

Name _____ Date _____
Period _____ Points available: _____

Physics School Closure Agenda

- First priority: stay safe and healthy.
- The chapters we are working on are chapters 22 and 23. Read through them and answer the questions at the ends of the sections.
- Build your flashlights. They need to have an Off/Low/High setting. They will be collected when we return from closure.
- Do your home energy audit. If you can, do it on Excel because that will make it much easier. If you can't do it by hand. This will also be collected when we return from closure.
- There is an assignment to write a short story about what life would be like without electricity. If you make me laugh out loud, I will give you bonus points.
- I have included the problem set for Ohm's Law and Power for you to review if you are bored.

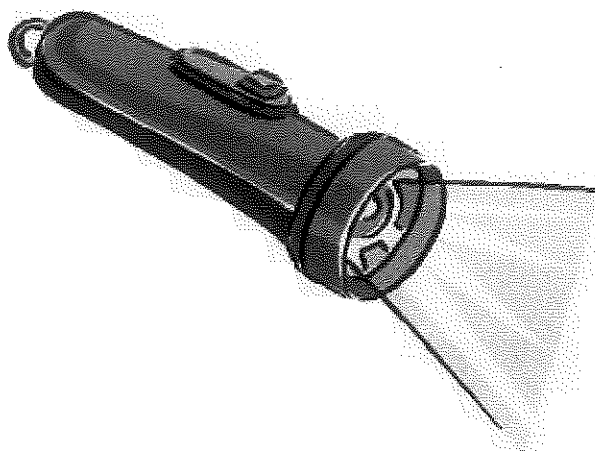
I will miss all of you. If you have any questions about any of the projects, text me (860)-593-8592

Brown

Blank

Physics

Project – Flashlight



Electronics: 1. *A branch of physics that deals with the behavior, emission, and effects of electrons.*
 2. *Devices, components, or equipment that utilize electricity to work.*

Electronic devices are all around you; you use them every day, all day long. In your world they have become essential parts of your everyday life. In this project you are to design and construct a basic electronic device; a flashlight. You are to build it from scratch using the principles you have learned in class. The flashlight must have three brightness settings; off, low, and high.

- The device must be a DC device that is powered by a maximum of 6V.
- The only specifically engineered components you may use are batteries, bulbs, wire, and a switch (the switch may not have dimming capabilities)
- You may not use any pre-made circuitry (circuit boards, chips, dimmers, etc.).
- The operation must be controlled solely by the switch; the switch must be what controls the brightness of the bulb
- The brightness must be manipulated through the design of the circuitry.
- Although it is a prototype, it must be designed with durability in mind. It may not have exposed wiring that could be affected by typical usage.

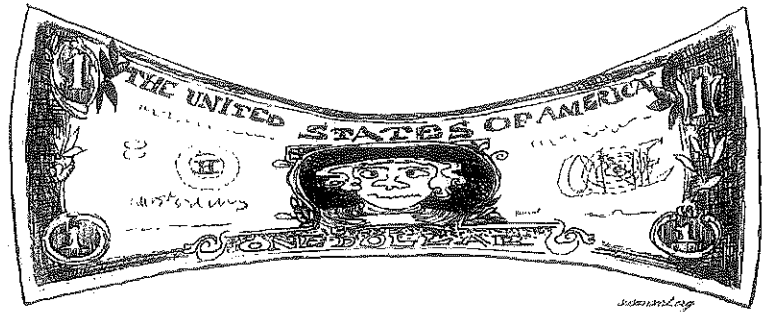
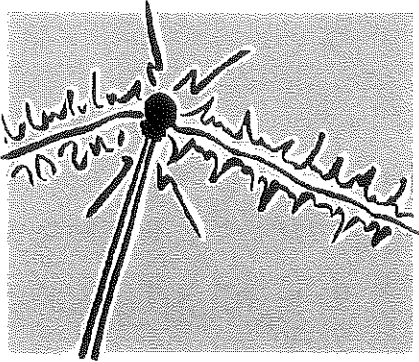
<u>Grading:</u>	<u>Points</u>
• Clear wiring diagram of the device	10 points
• Working model of device	30 points
• Current and power calculations for each switch position	10 points

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50•2

Physics

Project – Electricity Audit



Is your house as efficient as possible? Are you wasting precious money each day due to unnecessary electricity consumption? Each time you turn something on at home it costs you money. Sometimes, you don't even have to turn it on for it to cost money. You are going to perform a mini electricity audit to find out. Your audit will begin by identifying **everything** in your house that consumes electricity. Once you have generated a complete list, you are to determine how much energy each item consumes per month and what each item costs to use per month. With this list you are to evaluate your home electricity consumption, and make five (5) recommendations for improvement.

Requirements:

Electrical appliance spreadsheet: (20 points)

You are to create a spreadsheet (preferably in excel) that identifies everything in your home that uses electricity. Each item is to have its own line on the spreadsheet. The following information must be included; name of item, wattage of item, hours used per month, cost to use per month. Once the spreadsheet is completed you are to calculate the total monthly energy consumption and cost for your house. In order to complete this section you will need to evaluate a recent electricity bill to get a baseline number for energy consumption in your home and to determine your specific cost per kWh. This calculation must be included.

Usage Evaluation: (20 points)

Using the spreadsheet you are to perform a written evaluation of how your home uses electricity. You are to thoughtfully analyze the energy consumption. This will be grading according to the depth, clarity, and thoughtfulness of your analysis.

Recommendations: (10 points)

Once you have evaluated your home energy consumption, you are to make five (5) recommendations to reduce your energy consumption. These recommendations should clearly identify what you proposed to do. The recommendations should also include calculations that identify both the amount of energy that will be saved and the amount of money that will be saved.

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30

Physics

Worksheet – Ohms Law Problems

$V=IR$ $P=IV$

**Most things plugged into a standard wall outlet draw 120V*

1. Which circuit will have brighter bulbs and why? Three identical bulbs connected to a six volt battery in series or 3 identical bulbs connected to a six volt battery in parallel?

2. Which battery in question 1 will die out faster and why?

3. What physically happens when a light bulb burns out?

4. Which will do more damage; connecting a 110V toaster into a 220V outlet or plugging a 220V toaster into a 110V outlet? Explain your answer.

5. What is the resistance of a toaster if 120V produces a current of 4.2 amps through it?
6. A coffee pot is rated at 1,500W. How much current does it draw, and what is its resistance?
7. What voltage produces a current of 0.25A when connected to a 3800Ω resistor?
8. A hair dryer draws 7.5A when plugged into a 120V outlet. What is its resistance?
9. An electric clothes dryer has a heating element with a resistance of 9.6Ω . What is the current in the element when it is connected to a 240V outlet?
10. A 12V battery causes a current of 0.6A through a resistor. What is its resistance and how many joules of energy does it use in a minute?
11. What is the maximum power consumption of a 3.0V MP3 player that draws a maximum current of 320mA?
12. A 120V hair dryer has 2 settings: 850W and 1250W. At which setting do you expect the resistance to be higher? After you make a guess, determine the resistance at both settings. Were you correct?
13. A 115V fish tank heater is rated at 110W. Calculate the current through the heater and the resistance of the heater.
14. How many 100W bulbs can you connect to a 120V circuit without blowing a 15A fuse?

Points available:

30

Short Story: My Life Without Electricity

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

