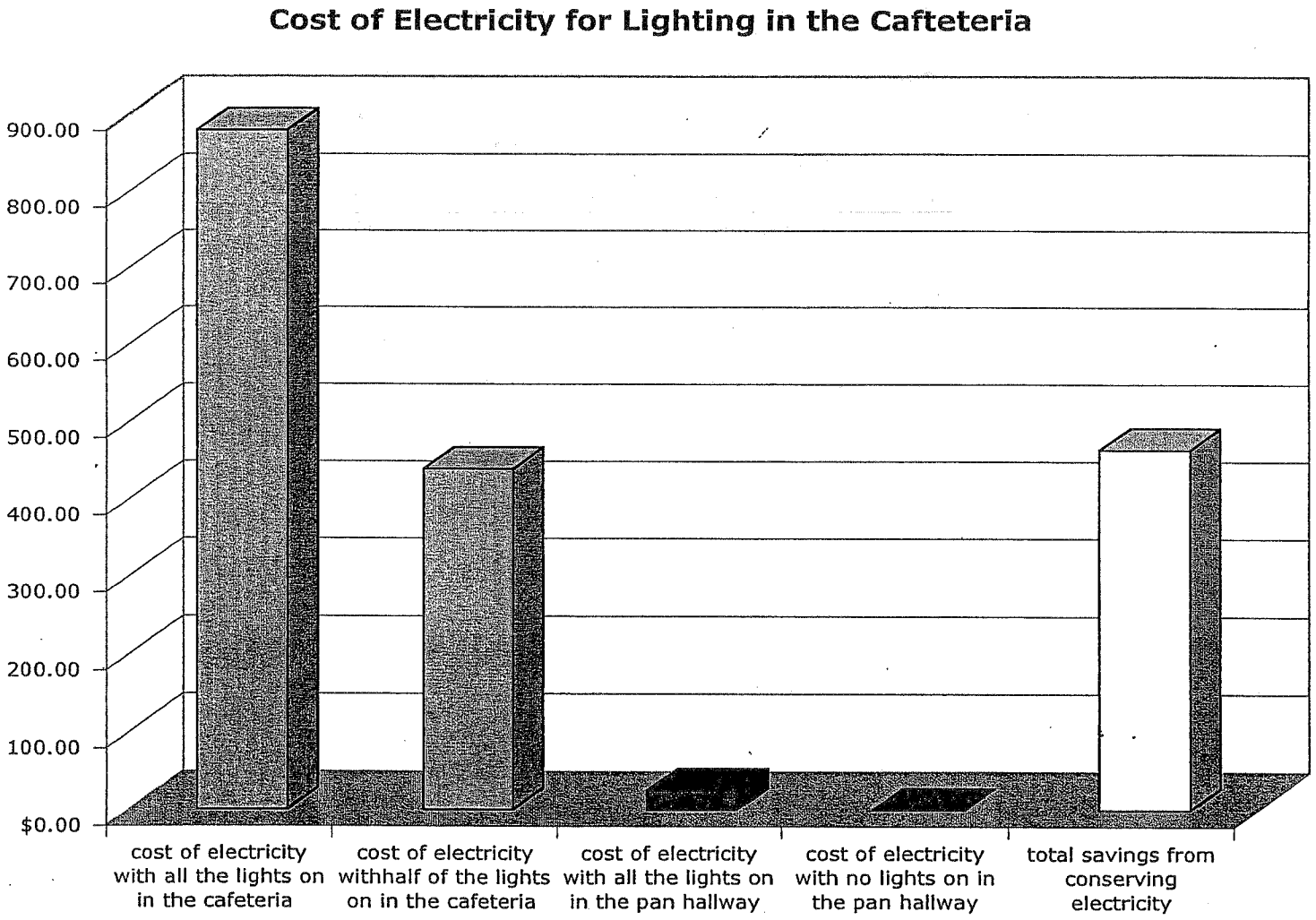


Freshmen in Exploring Earth Systems classes selected areas of the GSA campus and investigated a particular use of energy in those areas. Each team determined the amount of energy used and the cost of the energy. They then proposed a method of reducing energy consumption and calculated the savings.

Lighting In The Cafeteria

By turning off the lights in the pan hallway for an entire year (because lights there are really not needed) we would save $25. Also, by turning off half the lights in the cafeteria, we could save $440.

Nine out of 10 people surveyed said they would not mind if half the lights were off.

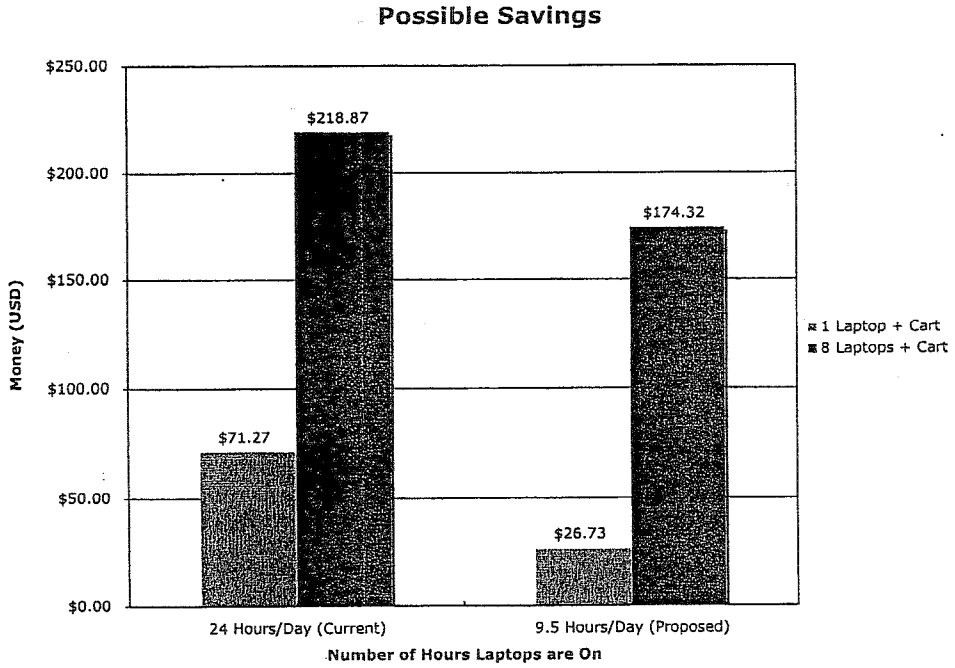


Lighting in the Cafeteria Circuit

Room	# of fixtures	# of lamps per fixture	Wattage per lamp	Total kW	hours per Week	hours per school year	cost per kWh
Cafetria	35	4	32	4.48	45	1156.5	$0.1697
Pan Room Hall	2	2	32	0.128	45	1156.5	$0.1697
Total kWh per year in Cafeteria			5181.12kWh*				
Total kWh per year in Pan Room Hall			148.03kWh**				
Cost in Cafeteria per year			$879.24***		Savings in the cafeteria: $440.14		
Cost in Pan Room Hall per year			$25.12****		Savings in the Pan room hallway:$25		
	*1156.5hrs(4.48kw)						
	**1156.5hrs(0.128kw)						
	***5181.12kWh($0.1697)						
	****148.03kWh($0.1697)						

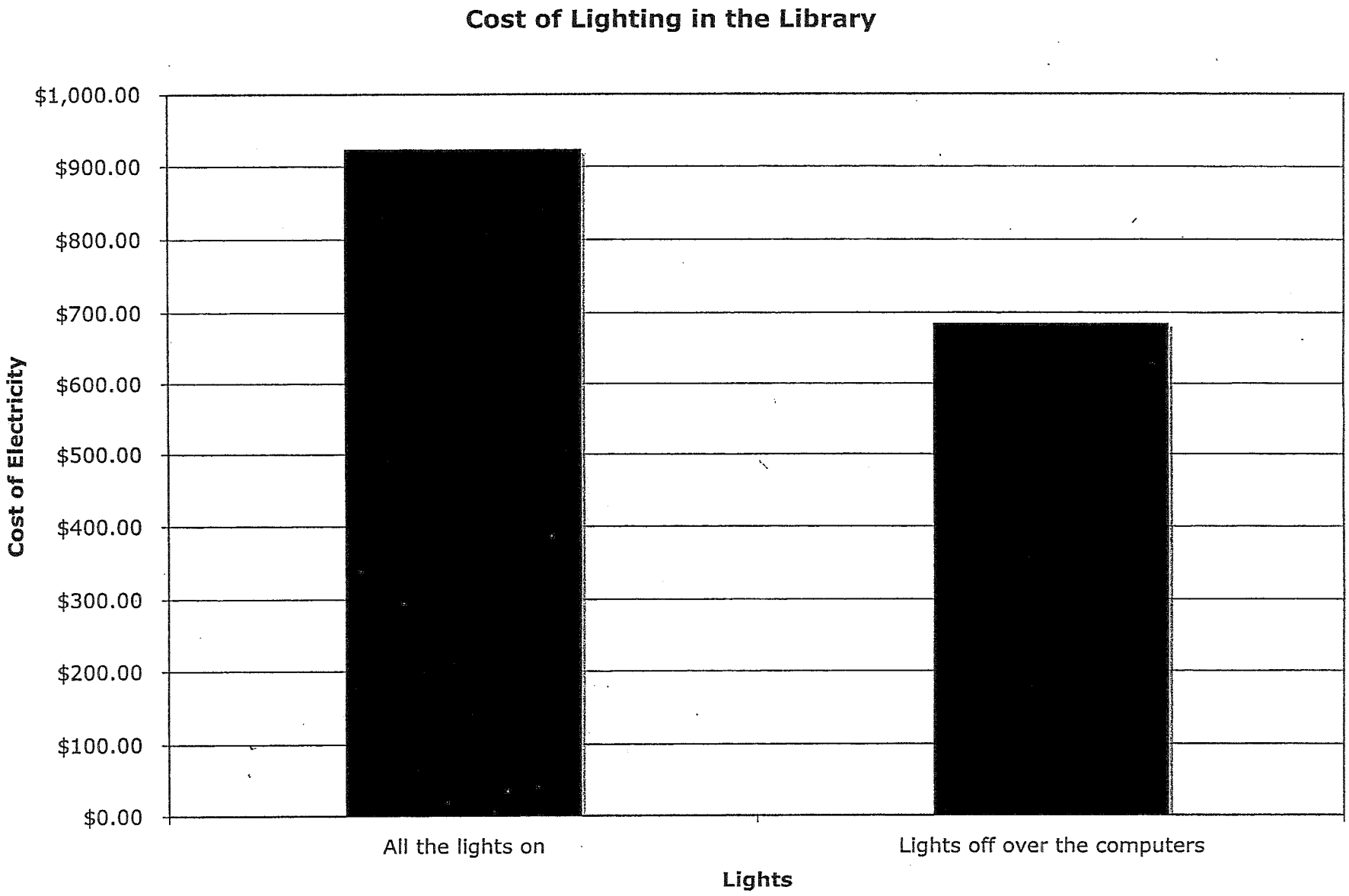
Library Laptop Energy Use

Appliance	$Electricity per KWh	Days in a School Year	Hours per Day per Laptop	KWh per Day for 1 Laptop (with phantom load)	KWh per Day for 8 Laptops (with phantom load)	KWh per School Year for 1 Laptop (with phantom load)	KWh per School Year for 8 Laptops (with phantom load)	Annual Cost ($$$) for 1 Laptop	Annual Cost ($$$) for 8 Laptops and Cart	Annual CO2 Emissions (Pounds) KWh * 0.9	Annual CO2 Emissions (Pounds) For 8 Laptops and a Charging Cart
iBook G4	0.1679	175	24	2.4KWh	7.37KWh	420KWh	1,289.75KWh	$71.27	$218.87	378.00	1,160.775
iBook G4	0.1679	175	9.5	0.9KWh	5.68KWh	157.5KWh	1,027.25KWh	$26.73	$174.32	141.75	924.525



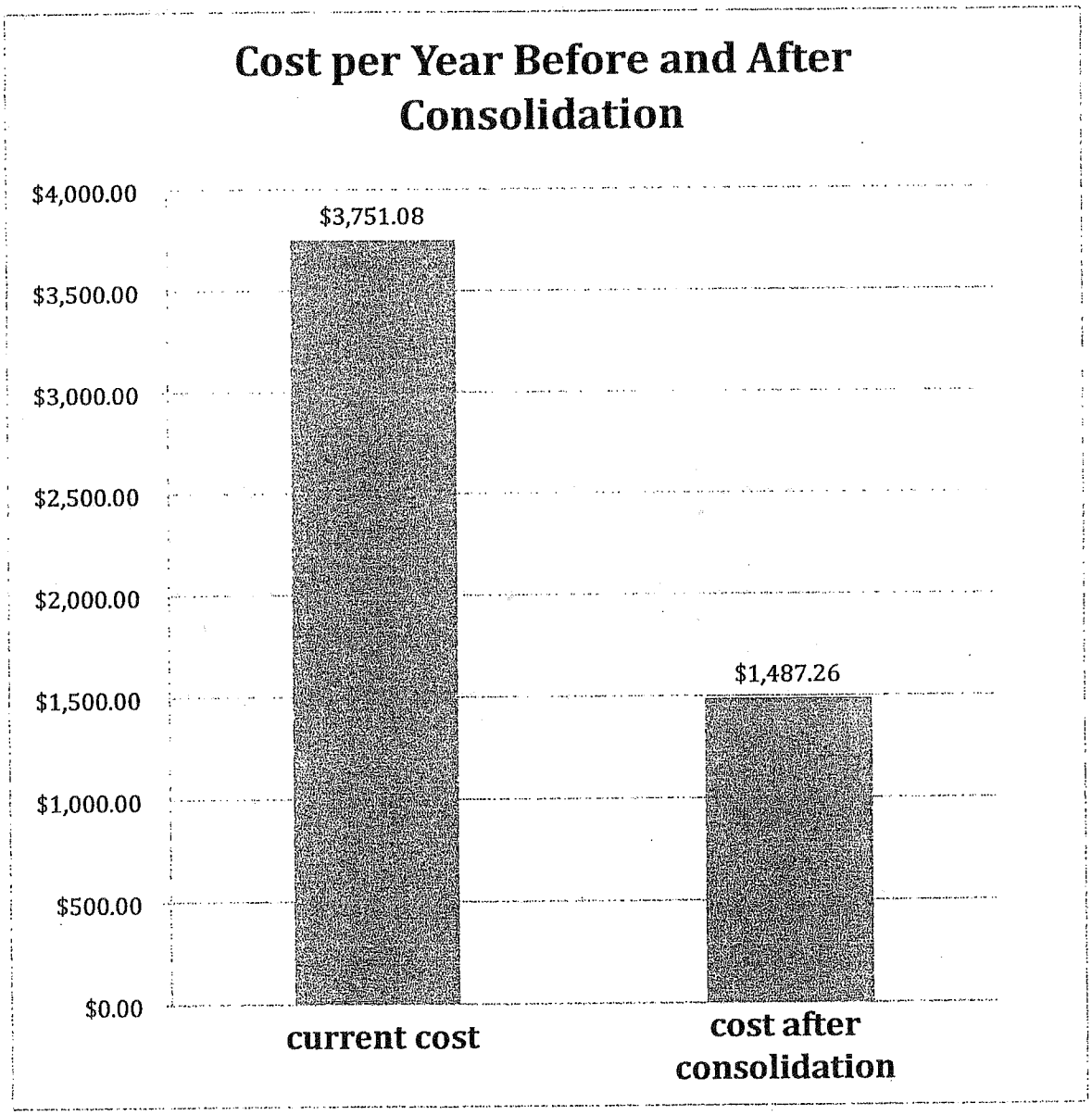
Our Proposal

If the library staff turns off the laptops and unplugs the power strip when they aren't being used (after 4 o'clock in the afternoon to 7 in the morning) we can reduce the energy cost by over 50%.


Cost of Lighting in the Library
$1,000.00
$900.00
$800.00
$700.00
$600.00
$500.00
$400.00
$300.00
$200.00
$100.00
$0.00
Cost of Electricity
All the lights on
Lights off over the computers
Lights

Cafeteria Refrigerating Units

By consolidating all drinks into 1 drink cooler like the vitamin water cooler the school could save about $2,200 or more a year.



Refrigerating Unit	Watts	KW	Time per Year	Cost per KWH	KWH per Year	Cost per Year	Temp. F°
Ice Cream Freezer	445	0.445	6912	0.1697	3075.84	$501.97	0°
Arizona Drink Cooler	550	0.55	6912	0.1697	3801.6	$645.13	40°
Vitamin Water Cooler	840	0.84	6912	0.1697	5806.08	$985.29	40°
Dasani Vending Machine	1380	1.38	6912	0.1697	9538.56	$1,618.69	40°

watts × time/year ÷ 1,000=KWH/year

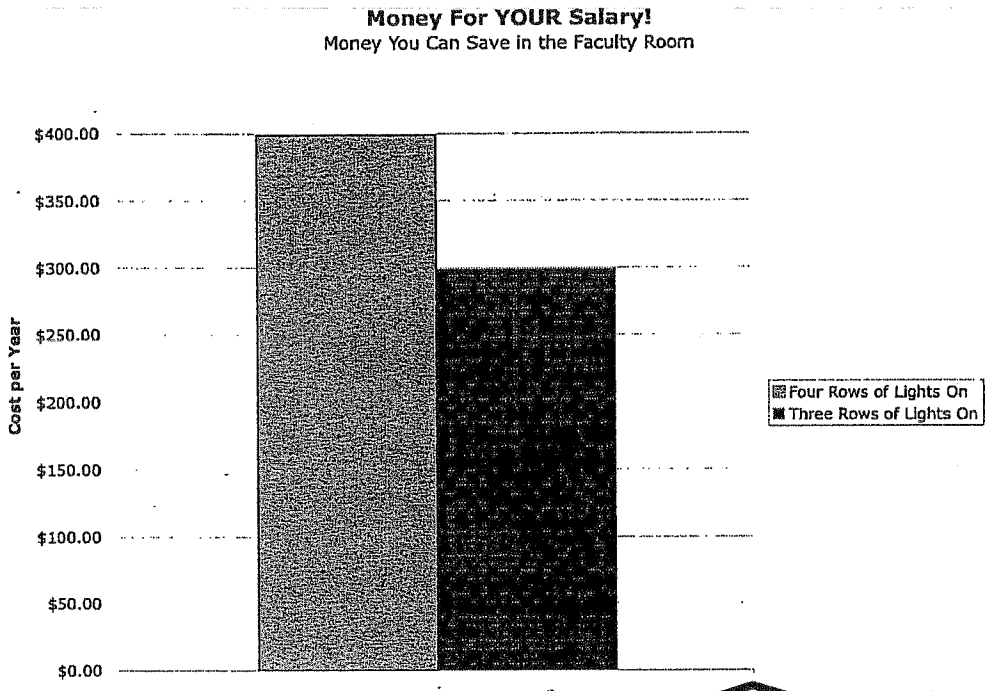
KWH/year × cost/KWH= cost/year

costs per year	KWH's per year
$501.97	3075.84 kwh
$645.13	3801.6 kwh
$985.29	5806.08 kwh
$1,618.69	9538.56 kwh
+	+

total cost/year - $3,751.08 **total KWh/year-** 22,222.08 kwh

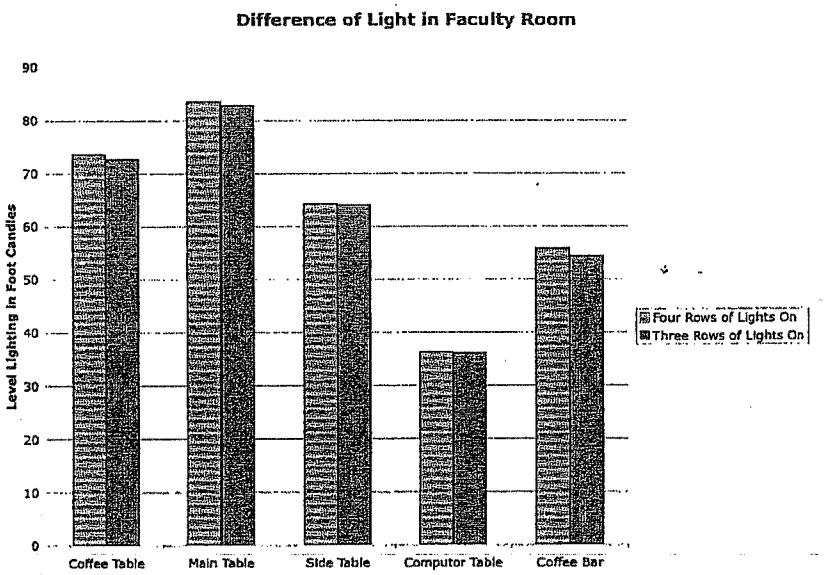
Our proposal to save energy and decrease spending is to consolidate all drinks into 1 cooler. If we get rid of the Dasani vending machine and the Arizon drink cooler we can put all the drinks in the vitamin water cooler the school could save about $2,200 a year.

Money and Lighting You Can Save in the Faculty Room



Keep one row of the lights off in the Faculty Room, and you'll save a lot of money. Its not that hard, and your little effort will amount to a lot

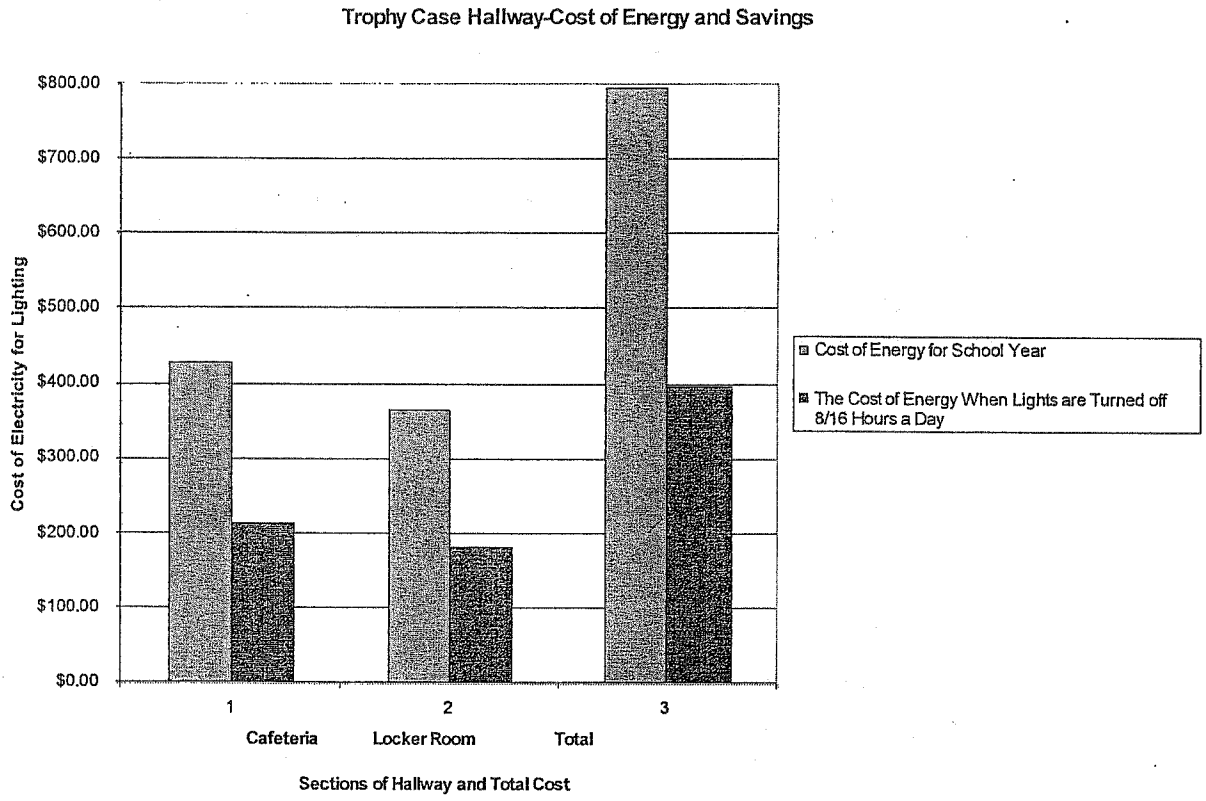
In this graph you can see that you can save up to one hundred dollars a year, if you keep only three rows of lights on instead of four. This graph is only a rough estimate of teacher school days, so it does not include weekends of vacations.



This graph shows the difference of light in the different parts of the room when one row is off. As you can see, there is hardly any.

*graphs based on 180 school days

Trophy Case Hallway Lighting*



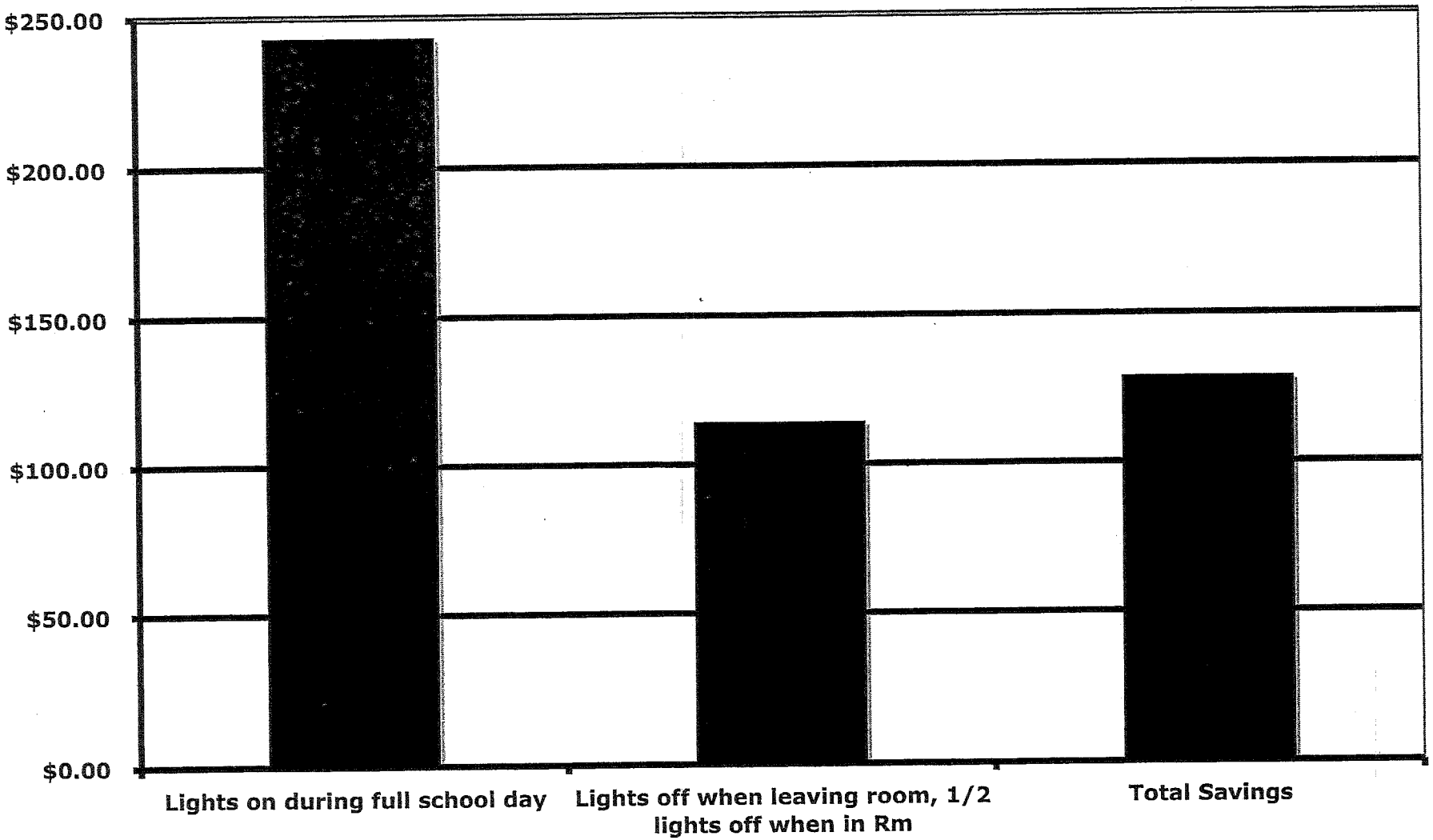
*The trophy case hallway counts as the cafeteria end of the hallway and the locker room end of the hallway not counting the center lights, near the stairs.

By turning the lights off in the trophy case hallway 8 out of the 16 hours a day the lights are on normally, the energy and cost of the lighting in the hallway would decrease by 50%.

We did a survey of 10 individuals both students and teachers, and the results were:

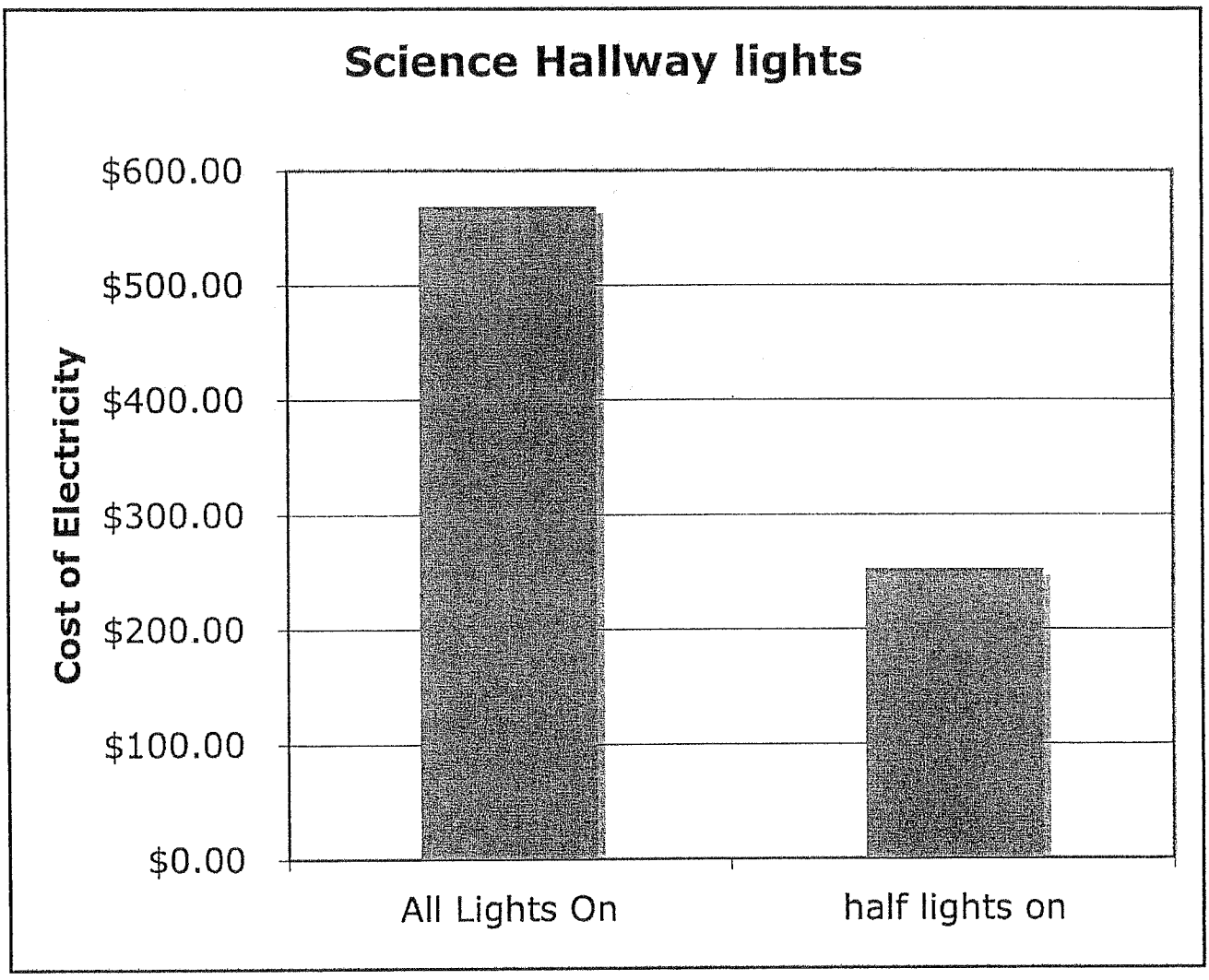
1 out of 5 people disliked the lights being off while **4 out of 5** agreed that by turning the lights off not only was it safe, but they preferred it.

Lighting Electricity Savings For Rm 8

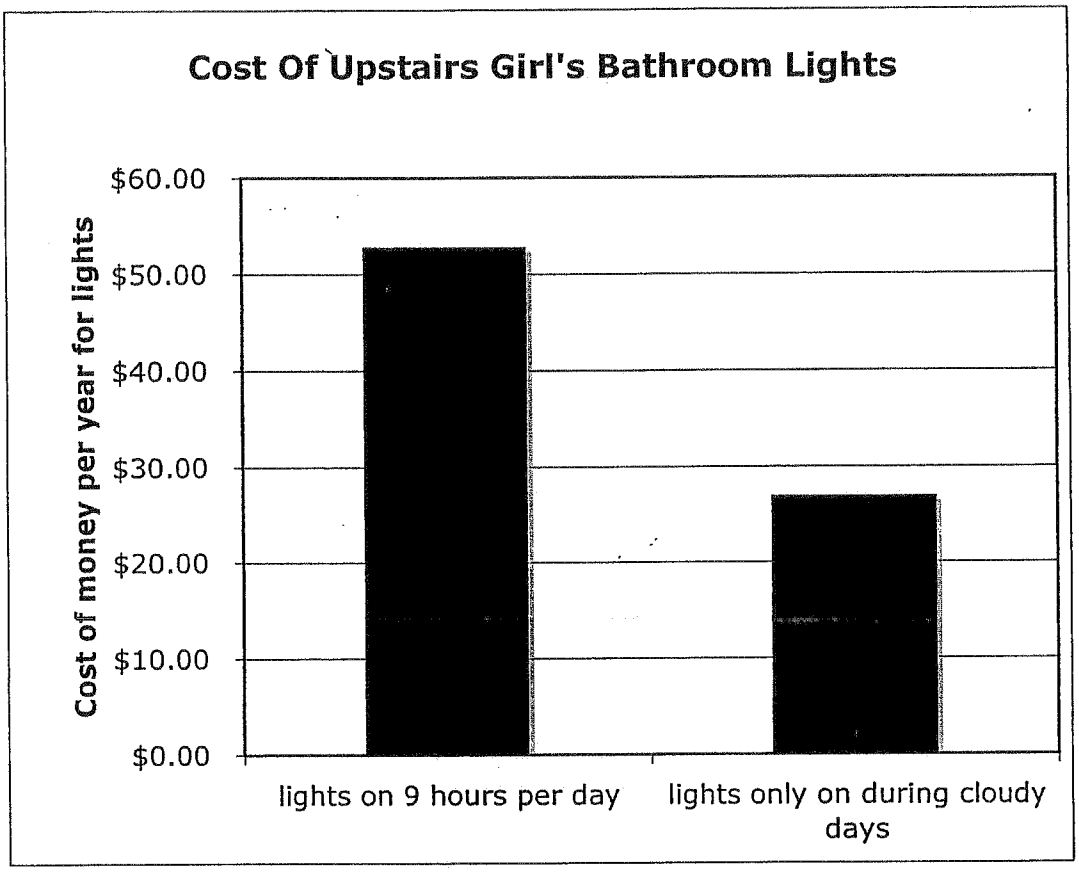


Science Hallway Lighting

Turning off one of the light switches a day will still give off enough light to see, and will save energy and money.



lights on 9 hours per day	$52.78	
lights only on during cloudy days	$26.92	3B 2/10/09



We propose to turn off the lights in the bathroom on sunny days. The windows provide enough light.

51%-60% of days in maine are sunny

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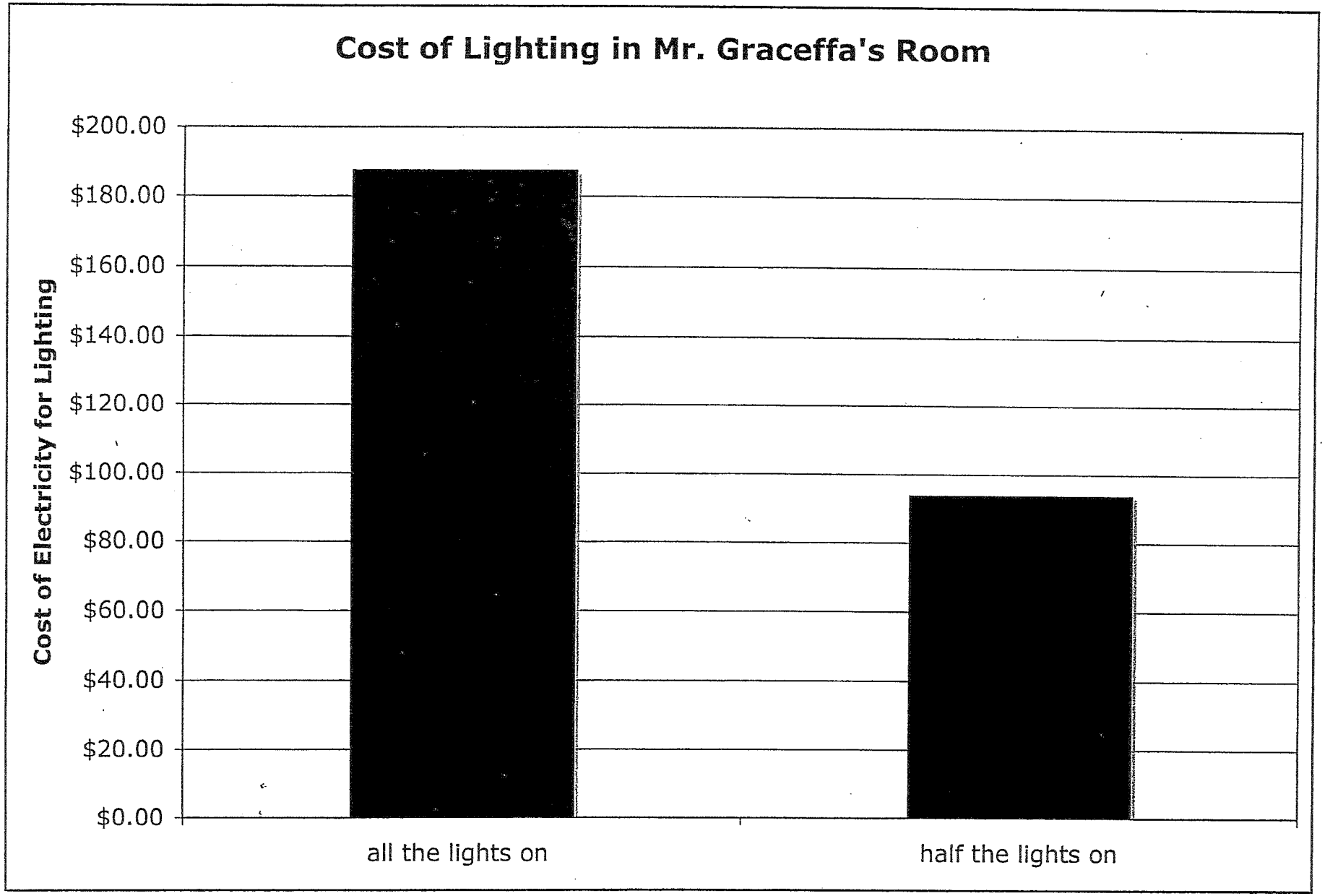
Cost of Lighting in Mr. Graceffa's Room
Cost of Electricity for Lighting
$200.00
$180.00
$160.00
$140.00
$120.00
$100.00
$80.00
$60.00
$40.00
$20.00
$0.00
all the lights on
half the lights on