Lighting Quiz

your name _____

your family members _____ _____ _____

Supply and Demand for Light

1. How much money on average (% of household income) does a household spend on lighting in the developing world?

2. How much money on average (% of household income) does a household spend on lighting in the United States?

3. What fuels do people use most typically to provide light when they do not have access to the electrical grid?

4. List 5 tasks where lighting could benefit people in developing countries who do not currently have good lighting options.

Lighting Quiz

Estimation

show your work and assumptions for all problems; don't forget to include appropriate units!

1. How many average incandescent light bulbs could an average adult power by pedaling on a bike?

2. How long will a solar lantern last at night turned to its maximum setting of 4 LEDs?

3. Estimate the lux for the following conditions. You will have to take into consideration the distribution of lumens over a surface area (see equations at end).

Hint: an average incandescent 60 Watt light-bulb emits 850 lumens.

dim moon light	dim room	comfortably-lit room	desk light

Lighting Quiz

Task Lighting

1. Give an example of a task that requires general illumination.

2. Give an example of a task that requires targeted illumination.

3. What is the efficacy of a light that emits 60 lumens at 3V drawing 500mA?

show your work

4. Write down a best practice from the provided sheet and the note for the best practice. Each family member should record a different best practice on their own sheet.

Helpful Equations & Relations

Voltage [Volts] = Current [Amps] * Resistance [Ohms]

Power [Watts] = Voltage [Volts] * Current [Amps]

efficacy [lm/Watt] = lumens / (current x voltage)

lux = lumens / meter^2

footcandles = lumens/foot^2

10 lux ≈ 1 footcandle

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