

SENIOR PROJECT LAB
Project Ideas

1. 'Paper' packaging made entirely from mineral powder and nontoxic resins that could biodegrade.
2. Designer bags made of a corn-derived polymer that could either be recycled or down-cycled.
3. Household lamp that uses an alternative energy source and supports the growth of herbs or small plants. As an added feature, the plants could have a self-watering reservoir.
4. Water purifying mug (made of technical nutrients) with built in filtration system, so that water could be obtained from any water fountain without fear of contaminations.
5. Playground made of sustainable and renewable resources like bamboo.
6. Dishwater for apartments that works on a steam principle by which coils are heated from an alternative energy source.
7. Fabrication of signs and banners to replace vinyl that would use technical nutrients.
8. Durable computer components made of technical nutrients.

Chosen Proposal:

SOLUTION:

Household lamp that uses an alternative energy source and supports the growth of herbs or small plants. As an added feature, the plants could have a self-watering reservoir.

PROBLEM:

Currently 34 billion, 1/3 of the U.S. annual electric bill comes from lighting, and more than 20% of the electricity generated in the U.S. is used for lighting alone. At the root of this problem are inefficient light bulbs and consumer overuse.

Additionally, principles of sustainable design solutions are even more relevant in urban areas where materials, space and productivity are more intensely scrutinized. For this reason, applying the theoretical applications of biophilia prove to be an intuitive and eco-friendly solution in the design of new products.

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Material Research

PLANT UNIT:

- I. *Mango Wood*
Moderately hard and dense, slightly harder than ash or black cherry, and highly water-resistant. (Often a replacement for Teak)
2. *Rice Hull*
Biodegradable, compostable and renewable, rice hull containers are also durable and offer great aeration.
3. *Coir (Coconut Husk)*
Made from compressed coconut fiber, coir exhibits an excellent balance of wetting, aeration, and a resistance to bacteria and fungus growth. Coir contains no natural nutrients, it has a high nutrient-absorption capacity and can hold 8-9 times its weight in water.
4. *Bamboo*
Incredibly strong with an ability to withstand more stress than steel, bamboo is versatile, durable, sustainable and renewable. It needs no pesticides or replanting as it grows new shoots from its roots.
5. *Bagasse (sugarcane byproduct)*
Heat-resistant and biodegradable, bagasse is a byproduct of sugarcane production. The end product is renewable and durable.

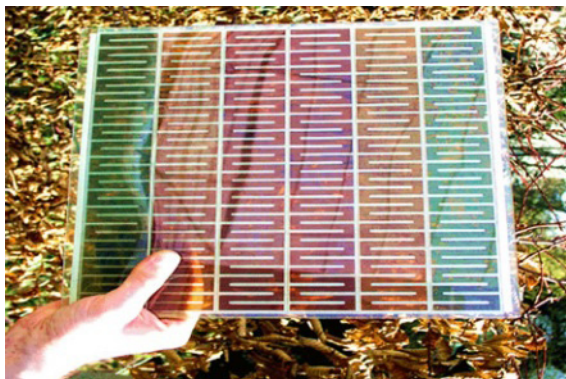
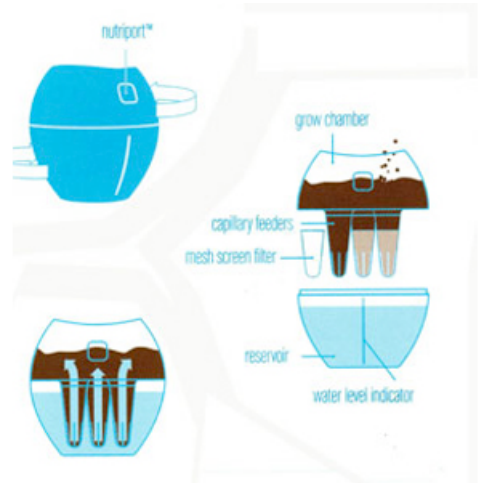
LIGHT UNIT:

- I. *LED*
Produce very little heat, extremely energy efficient, and last 10 years or 10,000 hours, which is 10-20 times longer than regular bulbs.
2. *Full Spectrum*
With brightness value of light similar to that of natural daylight, the bulbs have excellent color rendering capability and are great for growing plants.

ADDITIONAL FEATURES:

- I. *Bioshield Paint*
This company is one of the largest purveyors of natural, high quality, non-toxic paint. The BioShield collection of paints are made primarily from naturally-derived, renewable raw materials including seed oils, tree resins, inert mineral fillers, tree and bee waxes, lead-free dryers and natural pigments.
2. *Solar Energy*
Photovoltaic panels collect sunlight and convert it to electrical energy, which gets stored in a DC battery unit.

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Image/Concept Inspiration



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Concept Development

UNIT DYNAMICS:

- I. As workable design concept for lightsource, wattage and discharge rate on battery need to be considered.
 - What size solar cell is needed to power the light?
 - What kind of energy requirements are needed?
 - What additional components are needed to alternatively power the light?
2. If an LED lightbulb is used, than unit could run as an energy efficient unit, since LED's produce less heat and need less energy.
3. Unit would need to run on a DC system if solar powered and if operating as an independent appliance (separate from the 'grid').

LAMP LIGHT:

The light unit consists of one full spectrum LED lightbulb covered by a light monitoring shade inside a bamboo hull. A series of small LED lights on the back would indicate energy capacity to determine when the battery needs changing.

PLANT BASE:

Consisting of a coir fiber plant lining inside a bamboo hull, plants grow with the aid of a self-watering tray (inserted twice a month) and the full spectrum LED light source from the attached unit above. There are 5 seed units to choose from, and with the aid of individual Coir Nutrient Bricks, the plant base fills in quickly with even coverage.

SOLAR PANEL:

This unit can easily be mounted near any window, or outside if necessary. Since LED's do not have high energy requirements, the compact solar panel (rod?) could be sufficient to power the plant lamp continually for 100 hours before needing to recharge the lithium battery. This technology allows the user to be less dependent upon fossil fuels for their light source.

CHARGE CONTROLLER & LITHIUM BATTERY:

The charge controller allows for safe transference of energy in the battery, protecting the life of the battery as well as preventing risk of overcharging. Small, rechargeable and extremely energy efficient, the lithium battery fits into a waterproof slot, much the same way you might insert a disk.

STRUCTURAL ROD:

As an alternative, this rod allows for your plant lamp to go from desktop to a standing floor unit. The rod also has interlocking mechanisms to allow for the device to hang from a ceiling or wall fixture.

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Bibliography

THINKING GREEN, PACKAGING PROTOTYPES 3

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Rotovision SA, copyright 2001

EXPERIMENTAL ECO-DESIGN, ARCHITECTURE/FASHION/PRODUCT

Cara Brower, Rachel Mallory, Zachery Ohlman; Sheriden House, East Sussex, UK
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