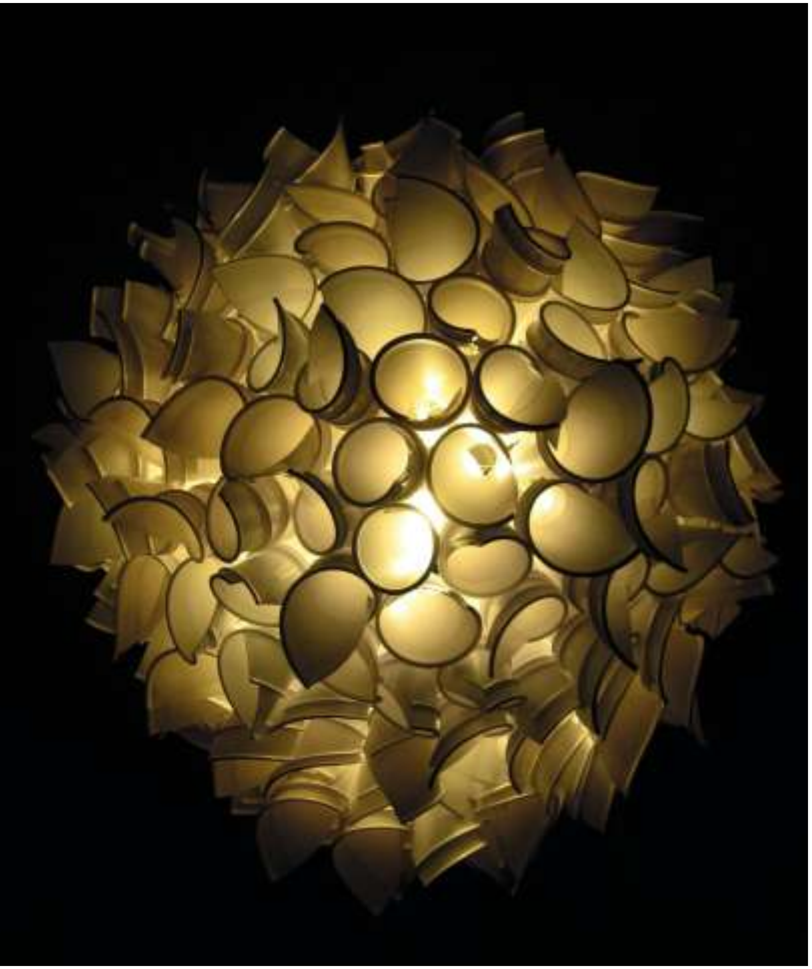


material rescue

design + sustainability in the classroom

Woodruff Art Center Educator Conference | June 4, 2015 | Raja Schaar + Catherine Muller






http://www.earthporm.com/heartbreaking-photos-of-pollution/

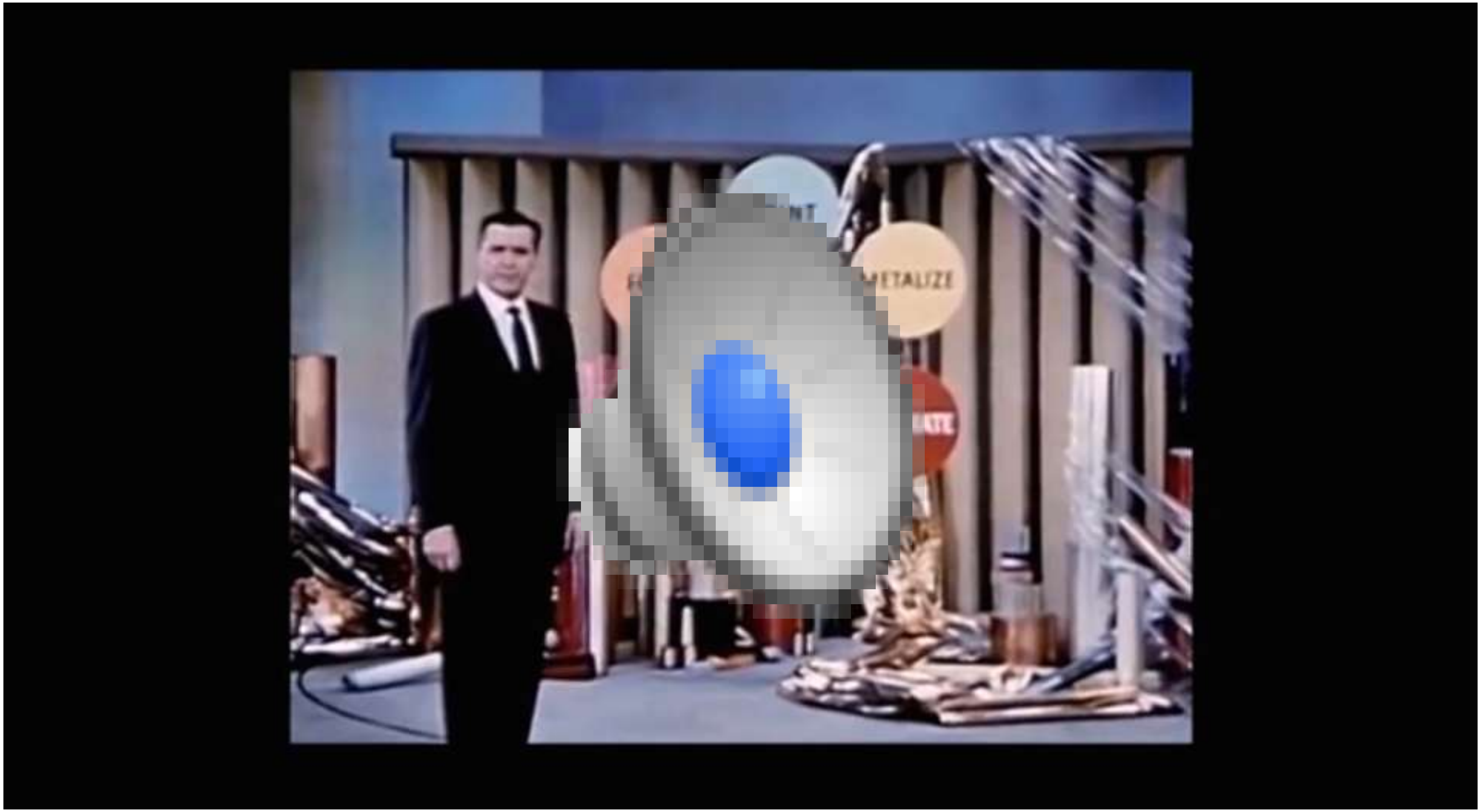
http://www.npr.org/2014/05/21/313157701/why-those-tiny-microbeads-in-soap-may-pose-problem-for-great-lakes

Arctic ice melt to release 1 trillion pieces of plastic into sea

Plastic debris contaminates 88 percent of ocean's surface

States like California beginning to ban products that contain microbeads

http://artthreat.net/2010/05/plastic-pollution-protest/

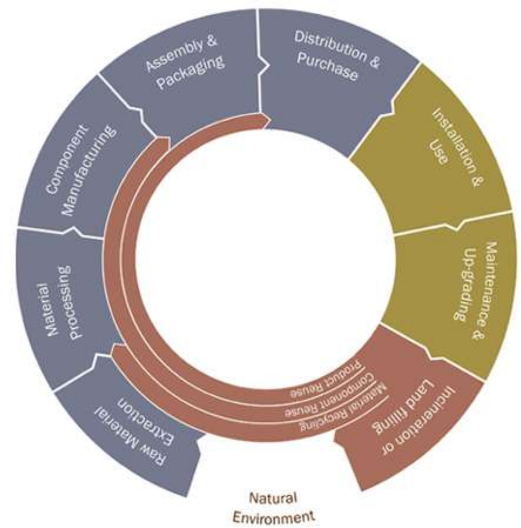


The Plastic Idea
from William Gubbins

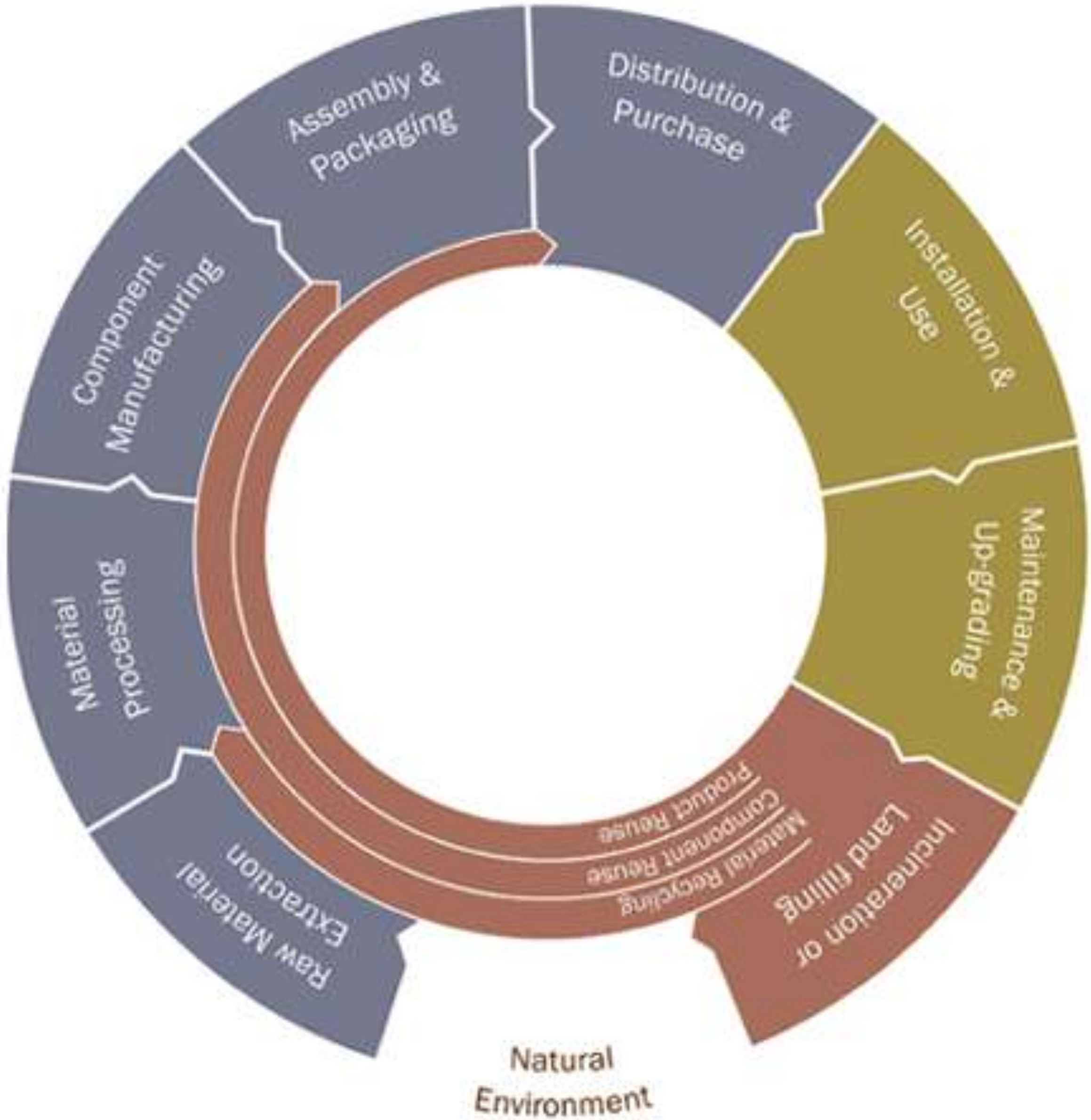
https://vimeo.com/87859735

http://magazine.good.is/articles/this-shoe-is-rubbish

life cycle analysis

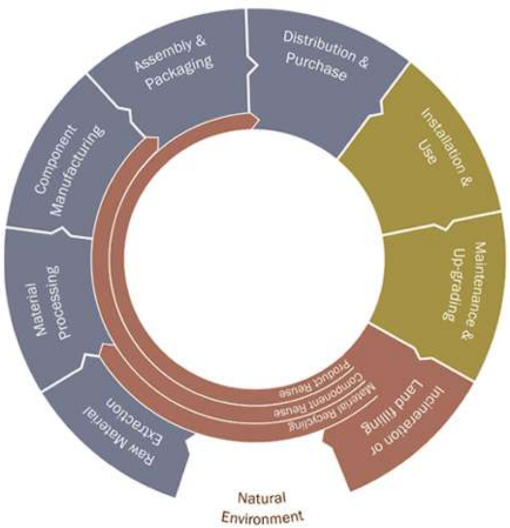


https://app.sustainableminds.com/learning-center/ecodesign-strategies/stages

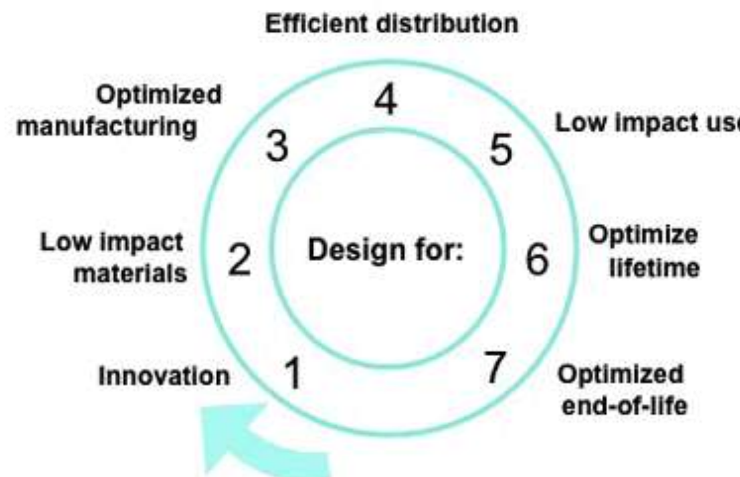


https://app.sustainableminds.com/learning-center/ecodesign-strategies/stages

Raw material extraction	Wood from forest, oil from well, metal ore from mine, etc.
Material processing	Wood to paper, oil to plastic, ores to metal alloys, etc.
Component manufacturing	Paper printed, plastic molded, alloys into circuitry, etc.
Assembly & packaging	Assembly and packaging with documentation
Distribution & purchase	Distribution, marketing and purchasing
Installation & use	Energy and additional materials used
Maintenance & upgrading	Product cleaned, parts replaced or upgraded
Transport (among all phases)	Via train, truck, automobile, sea vessel or airplane
Reuse, recycling, composting	Product or component reuse or material recycling
Incineration or landfilling	Burned or buried in landfill



ecodesign strategies



https://app.sustainableminds.com/learning-center/ecodesign-strategies/strategy-wheel

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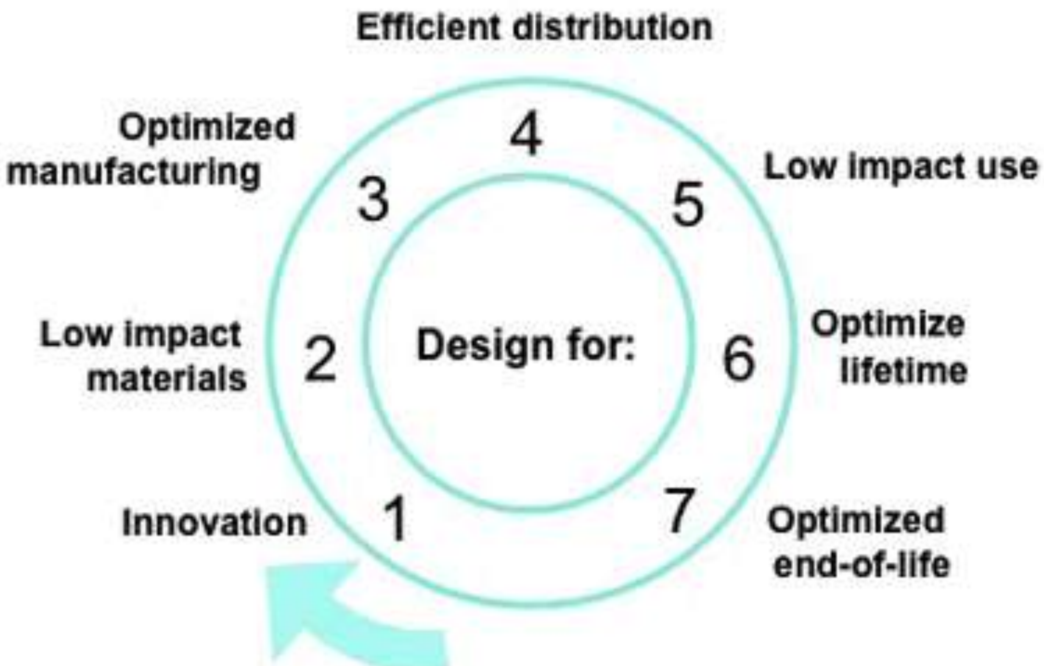
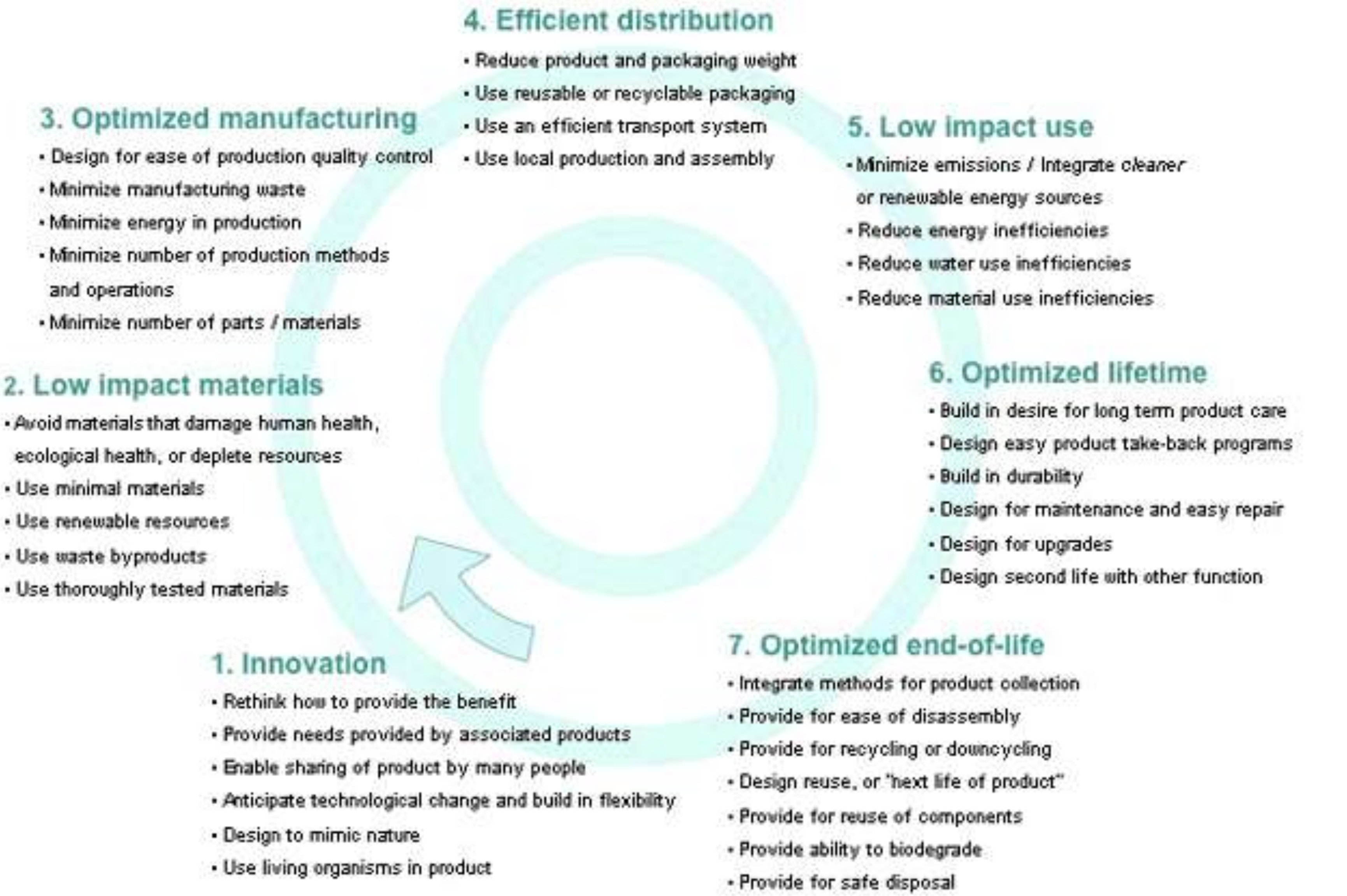
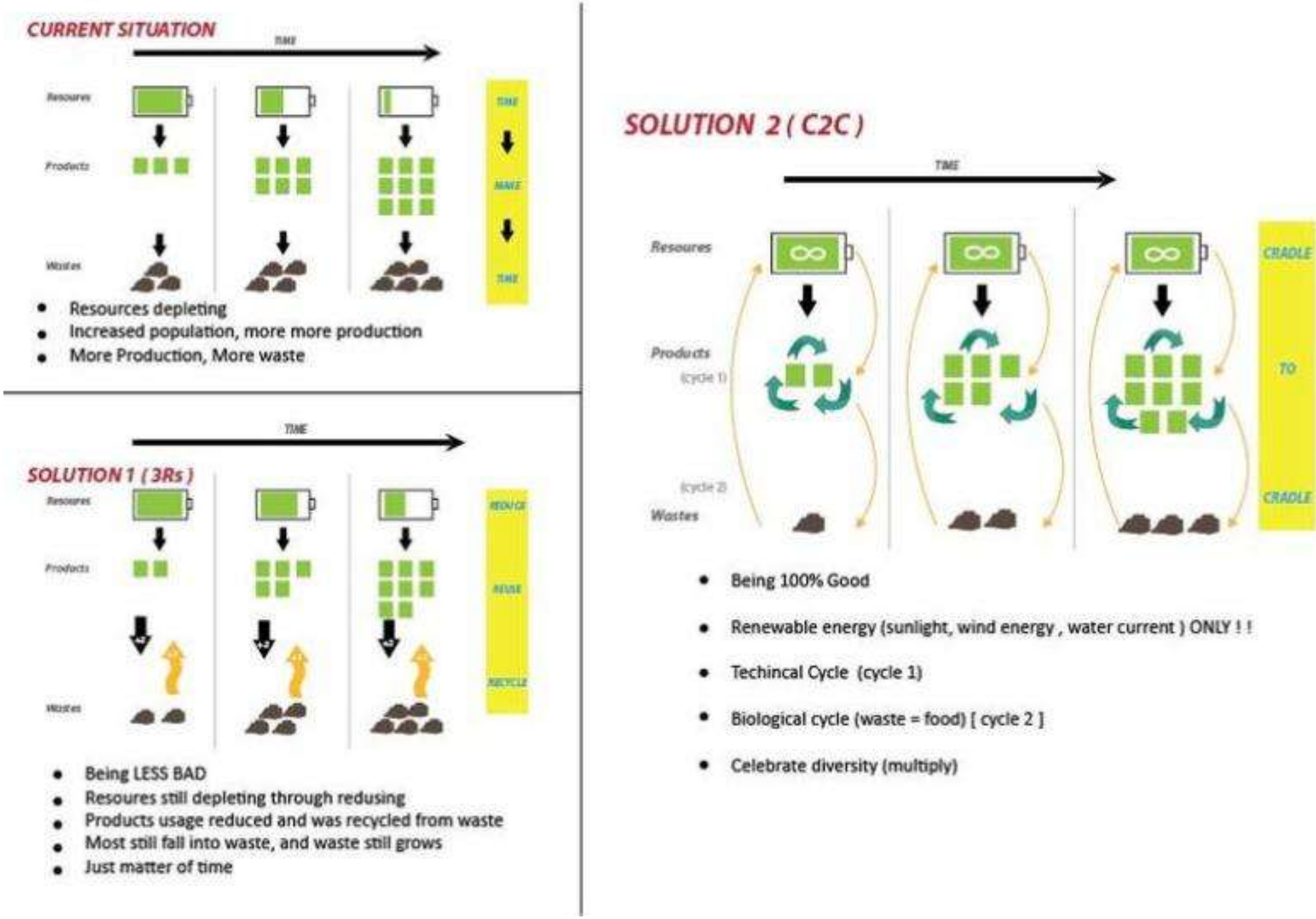




https://app.sustainableminds.com/learning-center/ecodesign-strategies/strategy-wheel

Sustainability Trends in Design

- Cradle to Cradle
- LEED
- Earth Craft Homes
- USGBC
- SouthFace
- Norway


CURRENT SITUATION
TIME
Resources depleting
Increased population, more more production
More Production, More waste
SOLUTION 1 (3Rs)
TIME
Being LESS BAD
Resoures still depleting through redusing
Products usage reduced and was recycled from waste
Most still fall into waste, and waste still grows
Just matter of time
SOLUTION 2 (C2C)
TIME
Resoures
Products
(cycle 1)
(cycle 2)
Wastes
CRADLE
TO
CRADLE
Being 100% Good
Renewable energy (sunlight, wind energy , water current) ONLY ! !
Techincal Cycle (cycle 1)
Biological cycle (waste = food) [cycle 2]
Celebrate diversity (multiply)

extend product life

http://gizmodo.com/replacement-caps-upcycle-coke-bottles-into-water-guns-a-1583377970

LITER OF LIGHT

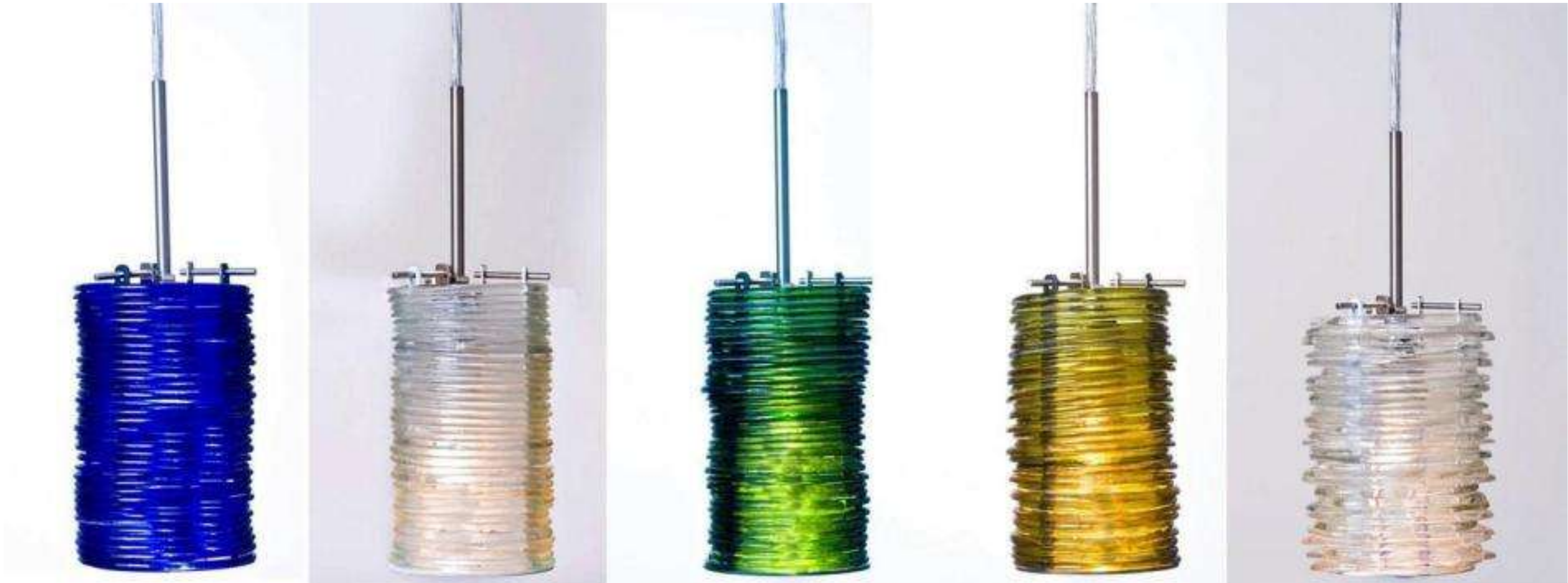
http://aliteroflight.org/index.php

[Liter Of Light *Official Version*](https://www.youtube.com/watch?v=o-Fpsw_yYPg)

https://www.youtube.com/watch?v=o-Fpsw_yYPg use as a structural or modular unit


organelle design ©2009

reimagine as a new material



http://www.smartglassjewelry.com/

Open Recycled
Jewelry

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material rescue

CHALLENGE

How can you demonstrate sustainable ideals through form? How do we reconcile previously held product design attitudes with the goals of sustainability? How could product design evolve to create a truly sustainable economic system? These are the goals and questions to be confronted through this design exercise. You may struggle with learned concepts or personally held beliefs of aesthetic beauty, usability, function and materiality. That is normal and central to this project. Challenge yourself - the reward is in experimentation, originality and risk.

OBJECTIVES

Develop an understanding of a product’s lifecycle and its application to multiple classroom contexts

Understand how art and design ideas can be influences by reclaiming materials.

Exercise the sustainable practices of repurposing/recycling materials into a new product.

Demonstrate how design can help communicate sustainable ideals in a 3D composition

ESSENTIAL QUESTIONS

- How can our understanding of product lifecycle inform our use of materials in everyday objects?
- How could the design of "new" things evolve to create a truly sustainable product or system?

material rescue

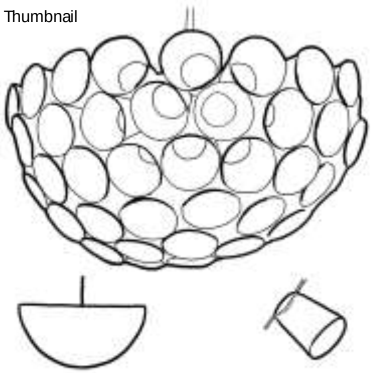
GOAL
In groups of 3, students will conceptualize and prototype a new "product" made from discarded, repurposed, recycled, found or locally-sourced materials. The aim of this project is to create a second life for the discarded materials and/or products using sustainable design strategies.

PROCESS
1. Gather materials
Collect discarded, repurposed, recycled, found, or locally-sourced materials from which to create a product. (Refer to 'Sustainable Design Criteria' below). The only "new" materials allowed are hardware, adhesives, paints and/or resins. Please keep the use of "new" materials to a minimum.

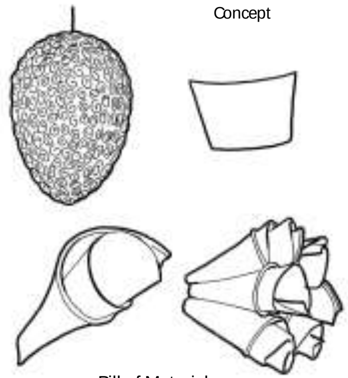
2. Research the Material Lifecycle of the original materials.
State the design issues of the composite material source (such as): intended use of product, design specifications, material properties, manufacturing processes, environmental connections (place of use), design limitation/shortcomings. Why were they discarded? How were they produced?

3. Experiment with material manipulations

Thumbnail



Concept



Bill of Materials

Dentist Rinse Cups (Bathroom Cups) - 320 Cups - White Polystyrene (#6 recycleable plastic)
Mono lament Fishing Line - Bears up to 15 lb.s - 11 ft. - Clear
Acylic Sheeting - .25" Thick - 1 sq. ft. - Clear
Hot Glue Sticks
MEK

Dentist Rinse Cups

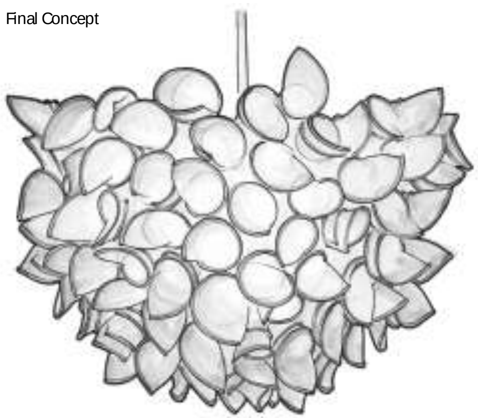
What are they made of?

Polystyrene - polymer of styrene, #6 recyclable plastic

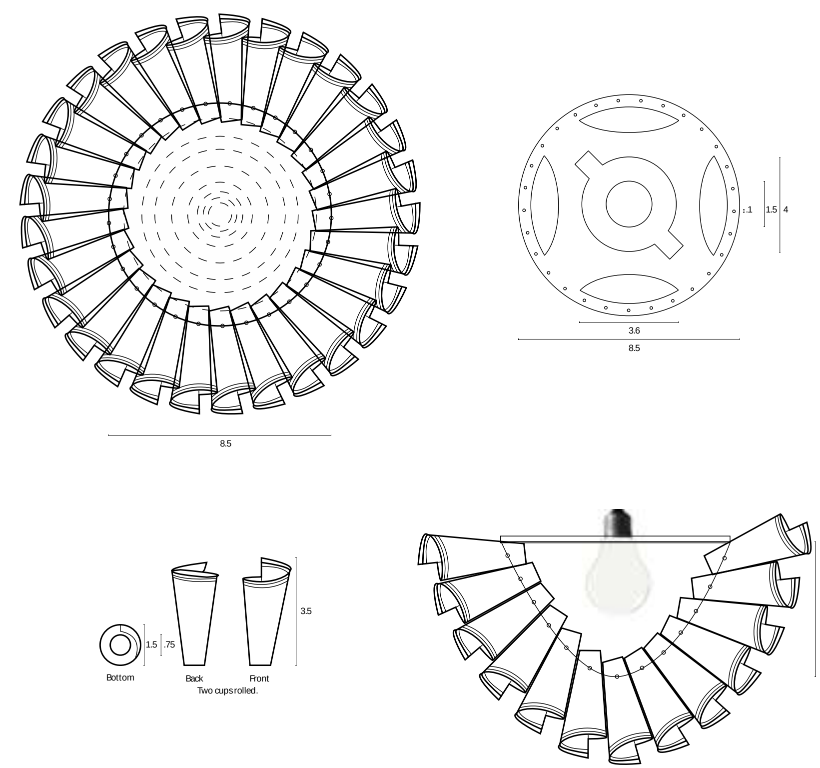
Manufacturing

1. Extruder melts polystyrene pellets
2. Melted pellets forced through die cutter to form sheets 2 mm thick
3. Malleable sheets simultaneously pushed and vacuumed into molds forming the cups
4. Molded sheets sent through trimmer to remove cups
5. Stacked and sent through lip roller which melts and curls the plastic forming rounded lips

Final Concept



Orthographics:



**Units are in inches.

Liliputian

Transforming an unremarkable, familiar object into a beautiful product bearing little or no resembelense to the original object.

Material Rescue|Ruth Elon and Allie Woodward|ID @GT|Sam Harris and Raja Schaar

Design Process





Materials
Tennis string, light cord, light bulb type B, 1/4 inch acrylic, tape, pink foam, epoxy

Sustainable System Proposal

Several tennis shops within metro Atlanta have offered to collect and save the strings from racquets that have been restrung instead of throwing the string away. Tennis stores, such as iPlay, averages 11 rackets a day, equalling 440 feet.

Approximately 350 feet of string will be needed to make one lamp. By combining the string collected from all of the tennis shops, sorting through to find longer pieces of similar colors, this amount of string can be appropriated in one day.

Three days are needed for two people to make one lamp; therefore, in half a year 50 lamps could be produced.





Final Product

connections to the standards

Science (9-12, GPS)

Environmental Science (GPS)

- SEV4. Students will understand and describe availability, allocation and conservation of energy and other resources
- SEV5. Students will recognize that human beings are part of the global ecosystem and will evaluate the effects of human activities and technology on ecosystems.

Materials Chemistry (GPS)

- SMS1. Students will examine the role of chemistry, physics, and engineering in the field of materials science
- SMS2. Students will examine the chemistry and composition of metals and alloys and their use in society.
- SMS3. Students will examine the chemistry and composition of polymers and their use in society.
- SMS4. Students will examine the chemistry and composition of ceramics and their use in society.
- SMS5. Students will examine the importance of composites ceramics and their use in society

Physics (GPS)

- SEVP4. Students will recognize that human beings are part of the global ecosystem

Visual Art (9-12, GPS)

Visual Art

- VAHSVAPR.4 Understands and applies media, techniques, and processes in three-dimensional art.

Sculpture

- VAHSSCMC.2 Finds and solves problems through open-ended inquiry, the consideration of multiple options, weighing consequences, and assessing results.
- VAHSSCMC.4 Analyzes the origins of one's own ideas in relation to community, culture, and the world.
- VAHSSCMC.4 Analyzes the origins of one's own ideas in relation to community, culture, and the world.
- VAHSSCPR.2 Engages in an array of sculpture processes, techniques, and aesthetic stances.
- VAHSSCC.1 Applies information from other disciplines to enhance the understanding and production of sculptural art forms.

Engineering + Technology (9-12, GPS)

Foundations of Manufacturing & Materials Science

- ENGR-FMMS-1. Students will explain the societal impact of manufacturing.
- ENGR-FMMS-5. Students will identify materials and resources used in manufacturing.
- ENGR-FMMS-6. Students will describe the essential systems and processes involved in manufacturing.

STEM

- ENGR-STEM-2. Students will identify the impact of engineering
- ENGR-STEM-3. Students will design technological problem solutions using scientific investigation, analysis and interpretation of data, innovation, invention, and fabrication while considering economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability constraints.

Social Studies

U.S. History

- SSUSH12. The student will analyze important consequences of American industrial growth.

Economics

- SSEF1 The student will explain why limited productive resources and unlimited wants result in scarcity, opportunity costs, and tradeoffs for individuals, businesses, and governments.
- SSEMI2 The student will explain how the Law of Demand, the Law of Supply, prices, and profits work to determine production and distribution in a market econom
- SSEIN1 The student will explain why individuals, businesses, and governments trade goods and services.

sources

Books

- Fuad-Luke, A. (2007) EcoDesign: The sourcebook. San Francisco: Chronicle Books Llc
- McDonough, W. & Braungart, M. (2002). Cradle to cradle: Remaking the way we make things. New
- York: North Point Press.
- Papaneck, V. (1995). The green imperative: Natural design for the real world. New York: Thames and Hudson Inc.

Sustainability + Design

- http://www.epa.gov/climatechange/
- https://app.sustainableminds.com/learning-center/ecodesign-strategies/
- http://www.idsa.org/sections/ecodesign
- http://www.dexigner.com/directory/cat/Sustainable-Design/Organizations.html
- http://www.c2ccertified.org/
- http://www.usgbc.org/
- http://www.ted.com/talks/william_mcdonough_on_cradle_to_cradle_design

EcoDesign Projects

- http://inhabitat.com/
- http://en.wikipedia.org/wiki/Upcycling
- http://flavorwire.com/456734/ingenious-homeless-shelters-made-from-repurposed-materials/view-all
- http://mentalfloss.com/article/13046/11-artists-doing-amazing-things-recycled-materials
- http://www.treehugger.com/tag/upcycling/
- http://www.driftwebs.com/

your turn!

- Experiment with Material Manipulations
- Work in groups
  - Gather materials
- Experiment with material manipulations
- Record/Sketch lighting ideas
- Prototype
- Brainstorm classroom applications.

thank you!

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