

### Models of the Problem Solving (Invention, Design) Process

Rossman (Invention)	Guilford (Problem Solving)	Wallas (Problem Solving)	Bieniawski (Design)	Shigley (Design)	Scientific Method
Observation of need or difficulty	Cognition (understanding the problem)	Preparation	Statement of the problem	Recognize need; Define problem	Identify problem
Analysis of the need	Memory (experience): internal information search		Functional requirements		Data collection
Survey of all available information	Divergent operation (external information search)	Incubation	Collection of information	Synthesis	Hypothesis
Formulation of all objective solutions	Convergent operation (solution search)		Concept formulation		
Critical analysis of these solutions	Evaluation	Illumination	Analysis of solution components	Analyze / Organize	Analysis
The birth of the new idea (the invention)			Synthesis and specifications for alternative solutions		
Experimentation (to test out the most promising solution)	Implementation	Verification	Evaluation / Optimization	Evaluate	Experimentation
Selection and perfection of the final embodiment (by some or all of previous steps)			Recommendation / Implementation	Present	Derive conclusion