Let There Be Greener Light!

You can save energy, money, and time as well as reduce waste by replacing the incandescent lightbulbs in your home with more energy efficient products. Compact fluorescent lightbulbs (CFLs) use less energy and last longer, which means you do not have to buy them, replace them, or throw them away as often as incandescent bulbs.

As a director of Bright Savior, a home energy preservation group, you must evaluate the lighting in a kitchen and then design a “greener” lighting plan that saves energy without sacrificing the function of the lighting.

Identify the Problem

☐ 1. What problem will your lighting plan help to solve? ________________________________________________________________

☐ 2. Why is there a need to solve this problem? ________________________________________________________________

Do Research

Examine the table below, which describes the current lighting for a large kitchen.

<table>
<thead>
<tr>
<th>Type of Lighting Fixture</th>
<th>Type of Bulb</th>
<th>Number of Bulbs</th>
<th>Wattage of Each Bulb</th>
<th>Number of Hours Each Bulb Lasts</th>
<th>Type/Purpose of Lighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fan/light fixture</td>
<td>Incandescent</td>
<td>4</td>
<td>60</td>
<td>1,000</td>
<td>Central area lighting</td>
</tr>
<tr>
<td>Recessed lighting</td>
<td>Incandescent</td>
<td>4</td>
<td>100</td>
<td>2,000</td>
<td>Area lighting for whole room</td>
</tr>
<tr>
<td>Floor lamp</td>
<td>Halogen</td>
<td>1</td>
<td>300</td>
<td>2,500</td>
<td>Area lighting for corner with table</td>
</tr>
<tr>
<td>Lamp</td>
<td>Incandescent</td>
<td>1</td>
<td>90</td>
<td>750</td>
<td>Area lighting for countertop under 3 cabinets</td>
</tr>
<tr>
<td>Lamp</td>
<td>Incandescent</td>
<td>4</td>
<td>15</td>
<td>1,200</td>
<td>Area lighting for countertop under 2 cabinets</td>
</tr>
</tbody>
</table>
3. What is the total number of bulbs used in this kitchen? ______________________

4. What is the total number of watts being used in this kitchen? __________________

5. What types of bulbs are being used in this kitchen? __________________________

6. What purpose does all the lighting in this kitchen have in common? ____________

7. How does the purpose of lighting affect the “greenness” of a lighting plan?

Read the box of a compact fluorescent lightbulb.

8. Why might these bulbs be good for a “green” lighting plan? __________________

Go to the materials station(s). Pick up the box for each fluorescent lightbulb. Think about how each bulb may or may not be useful in your design. Leave the boxes where they are.

9. What are your design constraints? ____________________________

Develop Possible Solutions

10. List two ideas for reducing energy used for lighting in the kitchen. _____________

11. Do either of these ideas sacrifice the function of the lighting? Explain. __________
Choose One Solution

✔ 12. Describe your plan for reducing the energy used in the kitchen without sacrificing the function of the lighting.

_____________________________________________________________________________________________________________________________________

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Design and Construct a Prototype

✔ 13. Make a table that describes all the lightbulbs you will need for your plan. Include this information:

<table>
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</table>

Test the Prototype

Test your design.

✔ 14. What is the total number of bulbs used in this kitchen? _________________

✔ 15. What is the total number of watts being used in this kitchen? _________________
Communicate Results

16. Does your plan reduce the number of watts used in this kitchen? If yes, by how many? ___________________________________________

17. Does your plan reduce the number of lightbulbs used in this kitchen? If yes, by how many? ___________________________________________

18. Does your plan help reduce the energy used in this kitchen in any other ways? Explain. ___________________________________________

Evaluate and Redesign

19. Explain how you could change your design to save even more energy. __________

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