



**Career  
Prep  
Center**

# The Design Process

# What is Design?

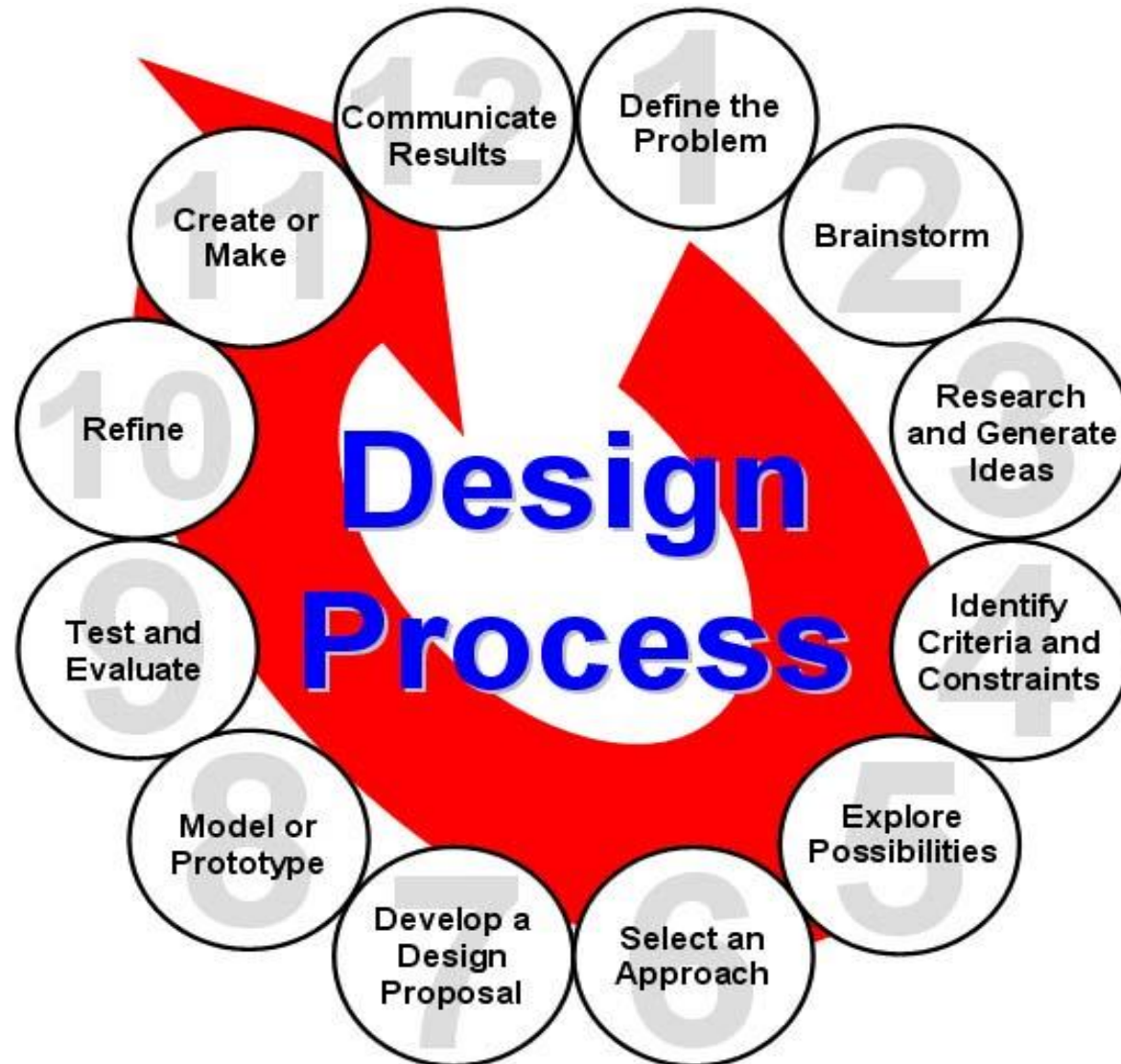
- Design is a creative planning process that leads to useful products and systems
- There is no perfect design
- Requirements of a design are made up of criteria and constraints



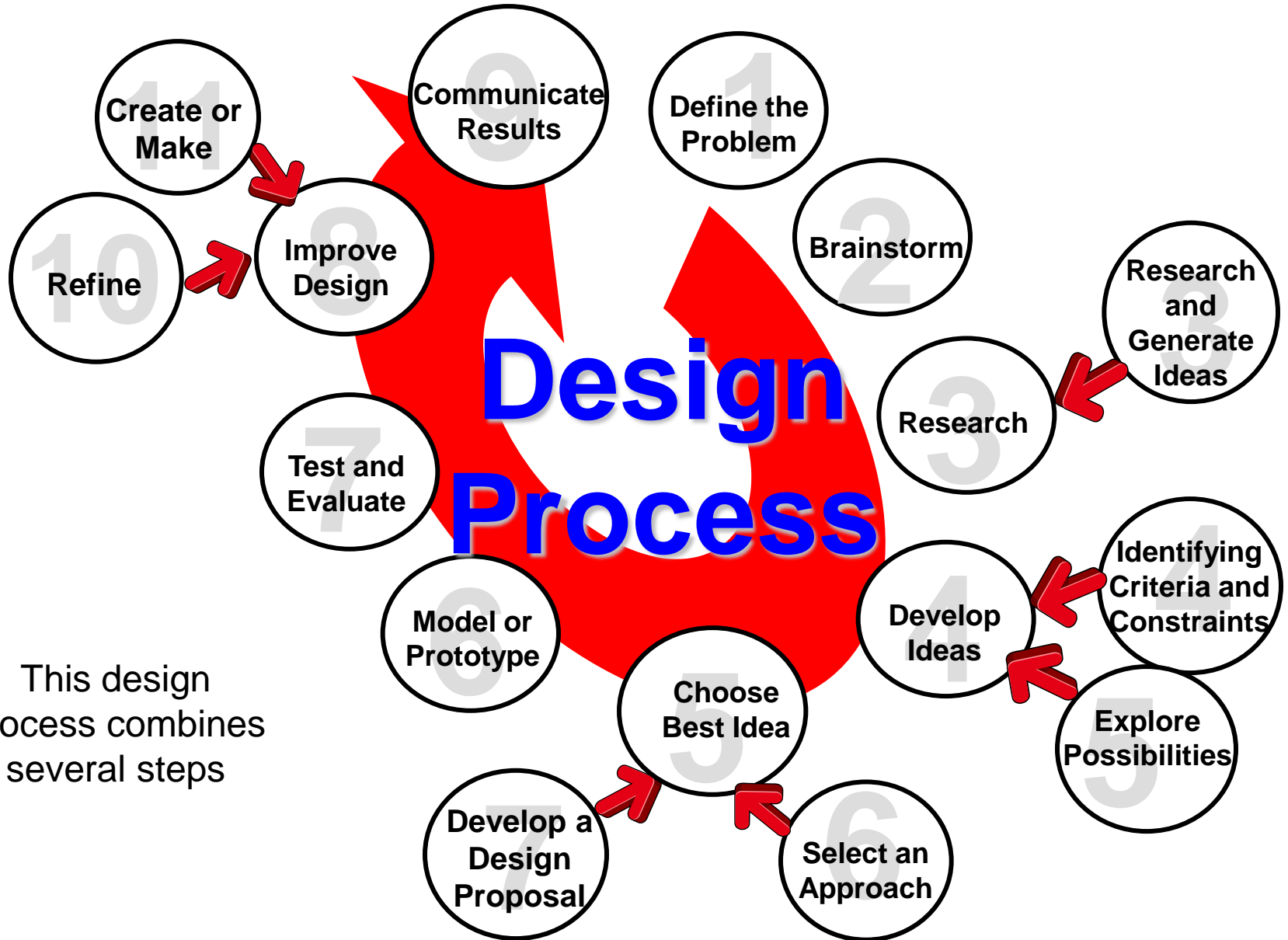
# What is the Design Process?

- The design process is a purposeful method of planning practical solutions to problems
- The design process is never final; there are always multiple solutions to a problem
- The design process is influenced by requirements called criteria and constraints

# OLD 12 STEP DESIGN PROCESS



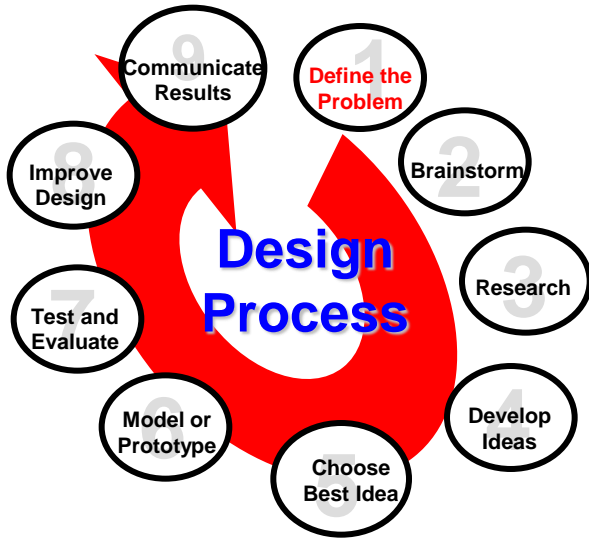
# REFINED DESIGN PROCESS



This design process combines several steps

# Define the Problem

- Defining the problem is like conducting detective work
- You must examine the evidence and form some conclusions

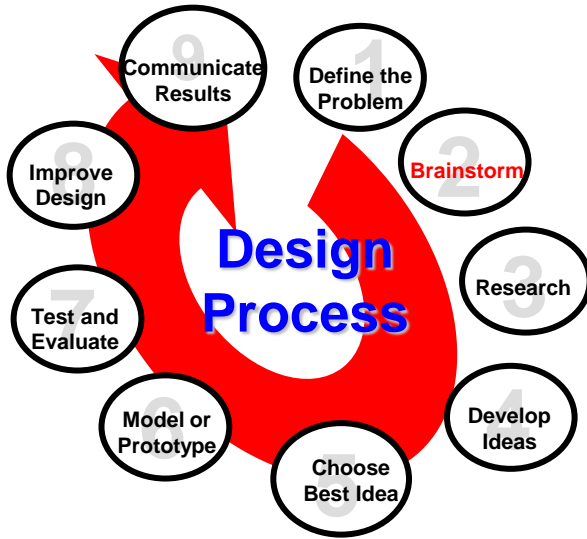


## Examples:

- Design a vehicle that can communicate with other vehicles to prevent accidents
- Design an athletic shoe that decreases the amount of sprained ankles when worn on hardwood gym floors.

What exactly is the problem we're aiming to solve???

# Brainstorm



- Brainstorming involves bringing a group of people together to generate many different ideas

## Examples:

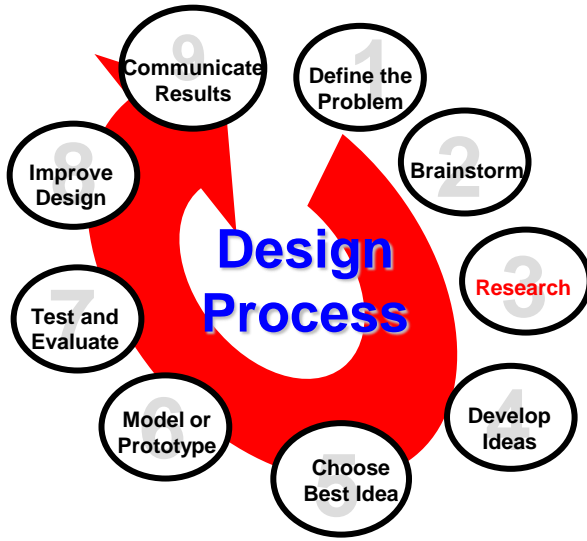
- “Make the athletic shoe out of plastic.”
- “The shoe needs to grip the floor; the bottom should be made of rubber.”
- “The ankle support should be stiff.”
- “Don’t forget the air vents.”



*All ideas are considered – none are criticized!*

# Research

- Research may require going to the library, using computer databases, writing letters, performing experiments, and asking questions



Examples:

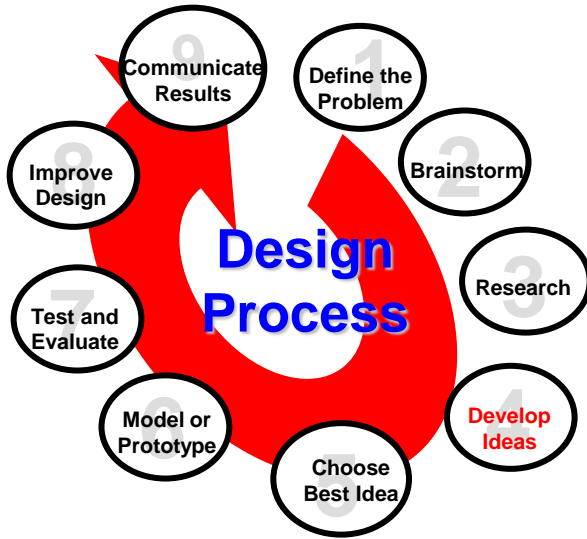
- ✓ Read books and magazines
- ✓ View films or videos
- ✓ Search the Internet
- ✓ Ask questions of the “experts”
- ✓ Create and analyze a survey





# Develop Ideas

- Develop multiple ideas that will solve the problem and meet the requirements
- The alternatives may all be quite diverse

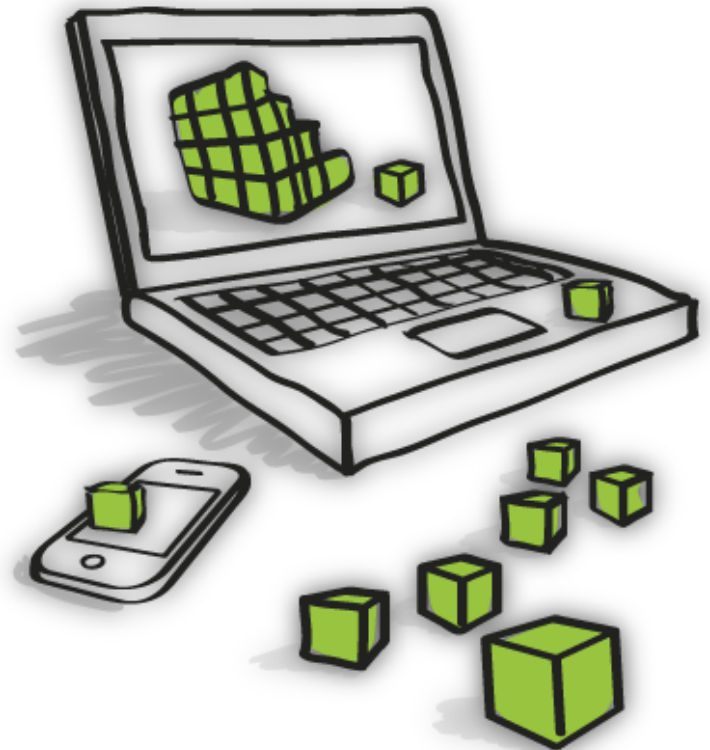


Criteria:

- ✓ How will the solution actually work?
- ✓ What materials should I use?
- ✓ What should the product look like so that people will buy it?

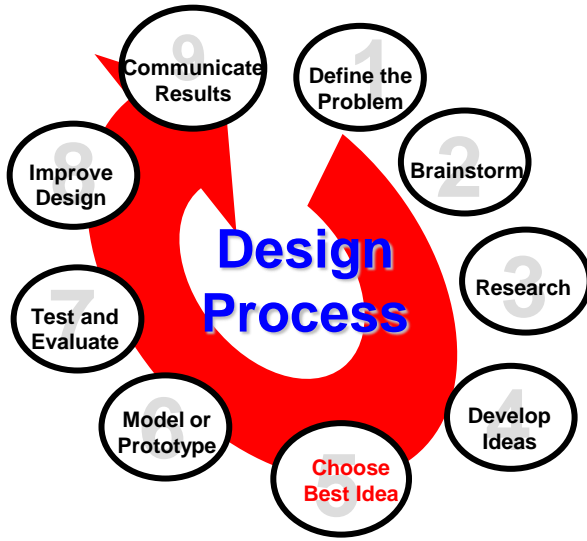
Constraints:

- ✓ Will it be completed by the deadline?
- ✓ What size should it be?



# Choose Best Idea

- Decide on an idea that best meets the criteria, fits within the constraints, and has the least amount of negative characteristics

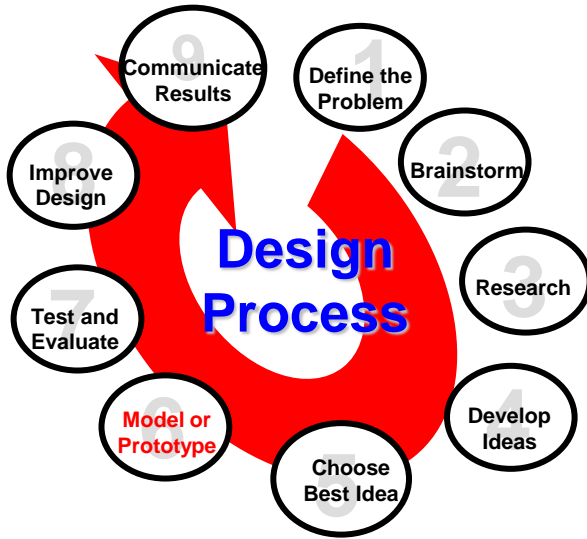


- ✓ List the strengths and weaknesses of each alternative
- ✓ Optimization – Making improvements to the design idea for better performance or increased safety
- ✓ Trade-off – Giving up one desirable trait for another (i.e., giving up on using a certain material so that the object is more affordable)



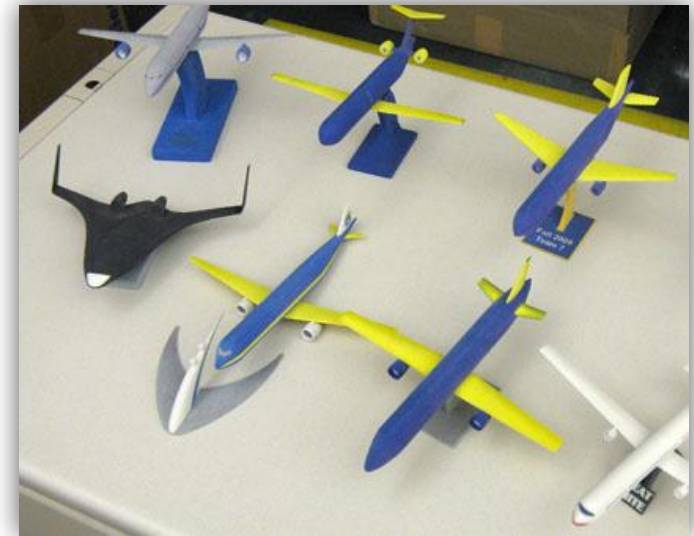
# Model or Prototype

- Model building is used to gather additional information and test design ideas



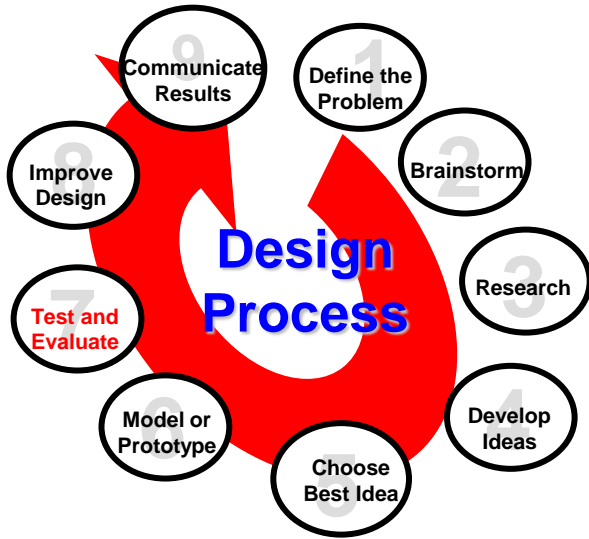
Examples:

- **Realistic drawings or renderings** help you visualize what the solution will look like in real life
- **Scale models or mock-ups** are small, accurate representations of the final product
- **3D CAD** (computer aided designs) can show objects in action
- A **prototype** is a working model; it looks and functions just like the finished product



# Test and Evaluate

- Models of design solutions must be tested and important questions must be answered during the evaluation

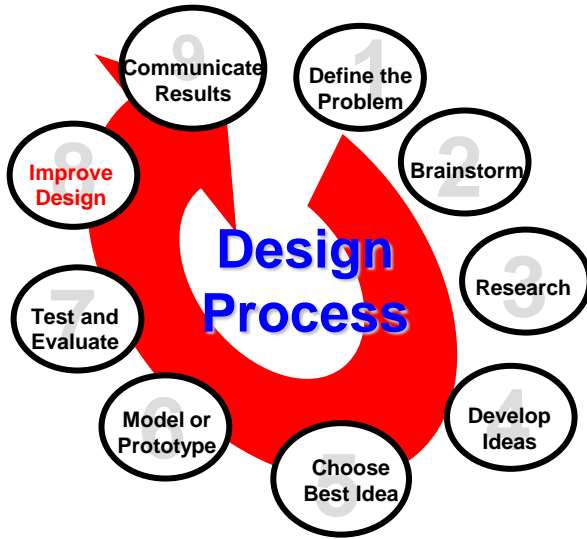


- Is it safe for people and the environment?
- Is it comfortable?
- Is it affordable?
- Is it aesthetically pleasing?  
(does it look good?)
- Will it last as long as it needs to?
- Does it meet the criteria and constraints?
- Does it work?



# Improve Design

- After studying all test data and evaluating design solutions, you may need to make changes

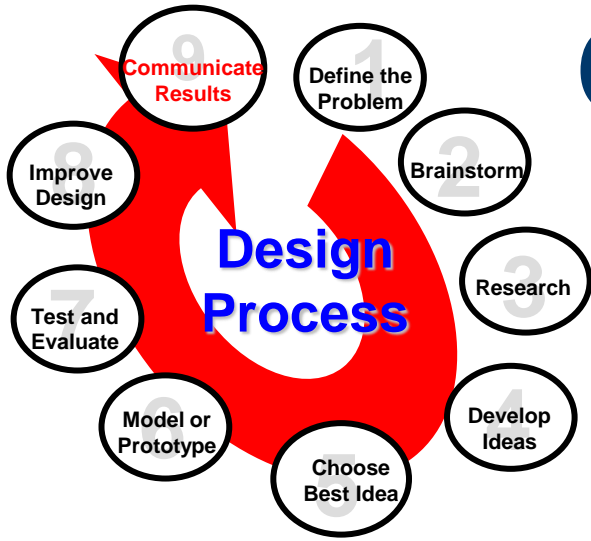


- ✓ Now is the time to improve a design – before production begins
- ✓ During the improve design phase, you may consider new ideas



# Communicate Results

- Share your design ideas with others to prove the design is worthy of manufacturing

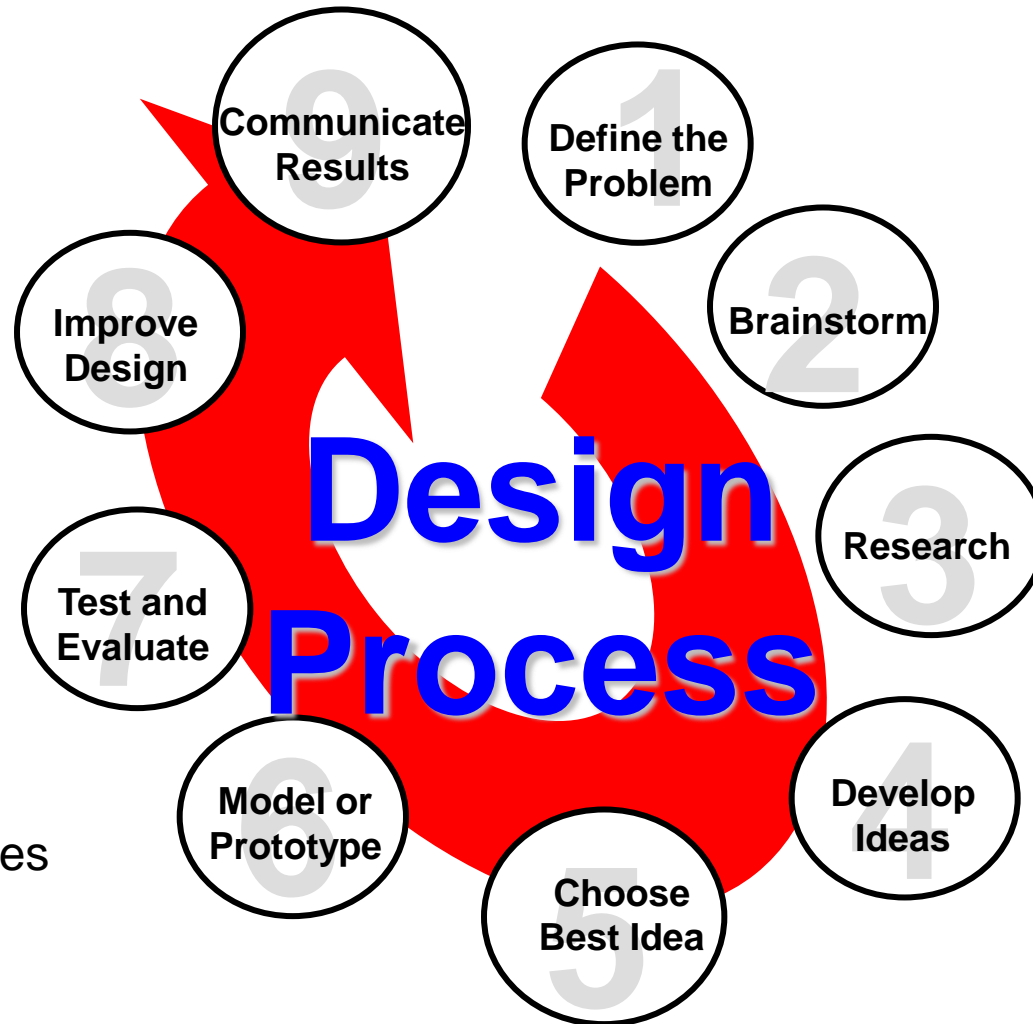


## Examples:

- ✓ Poster
- ✓ Drawings
- ✓ Charts
- ✓ Prototypes
- ✓ PowerPoint presentation
- ✓ Reports
- ✓ Discussion



# REFINED DESIGN PROCESS



This design process combines several steps

# DESIGN PROCESS GROUP PROJECT



## Projects:

- ✓ Alarms
- ✓ Pens & Pencils
- ✓ Scratch
- ✓ Green
- ✓ Hangers
- ✓ Puppies
- ✓ Buds