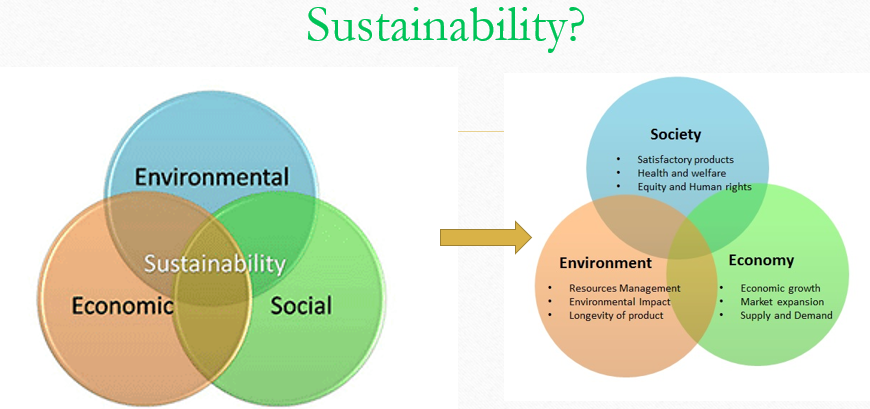
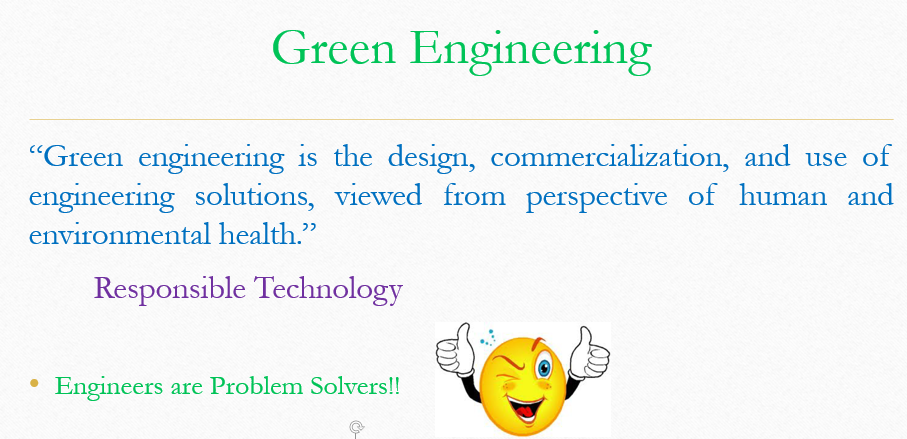
**Green Design Approach**











**The 12 Principles of Green Engineering**

**Principle 1:** Designers need to strive to ensure that all material and energy inputs and outputs are as inherently nonhazardous as possible.  
  
**Principle 2:** It is better to prevent waste than to treat or clean up waste after it is formed.  
  
**Principle 3:** Separation and purification operations should be designed to minimize energy consumption and materials use.  
  
**Principle 4:** Products, processes, and systems should be designed to maximize mass, energy, space, and time efficiency.  
  
**Principle 5:** Products, processes, and systems should be "output pulled" rather than "input pushed" through the use of energy and materials.  
  
**Principle 6:** Embedded entropy and complexity must be viewed as an investment when making design choices on recycle, reuse, or beneficial disposition.  
  
**Principle 7:** Targeted durability, not immortality, should be a design goal.  
  
**Principle 8:** Design for unnecessary capacity or capability (e.g., "one size fits all") solutions should be considered a design flaw.  
  
**Principle 9:** Material diversity in multicomponent products should be minimized to promote disassembly and value retention.  
  
**Principle 10:** Design of products, processes, and systems must include integration and interconnectivity with available energy and materials flows.  
  
**Principle 11:** Products, processes, and systems should be designed for performance in a commercial "afterlife".  
  
**Principle 12:** Material and energy inputs should be renewable rather than depleting.

**Green Questionnaire**

**Resources (Materials, Energy, Water):**

1. Do you use toxic or hazardous materials in your design?
2. How many percentage of your materials are virgin materials?
3. How many percentage of your materials are recycled materials?
4. How much energy do you need for fabricating your product?
5. How much water do you need for fabricating your product?

**Waste (Fabrication):**

1. How much is solid residue for fabrication of your product?
2. How much is liquid residue for fabrication of your product?
3. How much is gas residue for fabrication of your product?

**Waste (Use):**

1. How much is solid residue of your product during its lifetime?
2. How much is liquid residue of your product during its lifetime?
3. How much is gas residue of your product during its lifetime?

**Waste (End-of-life):**

1. How much is solid residue of your product after its lifetime?
2. How much is liquid residue of your product after its lifetime?
3. How much is gas residue of your product after its lifetime?
4. What is you plan for recycling or reusing your product after its lifetime?

**Final Question:**

1. Can you change your design to have improve your answers to above questions?