How the flashlight works

A flashlight is powered by batteries. They create an electrical current that flows through metal contacts and brings electricity to the lamp in the flashlight. A thin wire in the light bulb is connected to the batteries.
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Step-by-step: How to put the flashlight together

1. Put the battery spring and place it in the tail cap.

2. Take the batteries and put them in the battery holder.

3. Place the lame protector inside the frame from the top of the frame.

4. Put the battery holder inside the frame from the bottom.

5. Put the tail cap on the frame from the bottom, then close it.

6. Put the halogen lamp in the reflector.

7. Put the reflector with the halogen in it inside the frame from the top.

8. Put the lens in the face cap.

9. Put the face cap on the frame form the top, then close it.

10. Put the switch seal in the hole in the center of the frame.
### BILL OF MATERIALS

<table>
<thead>
<tr>
<th>Product #</th>
<th>Name</th>
<th>Qty</th>
<th>Dimension</th>
<th>Function</th>
<th>Interaction with other parts</th>
<th>Research cost</th>
<th>Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>lens</td>
<td>1</td>
<td></td>
<td>protect the light</td>
<td>keeps the light protected</td>
<td>15 ¢</td>
<td>EBay</td>
</tr>
<tr>
<td>2</td>
<td>battery</td>
<td>3</td>
<td></td>
<td>energy</td>
<td>energy source</td>
<td>$1.80 x3</td>
<td>EBay</td>
</tr>
<tr>
<td>3</td>
<td>reflector</td>
<td>1</td>
<td></td>
<td>reflect the light</td>
<td>reflects light from the light bulbs</td>
<td>1.42</td>
<td>EBay</td>
</tr>
<tr>
<td>4</td>
<td>tail cap</td>
<td>1</td>
<td></td>
<td>keeps the battery in</td>
<td>holds the batteries in</td>
<td>99 ¢</td>
<td>EBay</td>
</tr>
<tr>
<td>5</td>
<td>face cap</td>
<td>1</td>
<td></td>
<td>holds the lens</td>
<td>holds the lens and the lights</td>
<td>70 ¢</td>
<td>EBay</td>
</tr>
<tr>
<td>6</td>
<td>battery spring</td>
<td>1</td>
<td></td>
<td>for electrical current</td>
<td>used as an electrical current</td>
<td>27 ¢</td>
<td>EBay</td>
</tr>
<tr>
<td>7</td>
<td>screw</td>
<td>1</td>
<td></td>
<td>holds the halogen light</td>
<td>holds the light in place</td>
<td>31 ¢</td>
<td>EBay</td>
</tr>
<tr>
<td>8</td>
<td>battery holder</td>
<td>1</td>
<td></td>
<td>holds the batteries</td>
<td>connects batteries to the lights</td>
<td>1.19</td>
<td>EBay</td>
</tr>
<tr>
<td>9</td>
<td>switch seal</td>
<td>1</td>
<td></td>
<td>turns it on and off</td>
<td>turns the light on and off</td>
<td>70 ¢</td>
<td>EBay</td>
</tr>
<tr>
<td>10</td>
<td>halogen lamp</td>
<td>1</td>
<td></td>
<td>project light</td>
<td>gets power from the batteries</td>
<td>60 ¢</td>
<td>EBay</td>
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<tr>
<td>11</td>
<td>lamp protector</td>
<td>1</td>
<td></td>
<td>protects the light</td>
<td>protects and holds the light</td>
<td>$1.05</td>
<td>EBay</td>
</tr>
<tr>
<td>12</td>
<td>frame</td>
<td>1</td>
<td></td>
<td>holds everything together</td>
<td>holds all the parts</td>
<td>$1.18</td>
<td>EBay</td>
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</table>
### PURPOSE OF THE FLASHLIGHT

- **What is a flashlight?**

  A flashlight is a portable electrical light source, in which the light source is connected to batteries by a small thin wire.

- **How does a flashlight work?**

  A flashlight is powered by batteries. They create an electrical current that flows through metal contacts and brings electricity to the lamp in the flashlight. A thin wire in the light bulb is connected to the batteries.

- **How to use a flashlight?**

  The use of a flashlight is very easy; it is a simple-to-use device. You only need to move the switch to make a flashlight work. The switch is located at the center of the frame.
## Engineering Exploration Design Team Contract

**Group Number:** 8  
**Date:** 10/0/14

**Team Spokesperson for this assignment/project:**

<table>
<thead>
<tr>
<th>Member Name</th>
<th>Roles</th>
<th>Initials</th>
<th>Phone #</th>
<th>Email Address</th>
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<tbody>
<tr>
<td></td>
<td>Supervisor</td>
<td></td>
<td>N/A</td>
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<tr>
<td></td>
<td>Team Leader</td>
<td></td>
<td>N/A</td>
<td></td>
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</tr>
</tbody>
</table>

**Team Goals:**  
* Finish the project

**Responsible Members**

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**Team Performance Expectations**

- Everyone do their part
- Get in time
- Communicate well

**Strategies for Conflict Resolution (provide at least 3)**

- Talk about the problem
- Use a teacher
- Find more solutions

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Based on page 73 of *The Mechanical Design Process* (4th edition)  
By Professor David G. Ullman, © 2008, McGraw-Hill
CONCLUSION

- Improvements

  - The flashlight could be battery and solar powered.
    - Solar panel
    - Dimmable flashlight
      - Dim switch
      - Bright dim switch
      - Low
    - Break resistant
      - Metal tube inside a plastic foot
Project improvements

- 3 or more people per group. Things would get done faster if all groups had 3 or more people.

- More time to plan. I think we should have had a little more time to plan on who would do what and what we would take apart and how.

- Turn in Notebooks instead of online. We should be able to turn in and submit them online because it's easier.

Feedback: Overall this was a fun project. It's better than doing classroom works and it's interesting to learn about how different parts work.

Team evaluation: Our team did well. We were able to get our project done fast and in good quality. Bader was great.
Conclusion:

Our group did what we were supposed to do. We were able to successfully take apart the flashlight and begin on the required documents. We did well being partners. We both did what we were expected to do and we're able to get our work done.