



HOW TO SAVE THE EARTH ONE LIGHT BULB AT A TIME

By: The Electrical Engineers of Harlem Academy

# INTRODUCTION

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- ✘ The students that are in R.P.I electrical engineering class have been working with different types of lights.
- ✘ We will be covering Control of LEDs, Heat efficiency, Color, and Environment/Types of Light Bulbs.

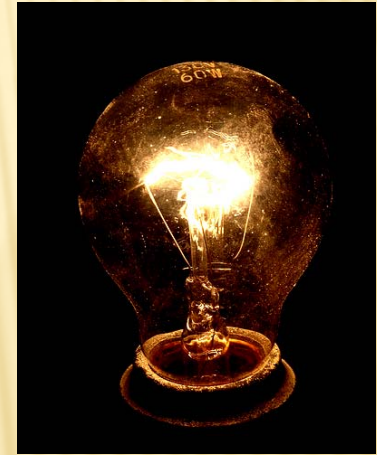


# TYPES OF LIGHT

- ✘ LEDs- Light Emitting Diode
- ✘ Incandescent- Regular light bulbs
- ✘ CFLs-Compact Fluorescent Light



CFL



Incandescent



LED

# INCANDESCENT

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- ✘ Incandescent light bulbs give out the most heat of available light bulbs.
- ✘ They last 3000 hours which really isn't a lot of time.
- ✘ An Incandescent light bulb's filament is 2000 degrees Fahrenheit.

# CFL

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- ✘ CFLs cost about \$5.80 at the store
- ✘ They last for 10,000 hours, that's a lot of time.
- ✘ CFL's are more efficient than incandescent bulbs but not as efficient as LED's
- ✘ They also have mercury in it so it needs to be handled carefully.
  - + Mercury is very toxic to plants and animals.



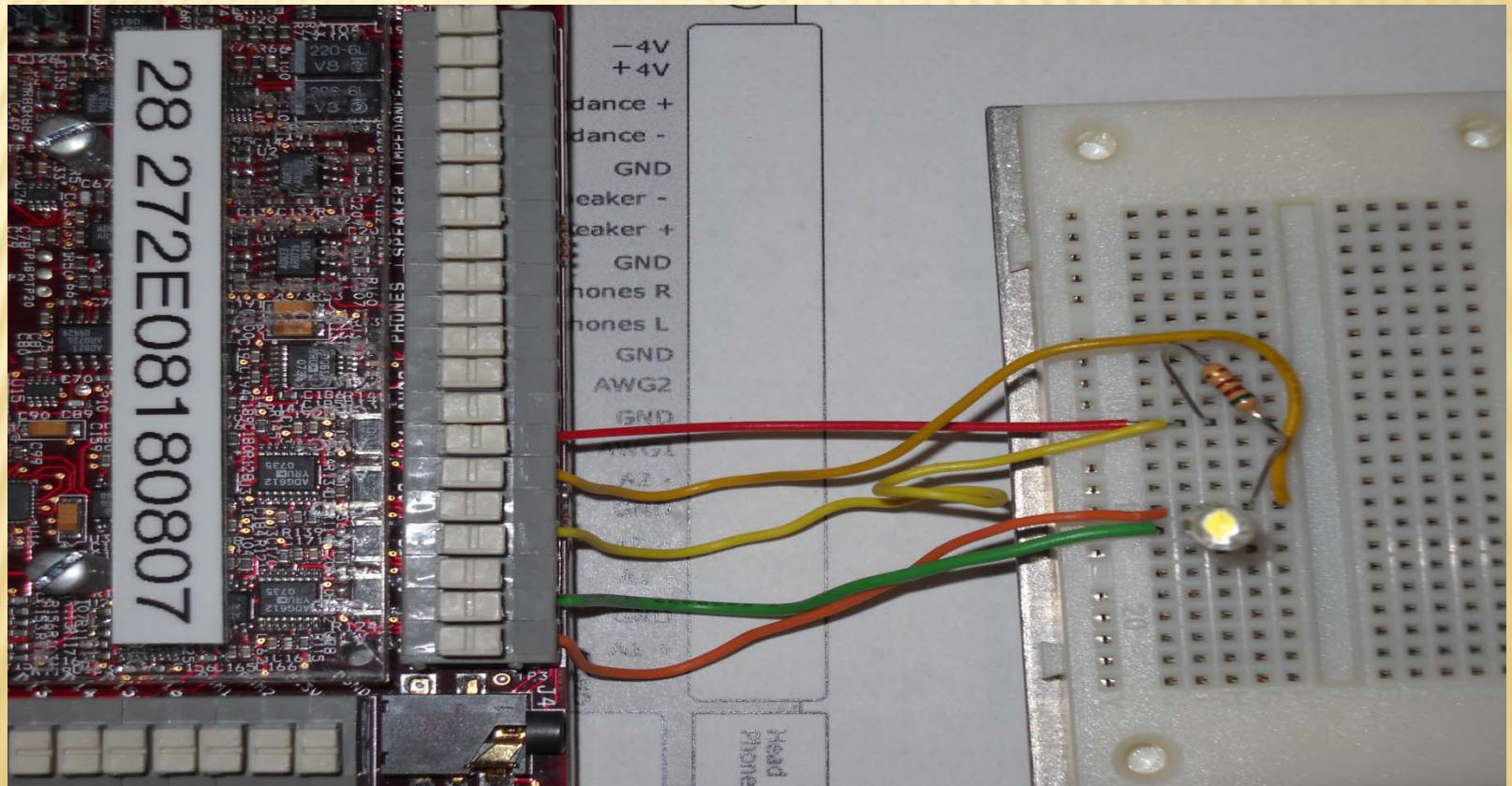
# LED

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- ✘ LED is the most earth friendly light bulb ever.
- ✘ They last for about 10 years(43,000 hours)
- ✘ It is difficult to break by dropping.
- ✘ The catch is it's \$50 bucks.
- ✘ LED lights are used as light on videos and high LED lights are used to produced white light.

# CONTROL OF LIGHT

- ✘ You can use a Mobile Studio Board/MSB



# HOW TO USE THE MSB

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- ✘ To use the MSB you need to connect you will connect wires to the A1+ socket to the circuit board so the lights so you can power the LED light



# LED CONTROL SUMMARY

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- ✘ LED lights are better than the common light and they are more durable than incandescent
- ✘ Control LED brightness

# BULB COMPARISON

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## LED Bulb

- ✘ The LED light is a bulb
- ✘ Introduced by Jacques Panvoke
- ✘ This light bulb was invented to decrease the amount of energy used.

## Incandescent bulb

- ✘ The Incandescent bulb was invented by Thomas Edison.
- ✘ His event was the most effective.





# LIGHT & EFFICIENCY

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- ✘ All light produces heat
- ✘ The amount of heat produced from a light bulb depends on the efficiency of the bulb
- ✘ LED lights are more efficient than Incandescent bulbs

# THE CHOCOLATE BAR COMPARISON

## LED CHOCOLATE

- ✘ The LED chocolate after 40 minutes

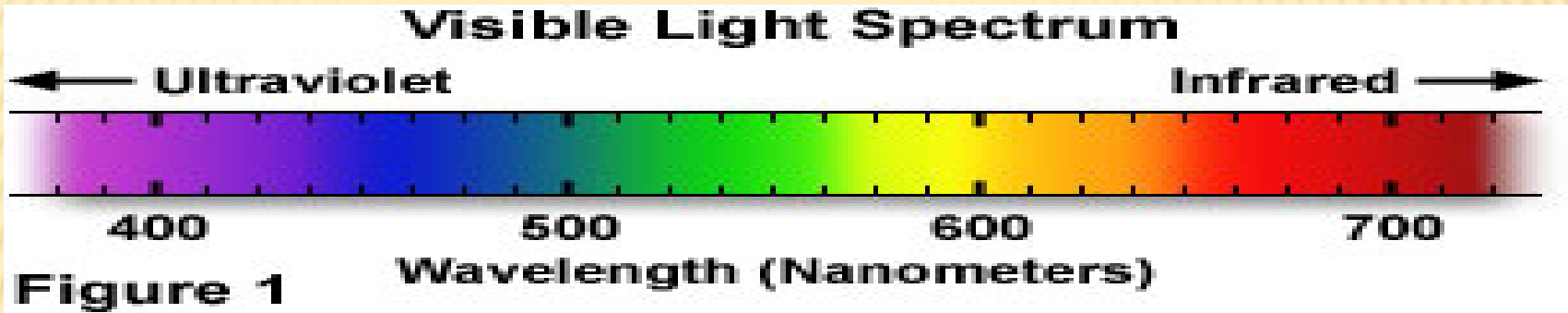


## INCANDESCENT CHOCOLATE

- ✘ The incandescent chocolate after 10 minutes

Bulb melted the plate





**THIS VISIBLE LIGHT SPECTRUM ONLY SHOWS THE WAVELENGTHS THAT THE HUMAN EYE CAN RESPOND TO.**

**THE HUMAN EYE CAN ONLY SEE APPROXIMATELY 400-700 NANOMETERS (A NANOMETER IS ONE BILLIONTH OF A METER).**

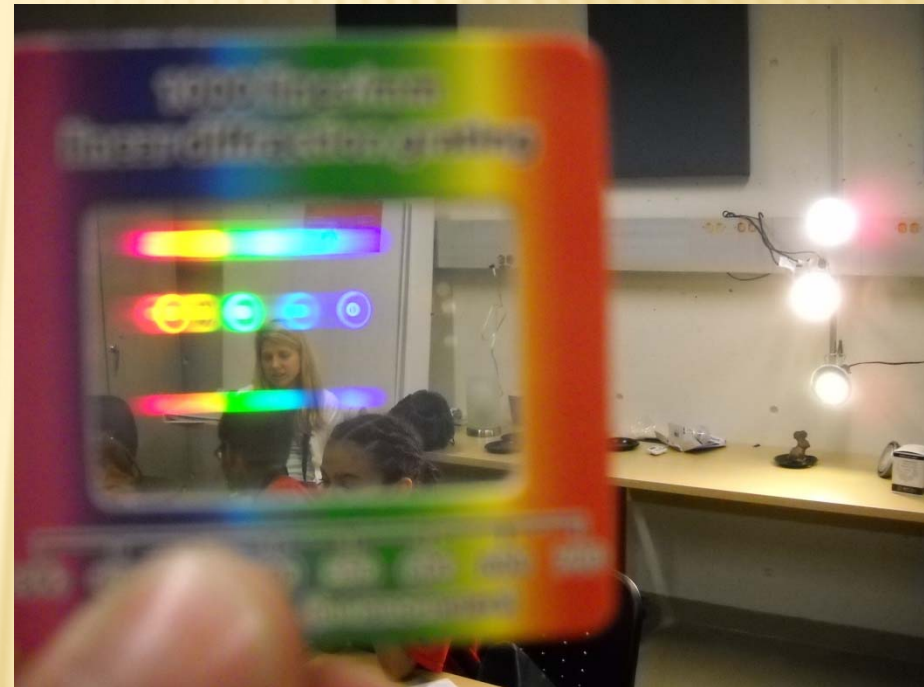


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**THE COLOR DIFFERENCE BETWEEN THE THREE LIGHT BULBS ARE DIFFICULT TO SEE. A LED LIGHT IS EASY TO SEE BECAUSE ITS SO BRIGHT. A CFL LIGHT IS DIFFICULT TO SEE BECAUSE IT SO DIM. A INCANDESCENT LIGHT IS A LIGHT THAT YOU ALMOST SEE EVERYDAY IN YOUR HOMES.**

# WHAT IS WHITE LIGHT?

- ✗ We looked at white light using a diffraction grating
  - + We saw a rainbow
- ✗ Each color has a different wavelength.
- ✗ Red= longest wavelength, Violet= Shortest wavelength.
- ✗ When all of these colors are seen together they make a White light.



# TELEVISION!

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- ✘ You would think the LED lights are the color that shows on the TV screen. You thought wrong.
- ✘ The vision that you get comes from pixels but pixels come from LED lights. The LED colors in a television are red, blue, and green but now there are some yellow ones in newer televisions.
- ✘ Red, blue and green are the only colors needed to make any other color (especially on the TV screen).



# HOW TO MAKE THE WORLD BETTER

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- ✘ Less CFL bulbs because the mercury is going to kill our environment.
  - + Also don't throw out CFL bulbs without proper disposal
- ✘ Using more LED lights can make a change.
  - + They will save you money in the long run.
  - + LED lights last much longer than conventional lighting, so they won't need to be replaced as often.

# CALCULATIONS

- ✘ We did calculations for different light bulbs for 12 hours a day for 10 years.

Type of bulb	Cost of energy
Incandescent	\$394.20
CFL	\$59.13
LED	\$50.93

# CALCULATIONS

- ✘ We figured out the total cost for different bulbs over 10 years including energy cost and bulb replacement cost.

Type of bulb	Total cost
<b>Incandescent</b>	<b>\$408.80</b>
<b>CFL</b>	<b>\$84.75</b>
<b>LED</b>	<b>\$103.49</b>



# HOW TO CONSERVE ENERGY USING DIFFERENT TYPES OF LIGHTS?

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## ✗ Incandescent

- + Pro: very cheap bulbs
- + Con: least energy efficient (gets very hot)

## ✗ CFL

- + Pro: more energy efficient than incandescent
- + Con: more expensive than incandescent, contains toxic mercury

## ✗ LED

- + Pro: most energy efficient (not as hot)
- + Con: most expensive bulb

# QUESTIONS?

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