

Higher Product Design

Unit 1: Outcome 2

This exemplar should be used in conjunction with the marking commentary

GARDEN LAMP

PROBLEM DESCRIPTION

The DIY Outlet Homebase wants to bring out a new selection of ground garden lighting for their new 'freestyle' range. The product will be targeted at the 35+ age. The product will be sold at every Homebase outlet and therefore will have to be mass-produced. It is anticipated that 10,000 units will be required.

SELECTED DESIGN FACTORS

In order to draw up a detailed specification for this product I intend to investigate a number of design factors. The factors, the reasons for investigating them and how I intend to carry out the investigation are shown in the table below:

FACTOR	REASONS FOR SELECTION	RESEARCH METHOD
Function	<ul style="list-style-type: none"> I am not exactly sure what ground garden lighting is supposed to do I need to know what the target market expect from such a product I need to know more about the conditions the product will be used in The function will have a bearing on the materials which will require to be used The function will have a bearing on the ease of maintenance of the light 	Looking at existing products. Questionnaire
Safety	<ul style="list-style-type: none"> This is a commercial product and there will be regulations that will have to be followed The product is likely to use electricity and is therefore potentially very dangerous Although the product is aimed at adults, children will still have access to it Any safety concerns could result in a product recall which would result in considerable costs and bad press 	Internet search
Aesthetics	<ul style="list-style-type: none"> The product may have to tie in with other garden products The target market may have a desire for particular aesthetics 	Existing products Questionnaire
Cost	<ul style="list-style-type: none"> I need to know how much people would pay I need to know what similar products retail for The retail cost will allow the calculation of other costs, e.g. the costs of materials, labour etc. I need to know the projected sales in order to work out costs 	Questionnaire Existing Products
Durability	<ul style="list-style-type: none"> I need to know how long the target market expect this product to last for This will affect the materials used and therefore cost of the light. 	Questionnaire

RESEARCH

I used three methods of research, questionnaire, existing products and internet search. These methods were used to gain information on a range of factors.

Existing Products

I looked at six existing products:



Pack of 3 Weather Resistant Black Finish Solar Lights.

£14.99

Pack of three attractive marker lights that emit a soft ambient glow using white LED bulbs

Daylight charges battery – no battery or wiring needed

Height 50cm, diameter 17.5cm



Colour Changing Outdoor LED Kit

£39.99

8 light LED globe kit

Controller allows choice of colour and speed of colour change

Complete with 24m of cable and indoor transformer

Weather Resistant Black Finish Solar LED

£5.49

Produces soft glow for use as a marker light

Daylight charges battery – no wiring or tools needed

Height 42cm, diameter 12cm





3 Rock Lights

£29.99

Triple pack weatherproof stone effect rock lights.

12.5cm high, 12.5cm wide, 9cm diameter

Complete with 15 metre cable, indoor transformer and 3 x 10 watt GU 5.3 halogen bulbs

Stainless Steel Intelligent Lighting Kit

£49.99

Ideal for illuminating garden features

Includes 4 x outdoor stainless steel spike lights, a 12v indoor transformer and a dawn/dusk sensor so the light is automatically activated

Supplied with 4 x 10 watt halogen bulbs, 14m of flex to first light and 2m between each light (20m in total)



Pair of Stainless Steel Solar LED Garden Lights

£12.99

Daylight charges battery – no wiring or tools needed

Height 50cm, diameter 16cm



Questionnaire

I compiled a questionnaire (Appendix 1) and interviewed 10 people in the target market age group. 5 of the sample were male, 5 female.

Internet Research

I looked at BSI standard BS7671 (the IEE Wiring regulations) to gain information and guidelines on the wiring and the installation of the product.

RESULTS OF RESEARCH

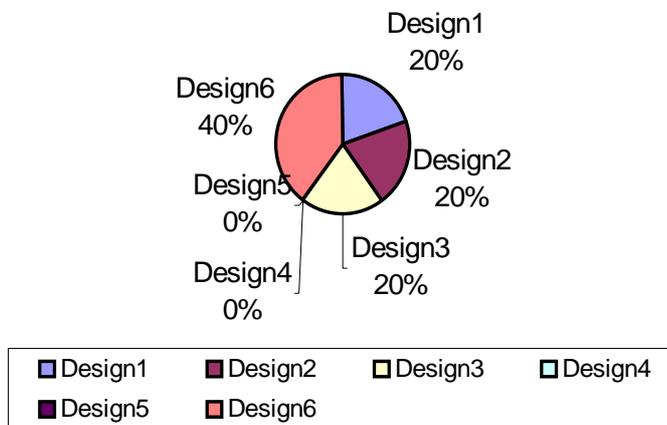
FUNCTION

It can be seen from the existing solutions garden lights can perform a variety of solutions from acting as markers to illuminating garden features and adding colour. In addition they can be manually operated or can be triggered by dawn or dusk.

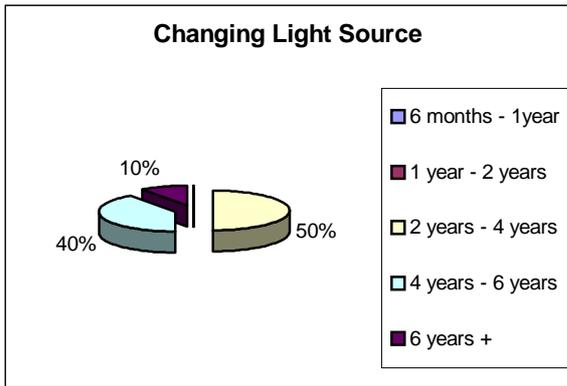
They are 3 main methods of powering them; battery, mains electricity or solar.

The people interviewed were asked several questions which related to function. The results to these questions are shown below:

Q1 Which of the existing solutions do you like best?

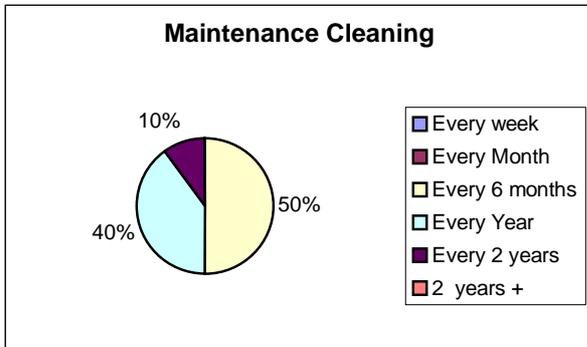


Q2 How often would you want to change the light?



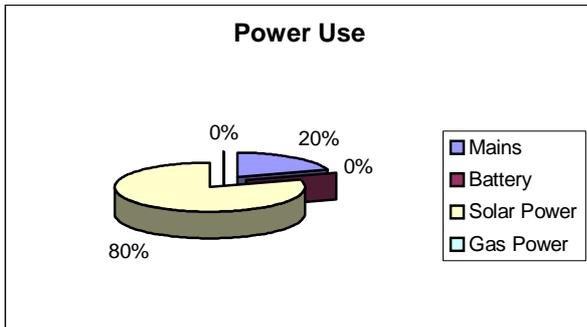
As we can see from the graph., 50% of all people would ideally change the light source of there product every 2-4 years, 40% prefer to change the light source every 4-6 years and 10% would be comfortable changing it every 6 years or over. This means that in order to satisfy the majority of people the light source will have to last around about the 6 year mark

Q3 How often would you want to carry out maintenance on the light?



From the graph we can see that 50% of all people would prefer to clean their garden light, if they were to purchase one, every 6 months. 40% of people said that they would ideally clean it every year and 10% said that they would be comfortable cleaning it every 2 years. This again means that in order to please the majority of consumers a cleaning time of every two years would be ideal.

Q4 What power source would you prefer the lamp to have?



From the graph we can see that 80% of the people asked would ideally have solar power as there power source in their garden light.

People liked the idea of solar power because it meant it would be easier to install and maintain.

SAFETY

The 16th Edition of IEE regulations make the following statements which are relevant to garden lighting:

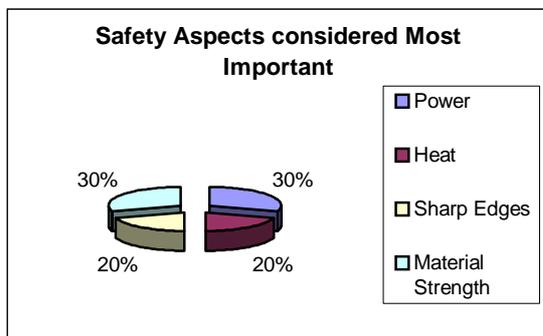
Socket outlets installed indoors but intended to provide outdoor supplies must be protected by an RCD with a maximum operating current of 30 mA. Any portable equipment not fed from a socket outlet must also be protected by an RCD with a 30 mA operating current. Outdoor sockets also require the same RCD protection and must also satisfy IP44 requirements.

Garden lighting, pond pumps and so on should preferably be of Class III construction, supplied from a SELV system and having a safety isolating transformer supply. Where 240V equipment must be used, it should be Class II double insulated (no earth) and should be suitably protected against the ingress of dust or water. If accessible Class I equipment is used its supply system must have an earth fault loop impedance low enough to allow disconnection within 0.4 s in the event of an earth fault.

Cables which are not buried must be shielded from direct sunlight, whose ultraviolet content will affect plastics. Cables with ultra-violet protected sheaths may be used; the preferred colour for such cables is black.

Safety was also touched on in the questionnaire.

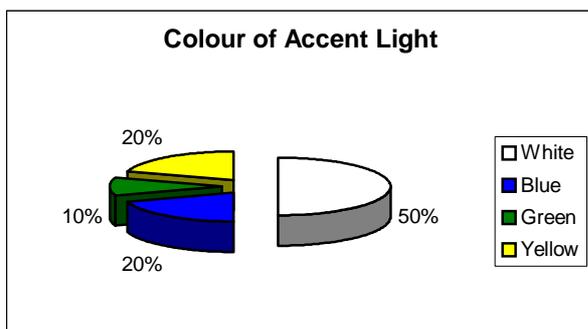
Q5 What do you think is the most important safety issue?



There is an even spread of results on this area indicating that safety is an area of concern among potential buyers.

AESTHETICS

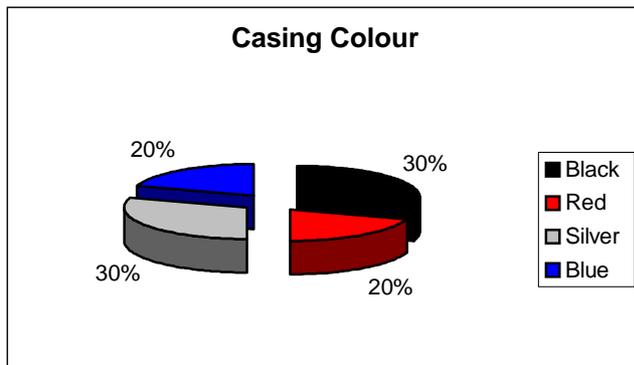
Q6 What colour of light would you like the lamp to give off?



White light is clearly the most popular. This is probably because it is neutral.

The colours could always be altered by using different bulbs.

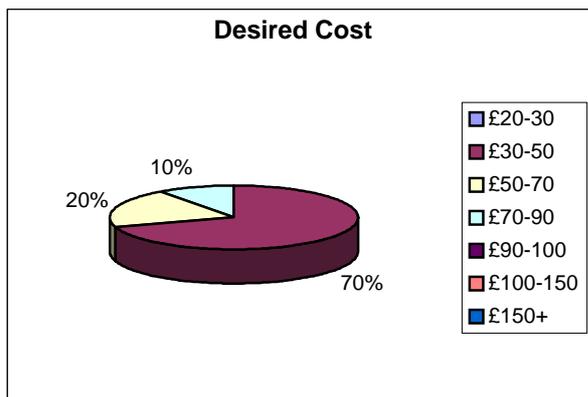
Q7 What colour would you like the casing to be?



Although black and silver were the most popular all four colours received a fair number of votes.

COST

Q8 How much would you pay for a garden lamp?



The majority of people indicated that they were willing to pay over £30 for a garden lamp – 70% were willing to pay £30-£50.

This seems to allow scope for the design since all of the existing products are priced below £50.

Calculation of manufacturing costs:

Assuming a retail price of £50 the money could roughly be split as follows:

Retailers profit	£20
Manufacturers profit	£10

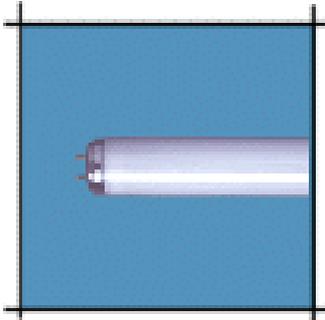
This leaves £20 for other costs.

These could be split as follows:

Labour, machine time, etc	£10
Transport	£2
Packaging	£1
Materials	£7

Standard components

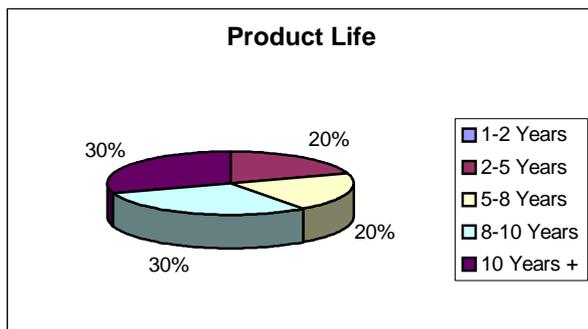
One method of reducing costs would be to use standard components such as the light fitting shown below:



DURABILITY

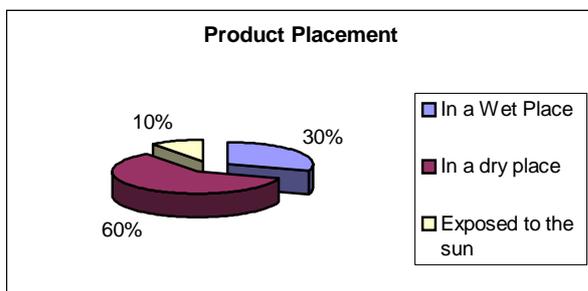
From the questionnaire:

Q9 How long would you expect the lamp to last?



It can be seen the large majority of people expect the lamp to last at least 8 years.

Q10 Where would you place the product?



Although the majority of people expressed a desire to place it in a dry place it is unlikely that this will happen. Therefore the product is liable to be affected by rain and the sun.

SPECIFICATION

1. FUNCTION

- 1.1 The product must act as a marker light
- 1.2 The product must be battery powered and be recharged by solar panel
- 1.3 The product must have a life span of 10 years
- 1.4 The bulb must last for 6 years
- 1.5 The product should require minimum maintenance – typically every 2 years

2. SAFETY

- 2.1 The product must meet the IEE regulations concerning power supplies and cables
- 2.2 The product must be safe in terms of power, material, heat and sharp edges.

3. AESTHETICS

- 3.1 The body of the product can be produced in a number of colours if costs and materials allow. However, if a range of colours proves to be uneconomical then silver and black should be used.
- 3.2 The colour of the light should be white. If costs allow additional coloured bulbs can be supplied with the product.

4. COST

- 4.1 The material costs for the product must not exceed £7
- 4.2 The product must be capable of mass production in order to keep the manufacturing costs under £10
- 4.3 The packaging must cost no more than £1
- 4.4 Standard components should be used wherever possible
- 4.5 10,000 units are to be produced in the initial manufacturing run

5. DURABILITY

- 5.1 The product must be able to withstand outdoor use
- 5.2 The product must be able to withstand the sun

Appendix 1

GARDEN LAMP QUESTIONNAIRE

Q1 Which of the existing solutions do you like best?

Design 1 2 3 4 5 6

Q2 How often would you want to change the light?

6 months-1yr 1-2 years 2-4 years 4-6 years 6+ years

Q3 How often would you want to carry out maintenance on the light?

Every week Every month Every 6 months
Every year Every 2 years Every 2+ years

Q4 What power source would you prefer the lamp to have?

Mains Battery Solar Power Gas Power

Q5 What do you think is the most important safety issue?

Power Heat Sharp Edges Material Strength

Q6 What colour of light would you like the lamp to give off?

White Blue Green Yellow

Q7 What colour would you like the casing to be?

Black Red Silver Blue

Q8 How much would you pay for a garden lamp?

£20-30 £30-50 £50-70 £70-90 £90-100 £100-150 £150+

Q9 How long would you expect the lamp to last?

1-2 years 2-5 years 5-8 years 8-10 years 10+ years

Q10 Where would you place the product?

In a wet place In a dry place Exposed to the sun