

# Games That Engage

Using Fun Tactile Games to Illustrate Complex Topics to Anyone

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## Game #1: LEGO Complexity Game

- ▶ Goal
  - ▶ To demonstrate how productivity is diminished as we add more complexity to any operation
- ▶ Operation
  - ▶ Build orders to satisfy customers and ONLY increase the complexity of the tasks



## Complexity Demonstration

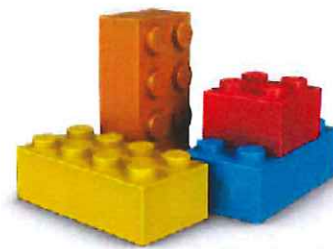
	3 Contestants	3 Contestants	3 Contestants
	Round 1	Round 2	Round 3
Products	2 Shapes	2 Shapes	3 Shapes
Processes	2 Colors	3 Colors	4 Colors
Markets	2 Cities	4 Cities	6 Cities
	8 Possibilities	24 Possibilities	72 Possibilities

### Products:

- Large
- Small
- Round

### Colors:

- White 
- Yellow 
- Orange 
- Gray 



## Game #2: The Bolt Game

### ► Goal

- To demonstrate the difficulty associated with not having standardization or standardized work
- Solicit ideas from the participants for how to improve the process

### ► Operation

- Build duplicate bolt assemblies in spite a lack of procedures and improve the process in the next round





## FUNDAMENTAL

	Concepts Intro'd	Layout	Procedure	Objective	Keywords
<b>Scenario 1 : <u>Autonomous Craftsman</u></b>	Demonstrates <b>variability</b> among operators. Emphasizes using "standardized work instructions"	Use <b>separated</b> workstations	10 Participants build 2 units and record time for 20 completions. Testing included.	<b>Key on variability</b>	Variability, STI (Standardized Work Instructions) or Method Sheets
<b>Scenario 2: <u>Assembly Line Work</u></b>	Emphasizes <b>PUSH</b> flow and illustrates bottlenecks	<b>Sequential</b> workstations with unlimited queues between	10 participants build 20 units incrementally while using apportioned instructions. Test station at end.	<b>Demonstrate PUSH flow</b>	Bottleneck, Constraints, Flow, Push, Quality Control
<b>Scenario 2.5: <u>Assembly Line Work with Batches</u></b>	Same as above but introduces <b>batching</b> concept to emphasize bottlenecks	Sequential workstations with <b>batch bins</b> instead of queue between some stations	11 participants build 20 units incrementally while using apportioned instructions. Test station at end.	<b>Emphasizing bottlenecks</b>	Bottleneck, Constraints, Flow, Push, Quality Control, Batching
<b>Scenario 3: <u>Assembly Line with Balanced Work</u></b>	Demonstrates <b>PULL</b> vs <b>PUSH</b> flow and the concept of <b>workload balancing</b>	Sequential workstations with small box for <b>single queue</b> space. Work instructions are balanced evenly.	Same as above being constricted to single queue space	<b>Optimizes Capacity</b>	Pull, Flow, Queue, Workload Balancing
<b>Scenario 4: <u>Pull system with Check included</u></b>	First-Time-Through Quality (FTT) and enhanced <b>defect detection</b>	Same as above with <b>straw for each operator</b> to touch "previous work" performed upstream	Same as above with added "Check" step at the beginning of each work station and "test" station eliminated	<b>Optimizes Quality</b>	FTT (First-Time-Through), Metrics, Immediate Quality Detection, Cross-Training, Non-Value Added (NVA) Activity
<b>Scenario 5: <u>Strategic Flexing</u></b>	Introduces <b>Takt time</b> metric. Introduces "flexing" to adjust capacity in line with Takt. Reinforces cross-training concept.	Same as above with 2 or 3 <b>stations unoccupied</b> for flexing.	Same as above but participants must physically move up/down stream as needed to perpetuate flow	<b>Optimizes Resource Efficiency</b>	Flexing, Takt Time, Customer Demand, Cross-Training
<b>Scenario 6: <u>Mixed Model Production</u></b>	Introduces concept of <b>mixed model</b> production and emphasizes cross-training. Introduces Kanban.	Same as above with <b>3 different LEGO vehicles</b> coming down the line in random order. Include bins.	Same as a above but participants must use appropriate work instructions for model at hand.	<b>Optimizes Flexibility</b>	Cross-Training, Mixed Model, Flexibility, Kanban
<b>Scenario 7: <u>Kanban Part Replenishment</u></b>	Emphasizes <b>Kanban</b> for part replenishment.	Same as above but focuses on <b>Kanban</b> .	Same as a above but uses 7 assemblers and 1 kanban runner. All parts are bin-based.	<b>Addresses Line Inventory Management</b>	Kanban Sizing, Depletion Rates, Replenishment Time
<b>Scenario 8: <u>Effective Sub-Assemblies</u></b>	Demonstrates using <b>Sub-Assemblies</b> to improve Lead Time and lower Total Process Cycle Time (TPC) without changing Touch Time.	Same as Scenario 4 but laid out with 5 Participants on the main line and 4 off-line as sub-assemblers	Sub-assemblers can build to a separate queue (qty 2)	<b>Optimizes Response to Demand</b>	Total Process Cycle Time, Lead Time, Touch Time, Supermarkets

## ADVANCED



## Game #3: LEGO Train Building

### ► Goal:

- Demonstrate a host of different Lean improvement techniques to a large group as you systematically modify a simple sequential process

### ► Operation

- Apply selected Lean improvement tools and monitor the impact on issues such as Lead-Time, WIP inventory, quality, bottlenecks, etc.



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## Game #4: The Changeover Game

### ► Goal

- To illustrate how productivity (and quality) are impacted as we shift from task to task
- This game applies more to back-room processes than to manufacturing and makes a great demonstration for office personnel

### ► Operation

- Use common strategic board games and require one brave participant to constantly shift from one game to another while their opponents can concentrate on one game alone; then compare productivity



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## The Changeover Game: 4 Opponents Against 1 Champion



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## The Changeover Game Results

Opponent	Game	# Moves	Total Time (sec)	Time/Move
Chuck	Connect 4	27	92	3.4
Abby	Uno	46	138	3.0
George	Memory	23	103	4.5
Barbara	Battleship	17	99	5.8
		113	432	4.2 totals
Champion	All 4 Games	113	768	6.8

Operate for 15 to 20 minutes and compare results.  
Look at productivity and quality for each.

## Game #5: The White Bead Company

### ► Goal

- To introduce the notion of common causes of variability and simple control charting through absurdity
- Demonstrate how we cannot inspire or manage our way out of quality issues without the proper application of Continuous Improvement tools

### ► Operation

- Demand that participants produce few or no defects from a defect-rich process and then demonstrate how control charts work



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## White Bead Game Sample Results

	EMPLOYEE	DAY OF THE WEEK					SUMMARY		
		1	2	3	4	5	Total	Ave	Range
1	Bob	10	5	12	8	13	48	9.6	
2	Anne	6	10	5	7	5	33	6.6	
3	Jill	7	6	9	6	10	38	7.6	
4	Mark	7	4	11	5	7	34	6.8	
5	Aaron	6	6	8	9	6	35	7	
6	Paul	9	3	7	6	8	33	6.6	
TOTALS		45	34	52	41	49	221		
AVERAGE		7.5	5.7	8.7	6.8	8.2		7.37	

## White Bead Game Sample Results

c Chart: Errors (Red Beads)

