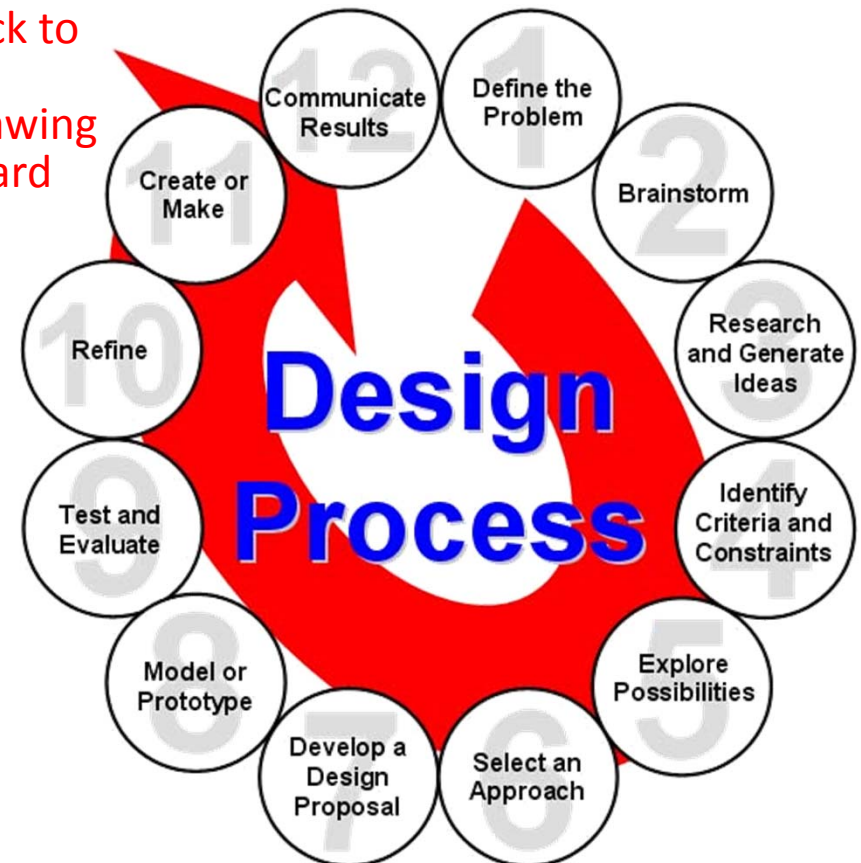
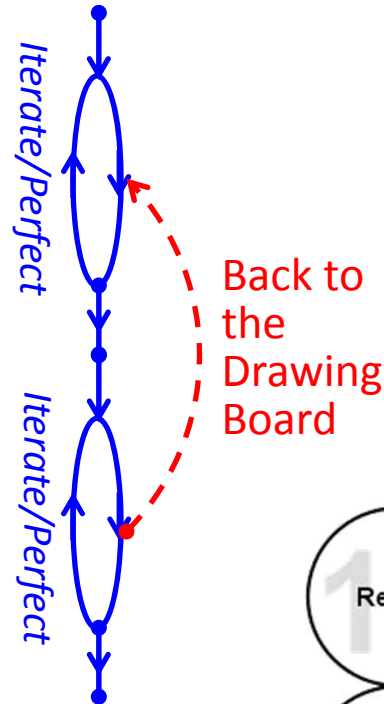


# Engineering/Physics Design Process



1. **Define the Problem**
2. *Brainstorm Possible Solutions*
3. *Research and Generate Ideas*
4. *Identify Criteria and Constraints*
5. *Explore Possibilities*
6. **Select an Approach**
7. **Develop a Design Proposal**
8. *Make a Model or Prototype*
9. *Test and Evaluate the Design*
10. *Refine the Design*
11. **Create or Make Solution**
12. Communicate All Results



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# 10-Stage Design

1. Identify the problem/product innovation
2. Define the working criteria/goals
3. Research and gather data
4. Brainstorm / generate creative ideas
5. Analyze potential solutions
6. Develop and test models
7. Make the decision
8. Communication and specify
9. Implement and *commercialize*
10. *Perform post-implementation review and assessment*

**From:**

**Your Future: A Comprehensive Introduction to Engineering**

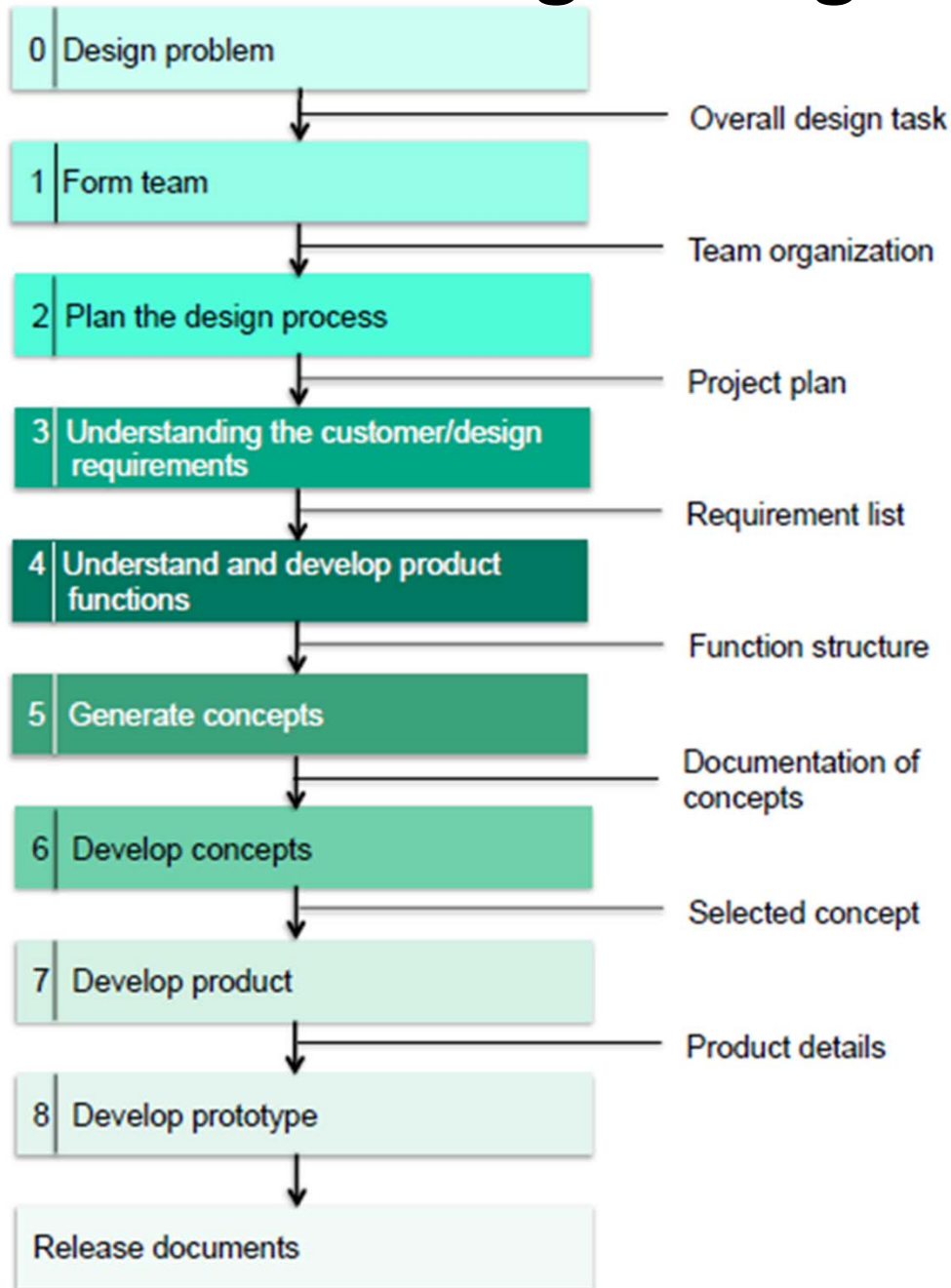
by William C. Oakes, Les L. Leone, Craig J. Gunn, John L. Gruender

- Oxford University Press ISBN 0199797560

1-Identify the problem/product innovation  
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8-Communication and specify  
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10-Perform post-implementation review and assessment

# 10-Stage Design –OU AME 4163



## ***AME4163 Design Process***

From:

**AME 4163 Principles of Design  
–Engineering design process**

August 21,2013, Zahed Siddique

# 10-Stage Design

vs.

# 12-Stage Design

1. Identify the problem/product innovation (1.)	↔	1. Define the problem (1.)
2. Define the working criteria/goals (4.)	↗ ↘	2. Brainstorm Possible Solutions (4.)
3. Research and gather data (3.)	↔	3. Research and Generate Ideas (3.)
4. Brainstorm / generate creative ideas (2.)	↖ ↙	4. Identify Criteria and Constraints (4.)
5. Analyze potential solutions (5.)	↔	5. Explore Possibilities (5.)
6. Develop and test models (7.,8.,9.)	↗ ↘	6. Select an Approach (7.)
7. Make the decision (6.)	↖ ↙	7. Develop a Design Proposal (6.)
8. Communication and specify (12.)	↗ ↘	8. Make a Model or Prototype (6.)
9. Implement and <b>commercialize</b> (11.)	↗ ↘	9. Test & Evaluate the Design (6.)
10. <b>Perform post-implementation review and assessment</b> (--)	↗ ↘	10. Refine the Design (--.)
	↗ ↘	11. Create or Make Solution (9.)
	↗ ↘	12. Communicate Results (8.)

***These Look better for a Product***

*– Engineering Your Future*

***These look better for Research***

*– ITEA Standards for Technological Literacy*

# 10-Stage Design

# vs. 12-Stage Design

1. Identify the problem/product innovation
2. Define the working criteria/goals
3. Research and gather data
4. Brainstorm / generate creative ideas
5. Analyze potential solutions
6. Develop and test models
7. Make the decision
8. Communication and specify
9. Implement and **commercialize**
10. Perform post-implementation review and assessment

1. Identify & Define a Justified Problem
2. Brainstorm Possible Solutions
3. Research and Generate Ideas
4. Identify Criteria and Constraints
5. Explore Possibilities
6. Select an Approach
7. Develop a Design Proposal
8. Make a Model or Prototype
9. Test and Evaluate the Design
10. Refine the Design
11. Create or Make Solution
12. Communicate Results

*These Look better for a Product*

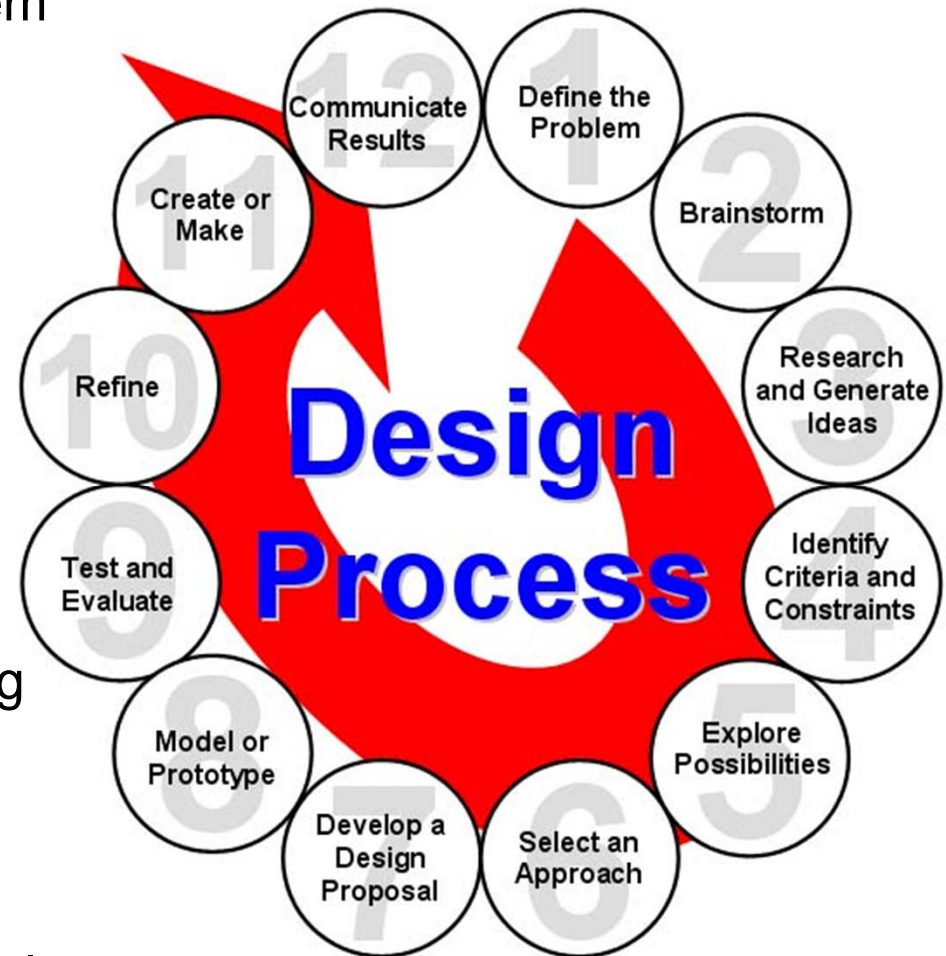
*– Engineering Your Future*

*Theses look better for Research*

*– ITEA Standards for Technological Literacy*

# Example Design Process

1. Identify & Define a Justified Problem
2. Brainstorm Possible Solutions
3. Research and Generate Ideas
4. Identify Criteria and Specify Constraints
5. Explore Possibilities
6. Select an Approach
7. Develop a Design Proposal
8. Make a Model or Prototype
9. Test and Evaluate the Design using Specifications
10. Refine the Design
11. Create or Make Solution
12. Communicate Processes and Results

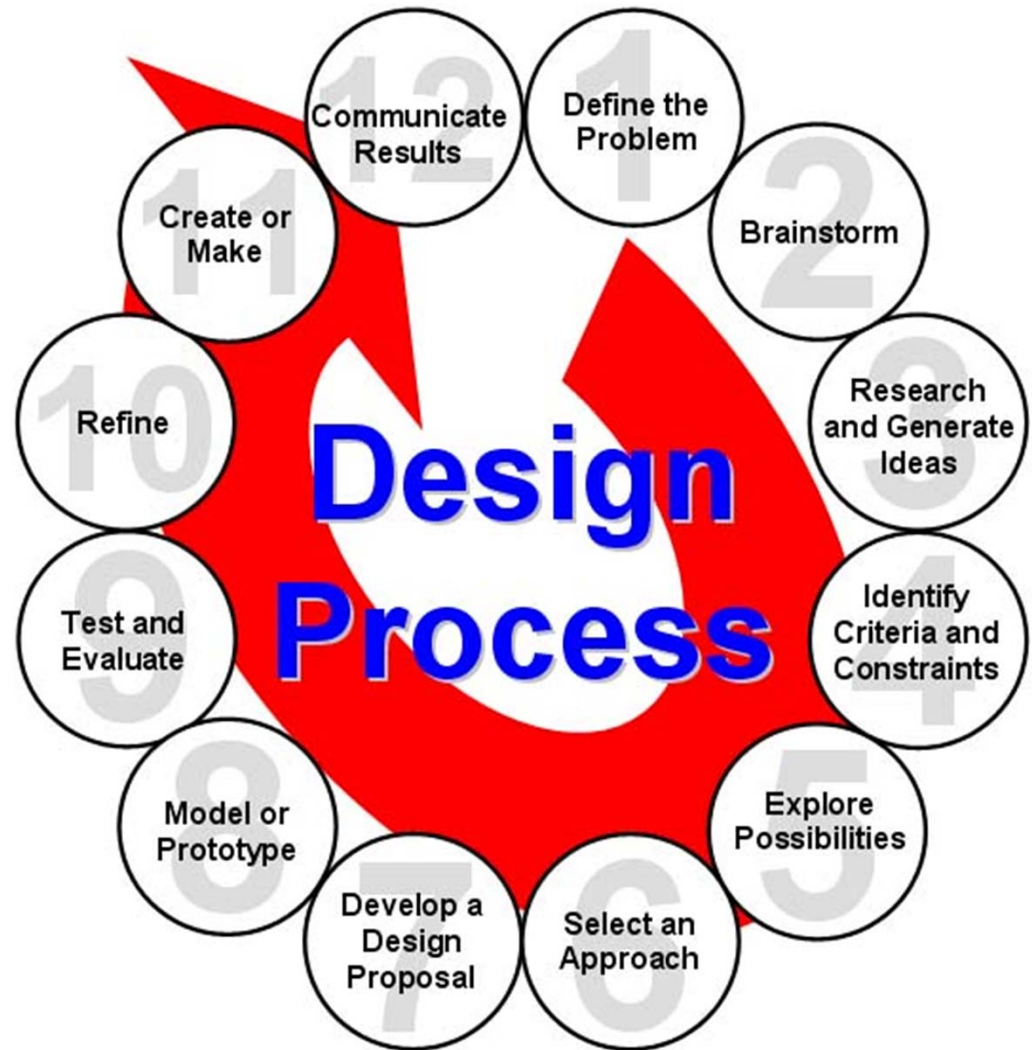


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# Example Design Process

1. Define the Problem
2. Brainstorm
3. Research and Generate Ideas
4. Identify Criteria and Constraints
5. Explore Possibilities
6. Select an Approach
7. Develop a Design Proposal
8. Model or Prototype
9. Test and Evaluate
10. Refine
11. Create or Make
12. Communicate Results



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# Design Concepts & Engineering Principles

- Edisonian Approach –large matrix of samples, trial and error
- Improvise
- Project Charter
- GANTT Chart
- Critical Paths
- PERT Charts
- 10-Stage Design
  
- ITEA- Design Process
  - INTERNATIONAL TECHNOLOGY AND ENGINEERING EDUCATORS ASSOCIATION
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