



# Flashlight Project



Your assignment is to create a flashlight using household materials and to create a report to go along with your flashlight. This project will count as a test grade.

## FLASHLIGHT

### Flashlight Requirements

Your flashlight must:

- Be made out of household materials
- Have a switch that will allow you to turn it off and on
- Be designed so that the batteries are easily replaceable
- Be able to withstand a reasonable amount of abuse without falling apart.



**Creativity:** A creative use of household supplies. The supplies used demonstrate thought and careful consideration. Creative methods of designing the switch and solving the problem of needing to replace the batteries can affect this grade.

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Example Scores:

- 4 --Putting a bulb in the horn of your trumpet so that when you press down one of the valves, the light turns on.
- 1 --Using standard flashlight parts.  
 --Handing in a simple circuit with just a battery, a bulb, and a wire.  
 --Handing in the example I just gave you above.

**Functionality:** How well does the flashlight work?

Does it turn on and off reliably?

Does it stay on without flickering?

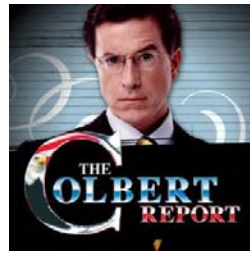
Will it withstand a reasonable amount of abuse?

Is the light bulb protected?

Does the light bulb produce a reasonable amount of light, or is it so dim that you can hardly even see the light?

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# REPORT



Your report will have two main sections: *Explanation of Your Flashlight* and *Explanation of the Physics of a Flashlight*. The *Explanation of Your Flashlight* section will be graded on completeness and professionalism. The *Explanation of the Physics of a Flashlight* section will be graded on how thoroughly you explain the physics, as well as how professional that part of the report is.

## *Explanation of Your Flashlight*

*Your report must include* explanations of:

- What you had to consider when building this flashlight.
- What struggles you had along the way.
- How you overcame those struggles.
- How satisfied you are with your flashlight.
- What you would change if you could.

*Your report must include* a list of the parts used to create your flashlight with an explanation for each part.

*Your report must include* a mechanical drawing of your flashlight.

**Completeness/Professionalism:** Did you complete all sections professionally? (This section of your report should be about a  $\frac{3}{4}$  - 1 page long, SINGLE SPACED, not including the mechanical drawing.)

*Things to consider about your report:*

Is it typed?

Are there spelling errors?

Are there grammatical errors?

Did you thoroughly explain each of the bulleted items?

Did you draw the mechanical diagram neatly?

I do not grade based on artistic ability, I grade based on a clear indication of maximal effort. This should not take you a minute to complete—you should spend a lot of time making it as professional as possible. Use a straight edge (ruler) to make straight lines, write very neatly when labeling, etc.

Did you sketch it reasonably to scale?

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## *Explanation of the Physics of a Flashlight*

Let's face it, this is a physics class. This is the part of the report in which you must thoroughly explain the physics of the flashlight. You will need to do research to find some of these answers. (This section of your report should be 1-2 pages SINGLE SPACED, not including the light bulb diagram.)

- What makes a light bulb light?
- Provide a diagram of a light bulb with each part labeled. Provide an explanation of the purpose of each part. Note: You may use a diagram from the internet, but you must explain the purpose of each part in your own words.
- Why does the filament in the light bulb glow?
  - Describe the filament.
    - Why is it designed with this material and in this shape?
  - What does the word "filament" mean?
- Why don't the wires connecting the bulb and the battery glow?
- What is the purpose of the glass "bulb" that surrounds the inner wires? (Hint: The glass bulb's ability to protect the inner wires is only a secondary benefit—that is not the glass bulb's main purpose.)
- How do the electrons move through your circuit?
- How does the switch work?
- What would happen if you added more batteries?
- What would happen if you added too many extra batteries?

Feel free to add more information about the physics of your flashlight if you would like.

Include a properly formatted bibliography listing the sources you used.

**THE MORE THOROUGHLY AND CORRECTLY YOU ANSWER THESE QUESTIONS THE BETTER YOUR GRADE WILL BE.**

For example, if you answer the question "What makes a light bulb light?" by simply saying, "Electricity is what makes a light bulb light," you have not thoroughly explained the physics.

**Thoroughness/Professionalism:** Did you answer all questions thoroughly? Is this part of your report done professionally?

*Things to consider:*

Is it typed?

Are there spelling errors?

Are there grammatical errors?

Did you thoroughly answer each question?

Did you cite your sources in a properly formatted bibliography?

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***Have fun with this project... and make it easy for me to give you a great grade!!***