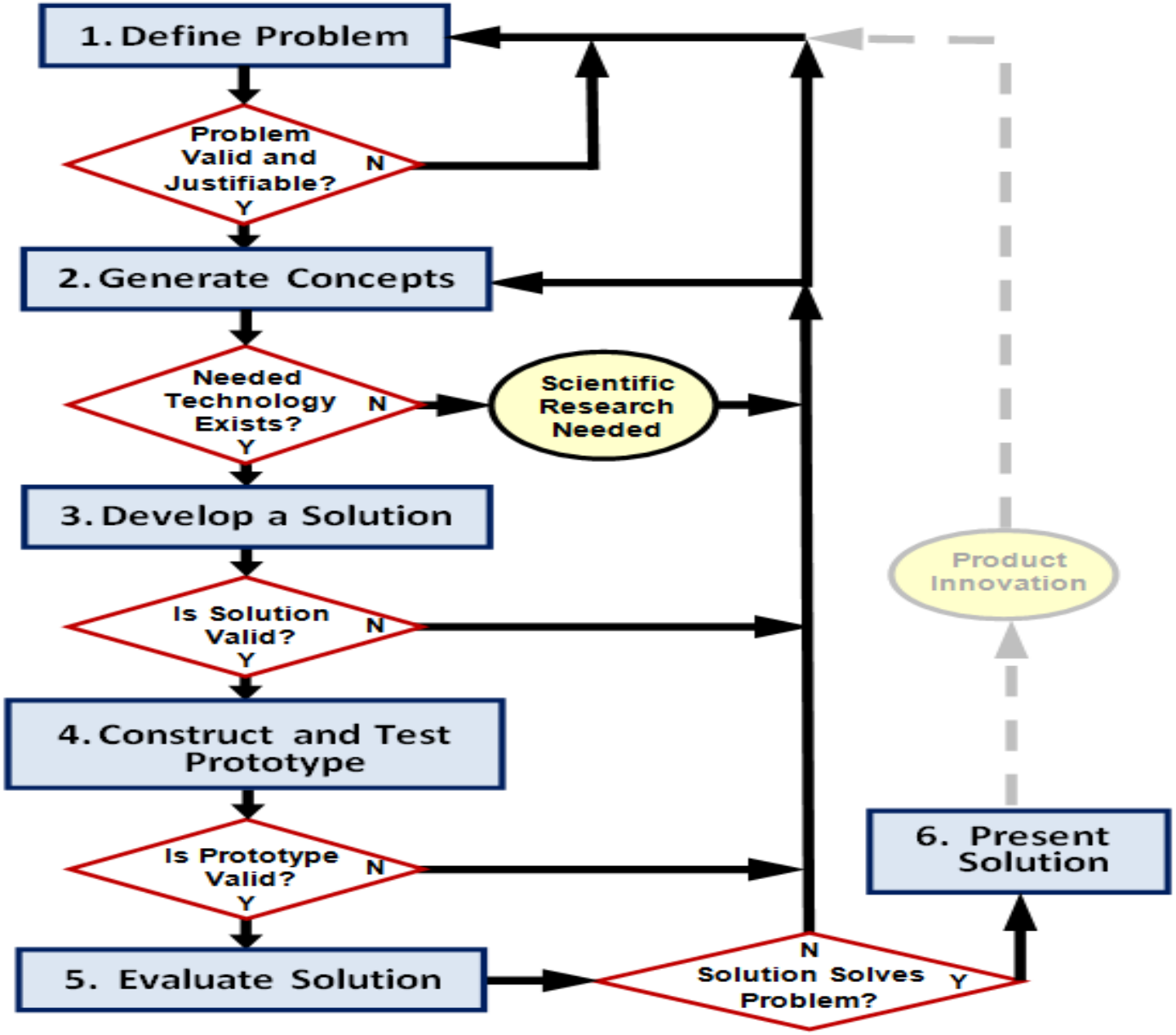
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Problem Valid and Justifiable?
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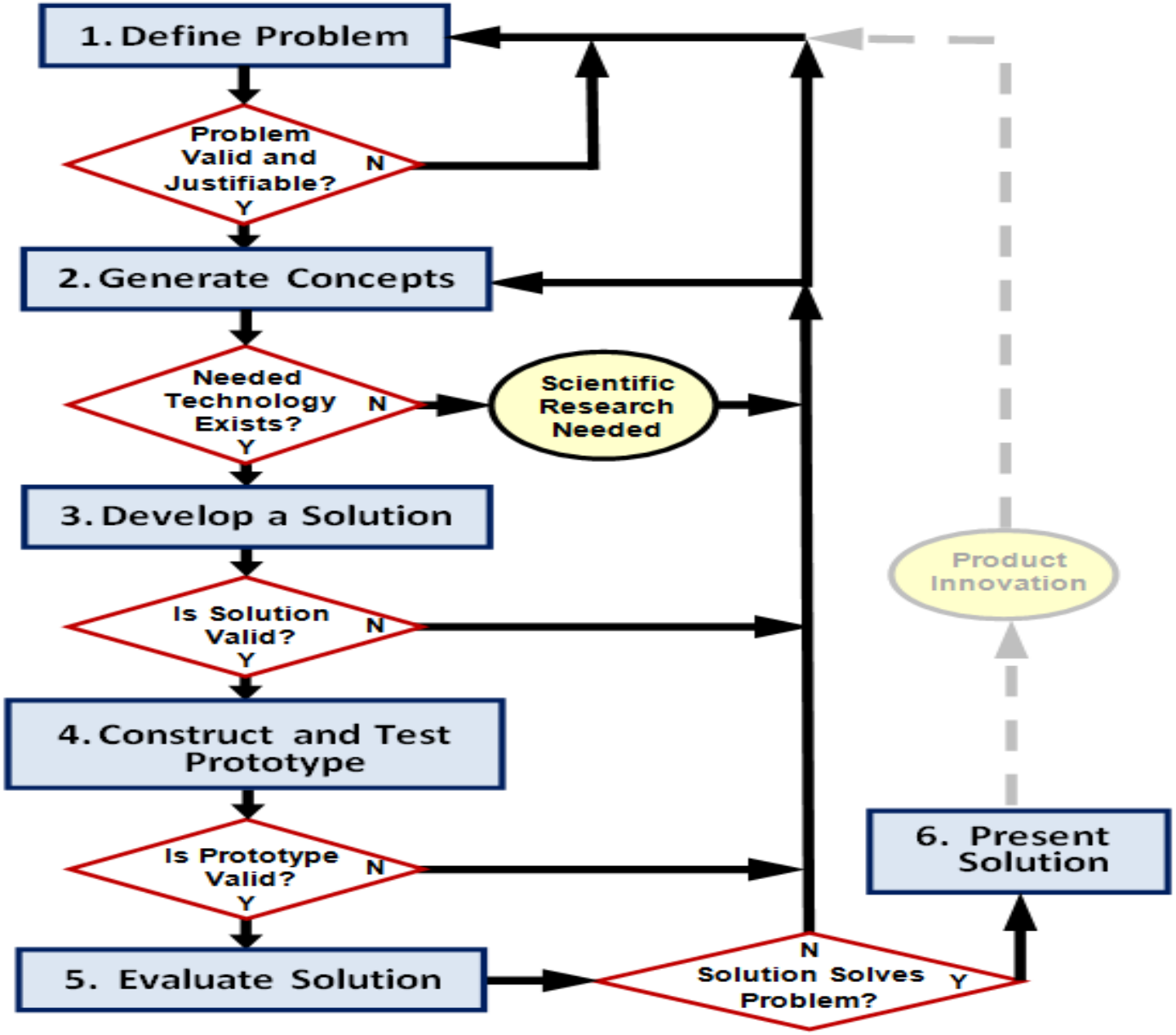
2. Generate Concepts
Needed Technology Exists?
N
Y
Scientific Research Needed
3. Develop a Solution
Is Solution Valid?
N
Y
4. Construct and Test Prototype
Is Prototype Valid?
N
Y
5. Evaluate Solution
N
Solution Solves Problem?
Y
6. Present Solution
Product Innovation

Define Problem	**Identify a problem that exists in the world.**	**Come up with clear problem statement.** **(Design Brief)**
Generate Concepts		
Develop a Solution		
Construct and Test a Prototype		
Evaluate Solution		
Present Solution		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Develop a Solution		
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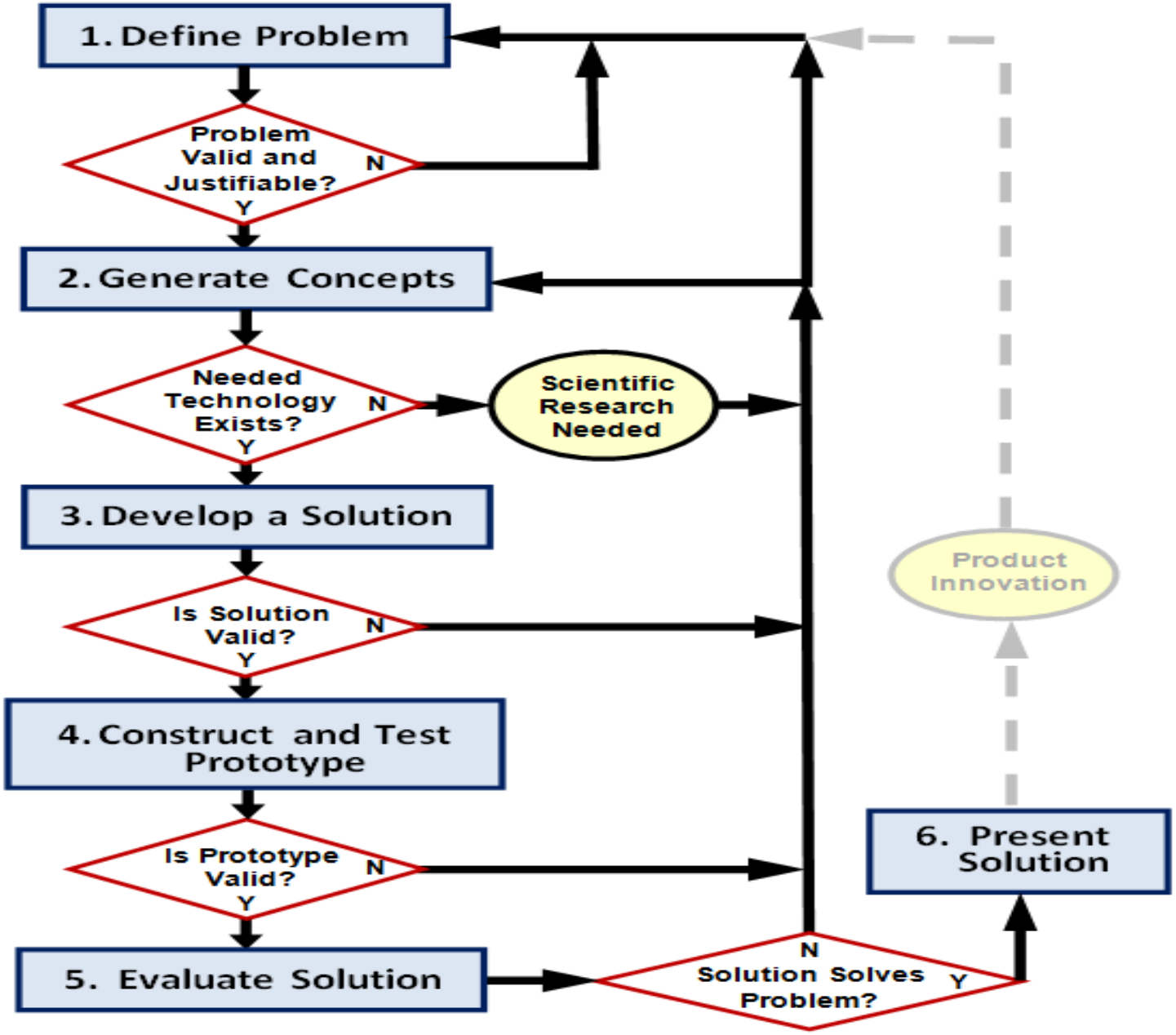
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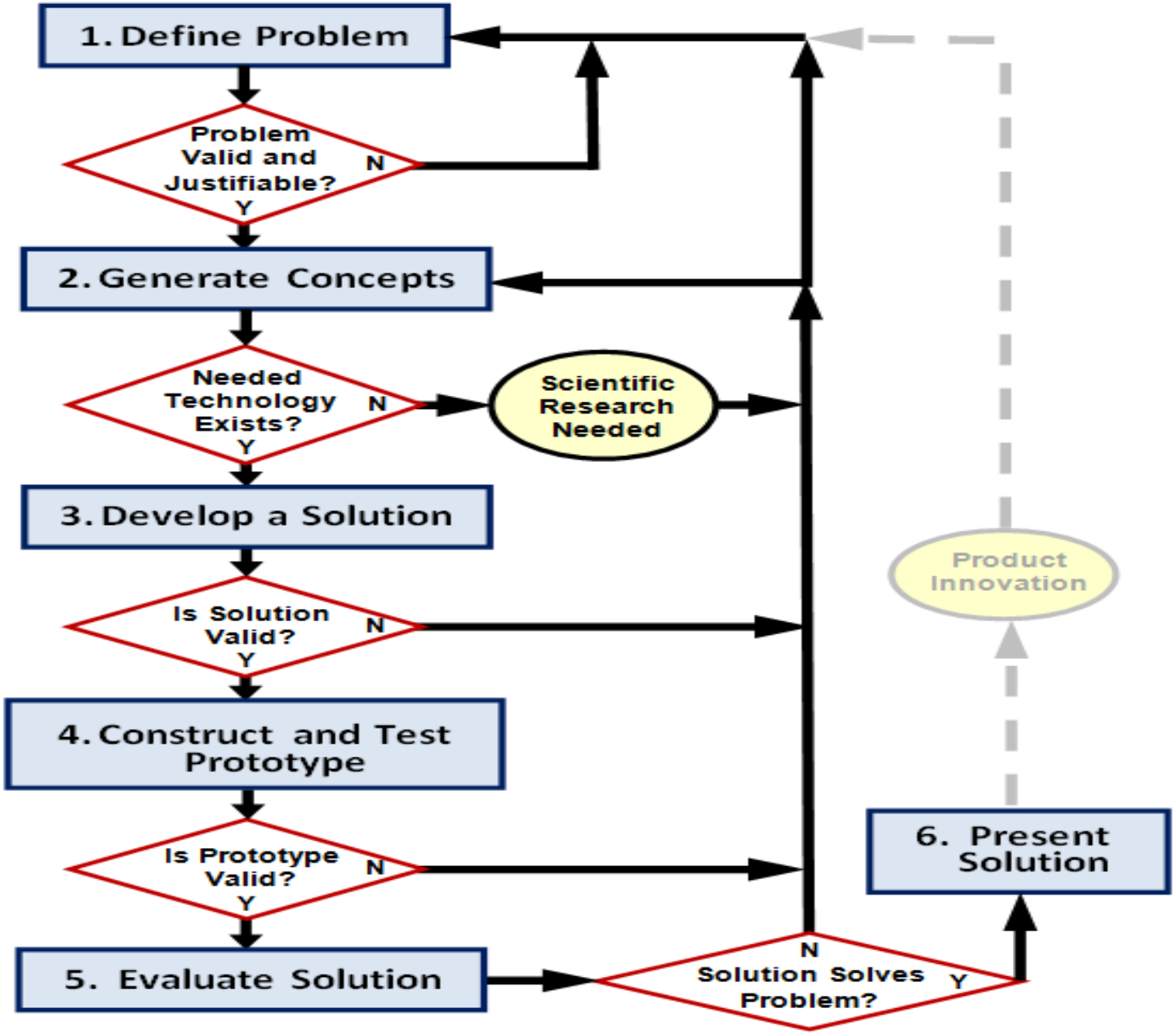
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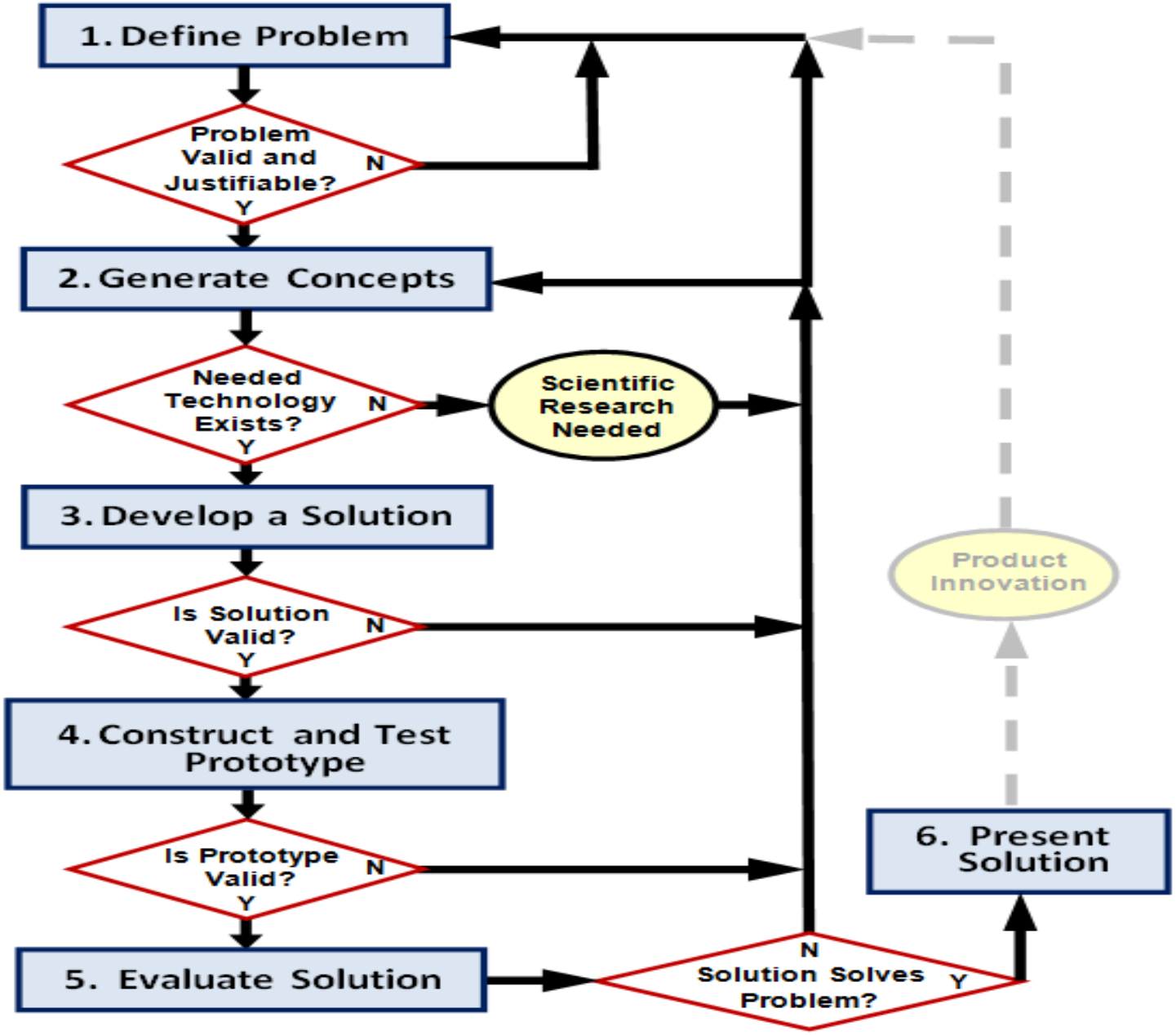
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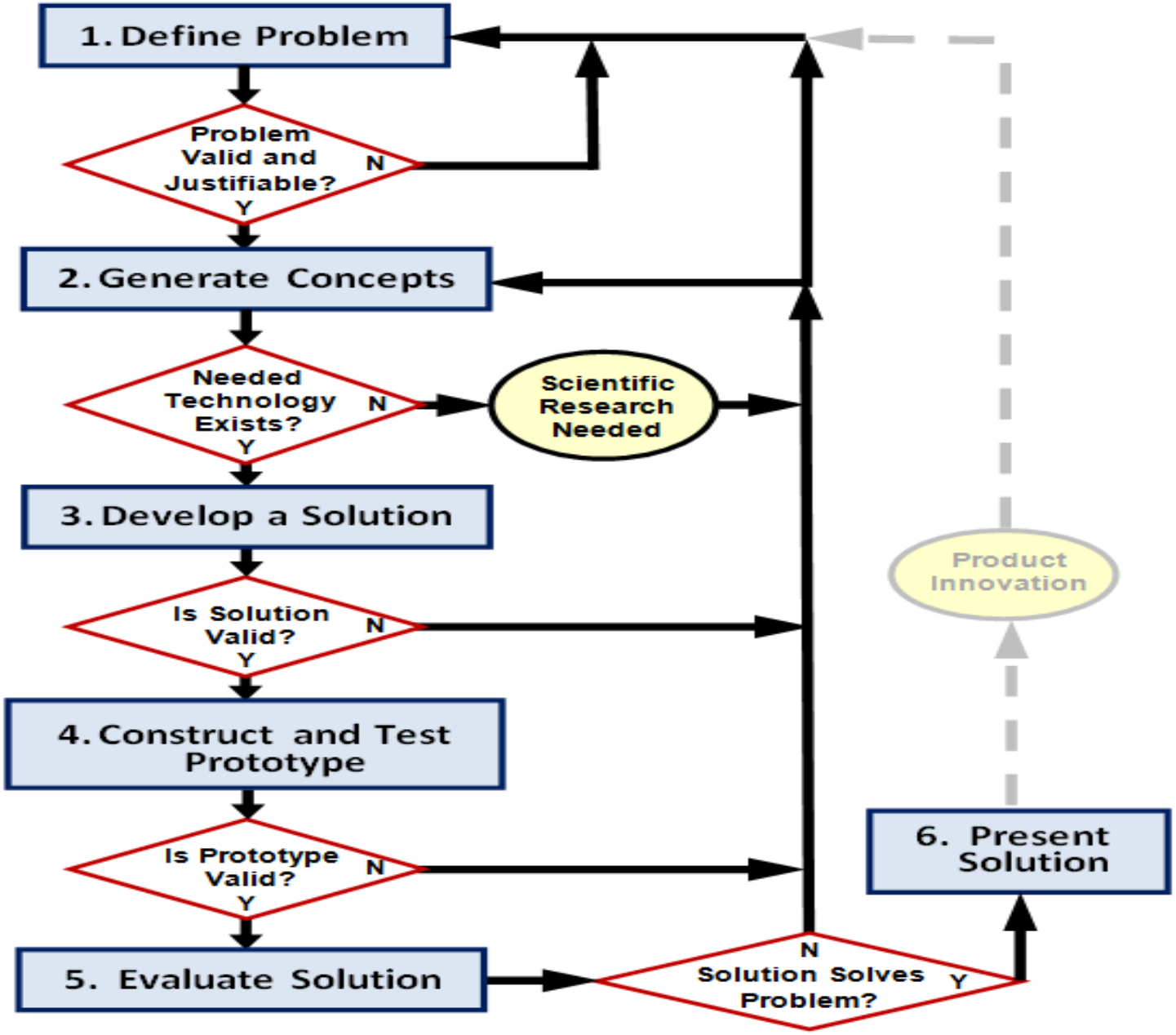
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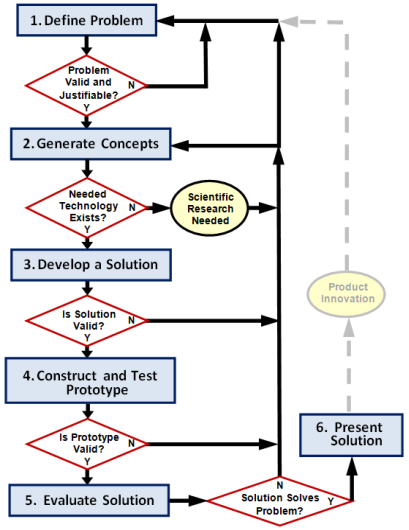
Evaluate Solution	**Determine whether your solution will solve your problem.**	**Critique your piece or come up with a plan about how you would test it.** **(LT 1.4)**
Present Solution	**Share your solution with the world**	**Come up with a presentation for your solution** **(Final Unit Project)**

Decision Making Matrix

Taking a Close Look at Preliminary Ideas



Moving from step 2 to step 3

Develop a Decision Matrix

A ***decision matrix*** is used to compare design solutions against one another, using specific criteria that are often based on project requirements.

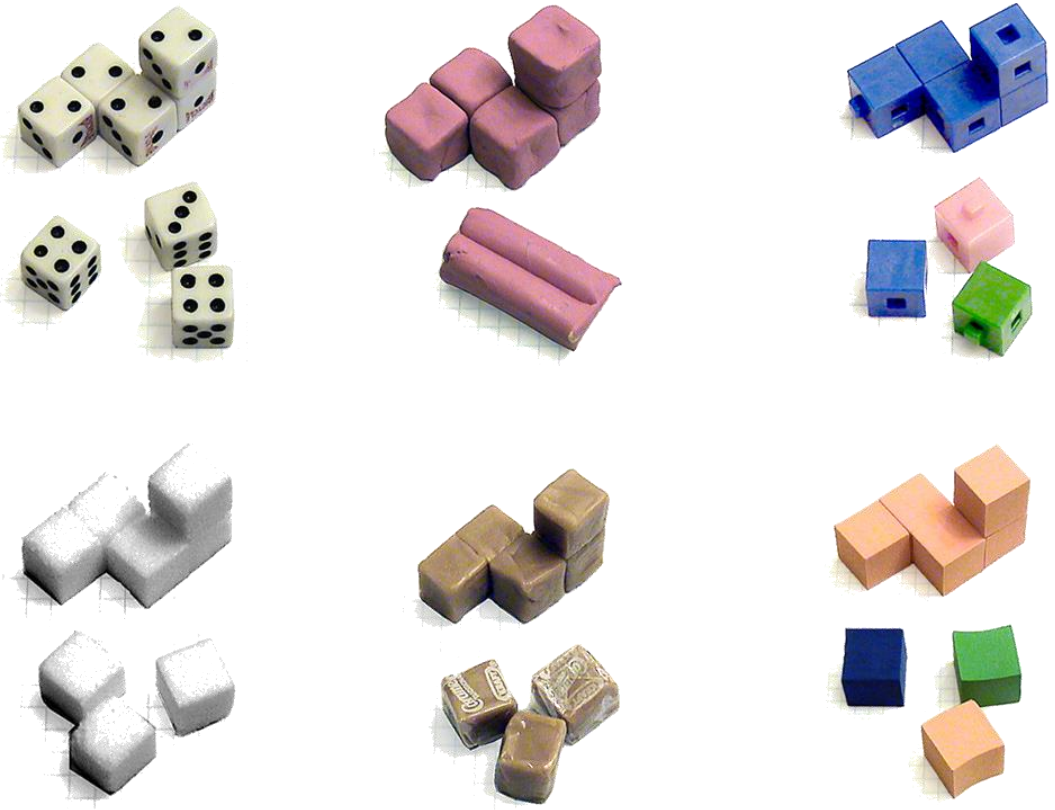
	cost	complexity	Development Time	Total
Idea #1	3	2	1	6
Idea #2	1	1	2	4
Idea #3	4	2	4	10
Idea #4	2	3	4	9
Idea #5	4	1	3	8
Idea #6	3	4	4	11

4	3	2	1
Best			Worst

2	1
Yes	No

Identifying Ideas or Alternatives

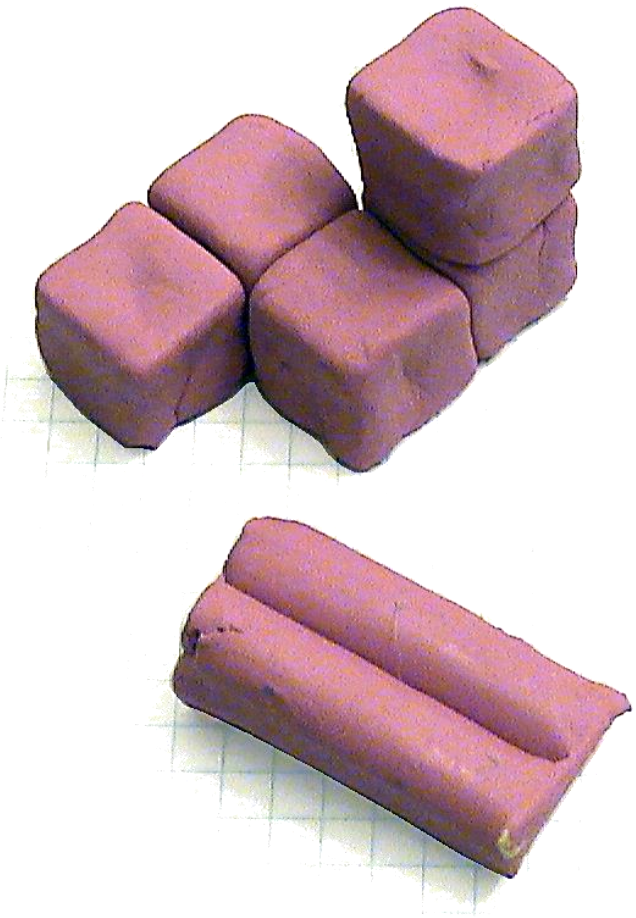
What material would be best for creating models of puzzle pieces?



Idea #1

Modeling Clay

- Reusable
- Readily available
- Requires forming
- Sticky
- Imprecise geometry



Idea #2

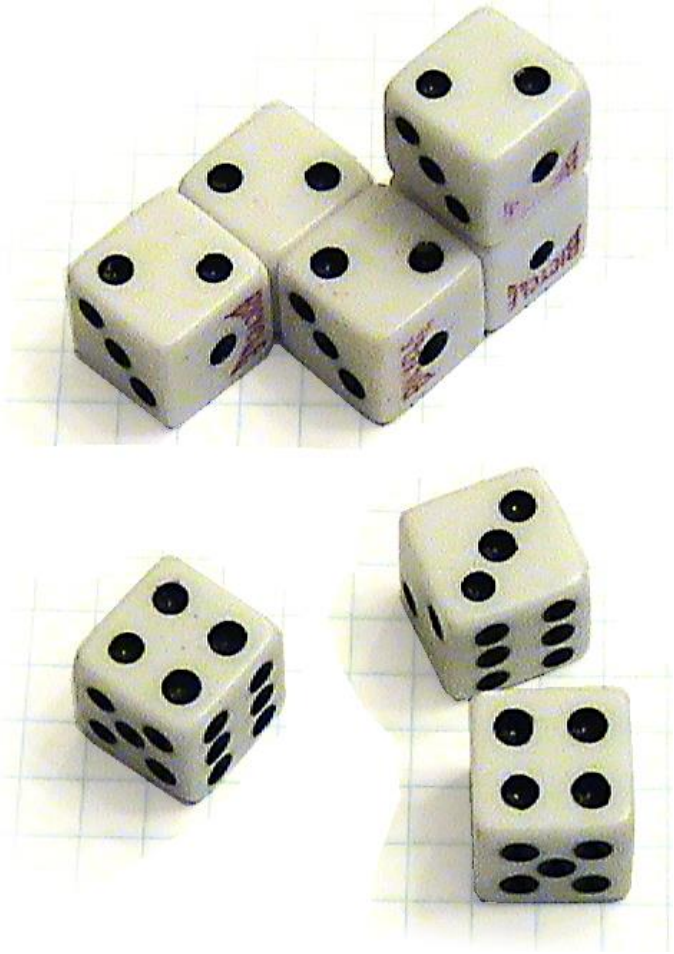
Caramel Cubes

- Cheap
- Readily available
- Pre-shaped
- Sticky
- Imprecise geometry

Idea #3

Dice

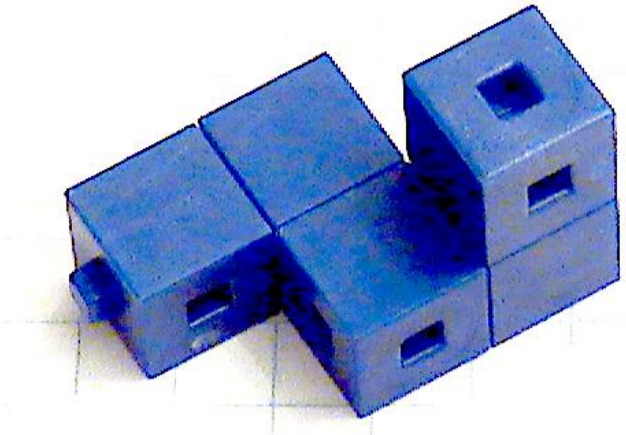
- Expensive
- Reusable
- Require 2-sided tape
- Moderately stable
- Precise geometry

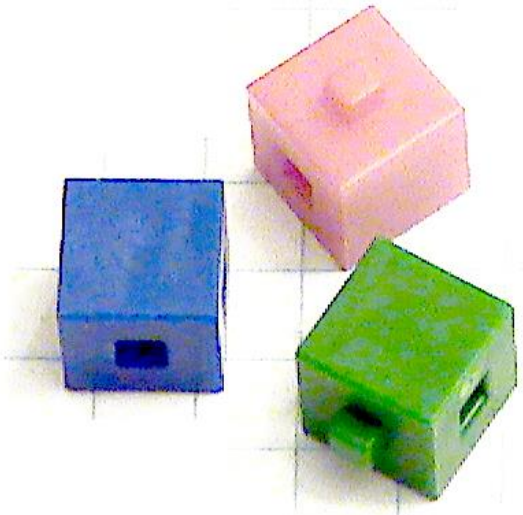


Idea #4

Centimeter Cubes

- Cheap
- Reusable
- Interlocking
- Protrusions
- Precise geometry

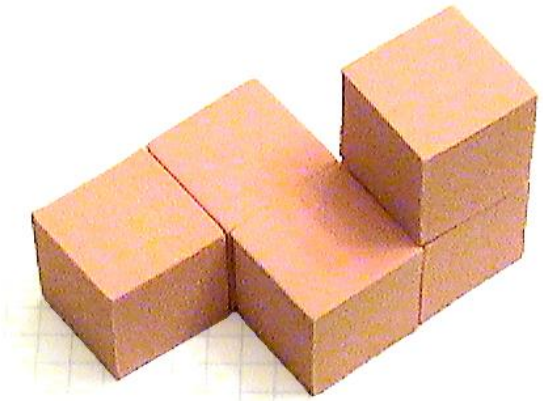


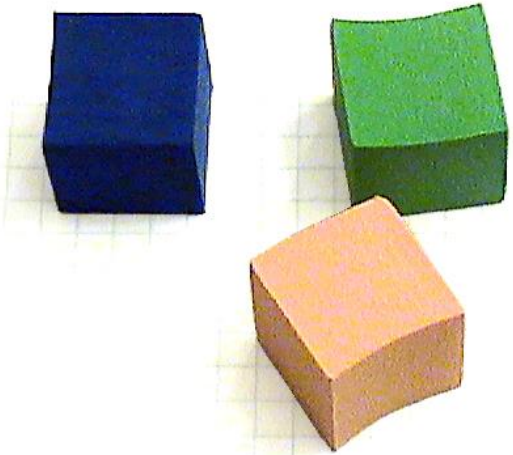


Idea #5

Foam Blocks

- Expensive
- Reusable
- Require 2-sided tape
- Fall apart easily
- Imprecise geometry

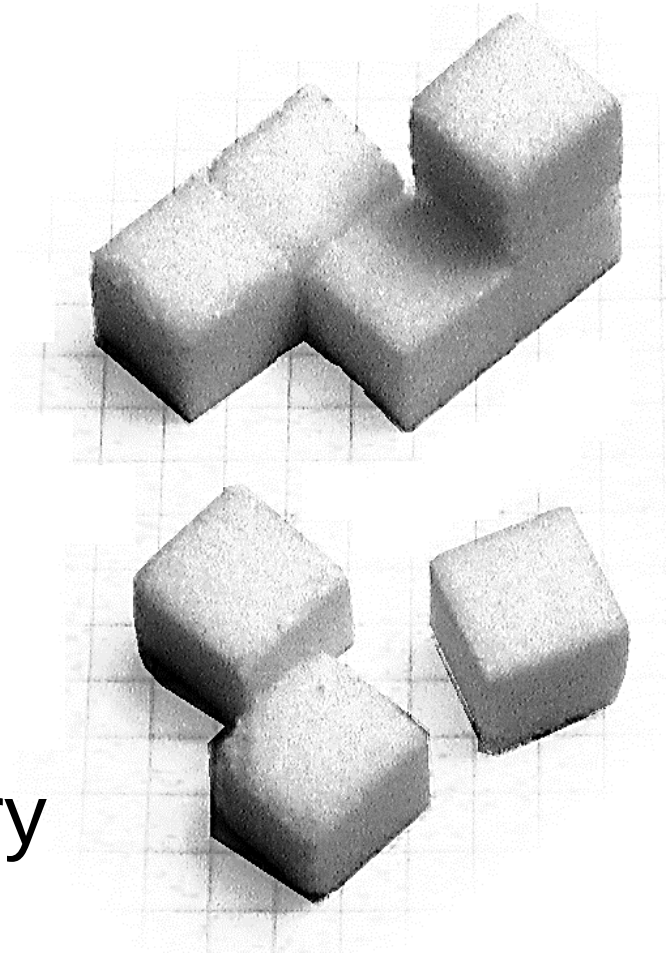




Idea #6

Sugar Cubes

- Cheap
- Readily available
- Require glue
- Have messy granules
- Fairly uniform geometry



Identifying Criteria

- Cost
- Reusability
- Geometry
- Connections
- Cleanliness
- Resilience
- Testability

Other Types of Criteria

- Function
- Product life span
- Development time
- Size
- Material costs
- Development costs
- Manufacturing costs
- Company standards
- Manufacturing capabilities
- Safety

Develop a Decision Matrix

A grading scale must be developed to assign values for each criteria category.

Rank Scale

4	3	2	1
Best			Worst

Question Scale

2	1
Yes	No

Ranking The Alternatives

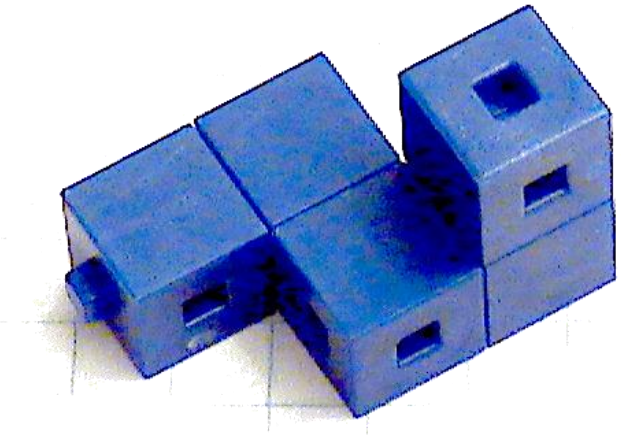
	Cost	Reusable	Uniform Geometry	Self-Adhering?	Clean-Up Needed	Model Resilience	Testability with other Parts	Total
Modeling Clay	2	2	1	2	1	1	1	10
Caramel Cubes	3	1	2	2	2	1	1	12
Dice	1	2	4	1	3	2	4	17
Interlocking Centimeter Cubes	4	2	4	2	4	4	2	22
Foam Cubes	1	2	3	1	3	2	2	14
Sugar Cubes	4	1	3	1	2	3	3	17

4	3	2	1
Best			Worst

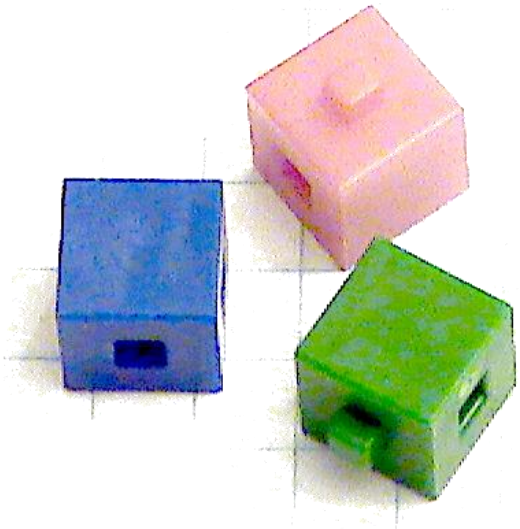
2	1
Yes	No

The Right Decision: Idea #4

Design decisions should be based on analysis and logic; not personal opinion.



A ***decision matrix*** is a design tool that may be used multiple times throughout a design process.



Decision Matrix Template

Criteria

Ideas							Totals

4	3	2	1
Best			Worst

2	1
Yes	No