Solar Power Rechargeable LED LAMP

TQ Systems

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Overview

- The Problem
- Initial Designs
- Proposed Designs
- Issue Faced
- Costs
- Summary

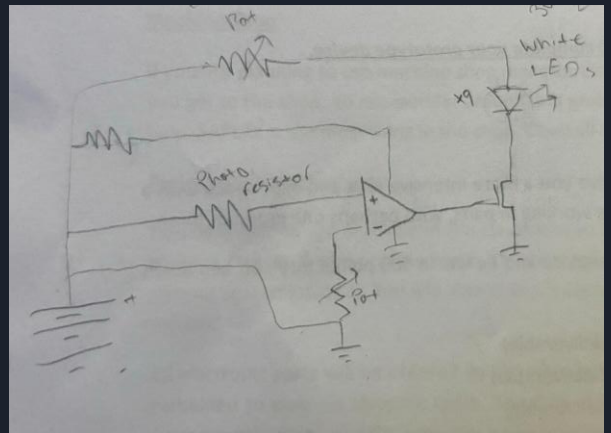
Problem:

- Small remote village with limited electricity
- Objective is to develop cleaner, safer portable lighting for the villagers
- Must be efficient, use rechargeable batteries, and low cost

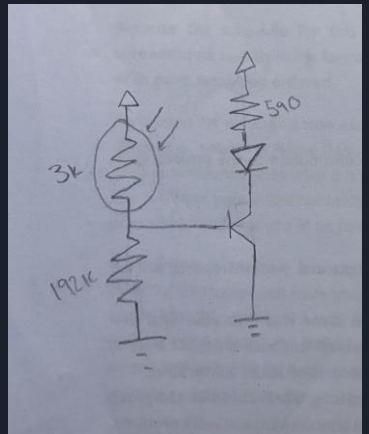
Initial Designs (Trade Studies)

- Op-amp into MOSFET (trade #1)
- Voltage divider into npn transistor (trade #2)
- Traditional desk lamp packaging

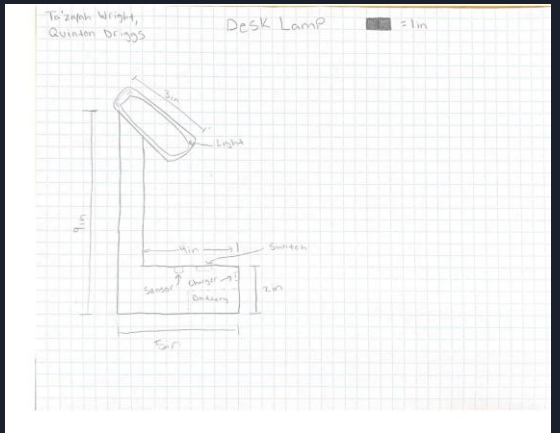
Trade #1



Trade #2



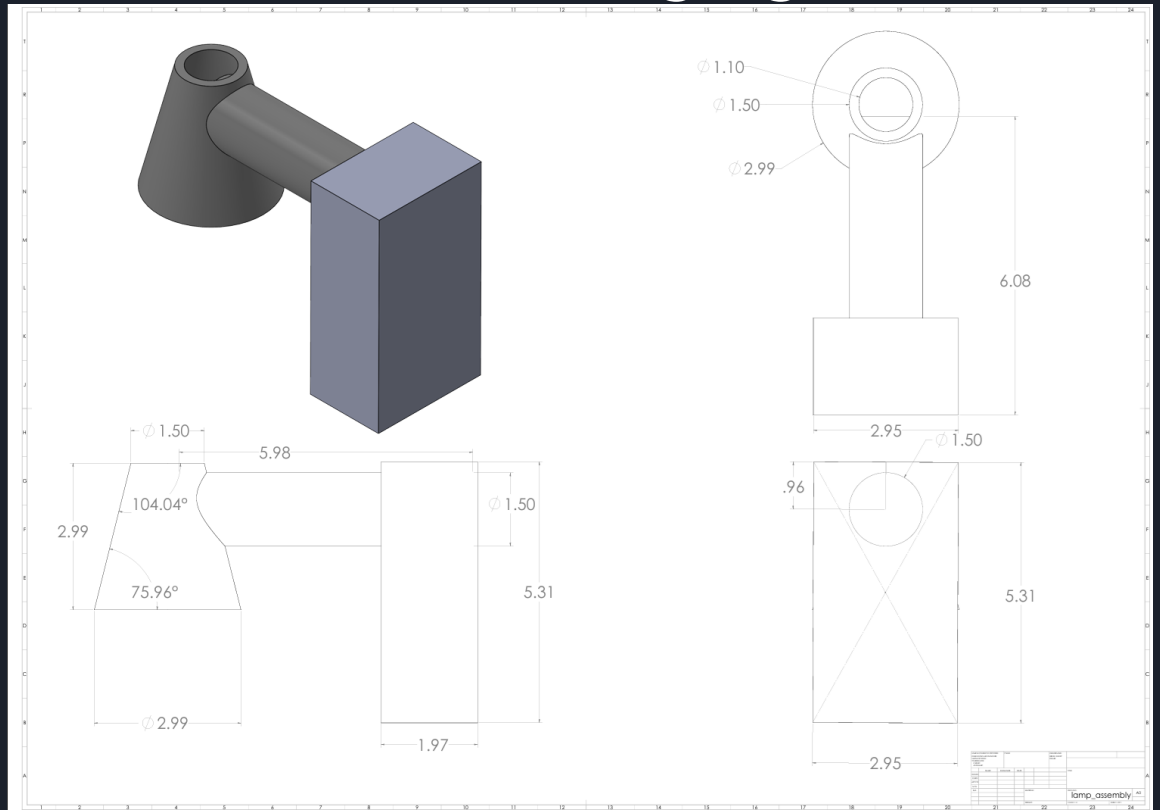
Ligthing encloser



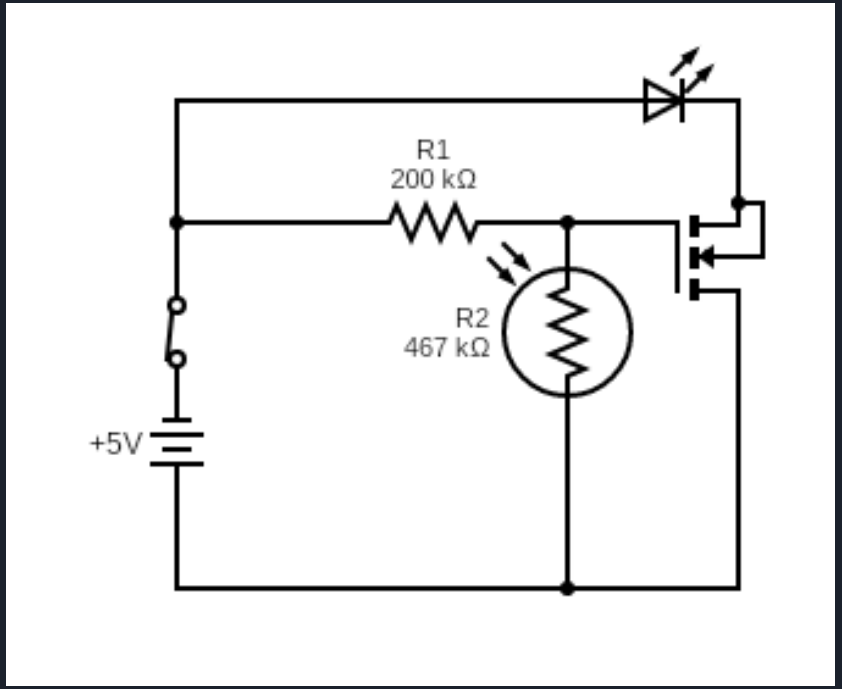
Issues with our Designs:

- Designing the circuit
- Making the circuit efficient
- Assembling the prototype

Proposal Design:
Packaging



Proposed Design
Electrical



LEDs and Batteries

- Cool White LED BA9s 1.2 W
- Batteries are 18650, 3.7 V, 9900mAh

Costs:

Total: $27.05

LEDs	1	$3.99	$3.99
Battery	2	$5.50	$11.00
Light Bulb Socket	1	$1.80	$1.80
SWITCH ROCKER	1	$1.72	$1.72
2x2 Protoboard	1	$2.59	$2.59
Box for Base	1	$1.99	$1.99
LDR 30-50k Ohm	1	$2.78	$2.78
3-D Printed Base	1	$3.00	$3.00

1597-1069900268-ND
1
$0.60
$0.60

Prices for 1000 parts

- $2.80 for full plastic mold each
- $3.62 each for batteries
- $22.98 total for each
- $22,980 for 1000

Summary:

- Lasts up to 60 hours
- 96% efficient
- Safe and easy to use