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# Lean Six Sigma In Education

October 1, 2009

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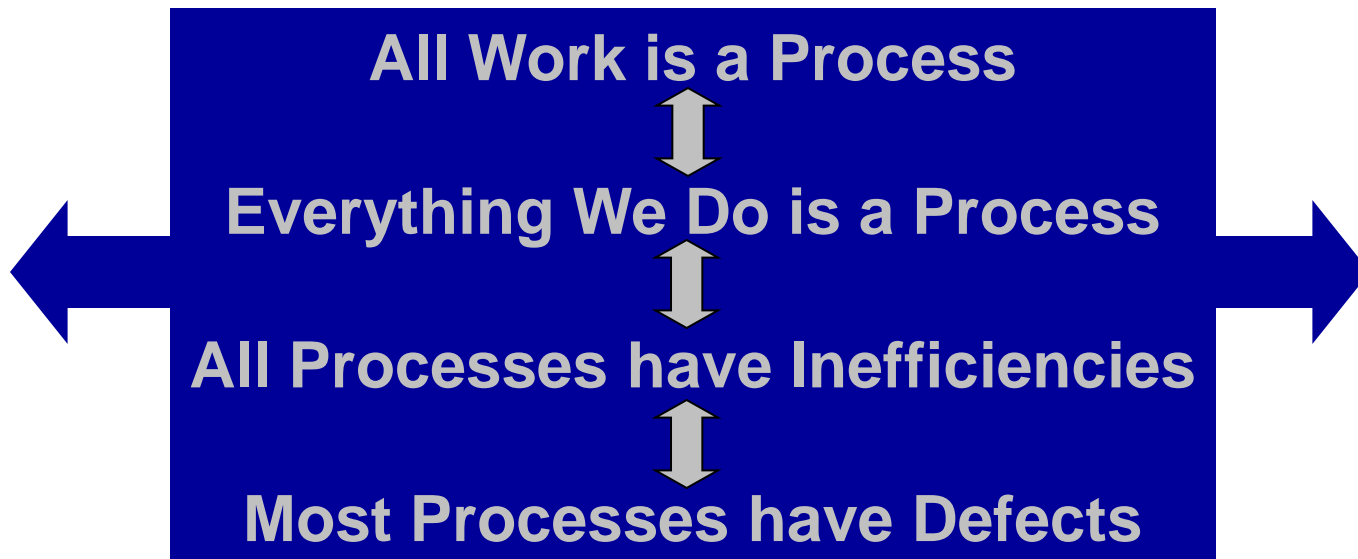
**Please Make a Name Tent and  
Place It In Front Of You**

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- **Methodology to Solve Problems Through a Process Approach**
  - **Way to Improve Processes**
  - **Way to Improve all Business and Personal Tasks**
  - **Way to Make Any Task Easier, More Efficient With Less Errors**
  - **Lessons Learned That will Last A Lifetime**
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## Process Improvement



**Lean Six Sigma Fixes Processes**

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**Is 99% Good ?**

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## Practical Meaning of “99% Good”

- **20,000 lost articles of mail per hour**
- **Unsafe drinking water almost 15 minutes each day**
- **5,000 incorrect surgical operations per week**
- **2 short or long landings at most major airports each day**
- **200,000 wrong drug prescriptions each year**
- **No electricity for almost 7 hours each month**

**99% Is NOT Good Enough Anymore**

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## A 5 Phase Project Approach

**Define**

Define the Problem and Process

**Measure**

Measure the Process and Problem through Data

**Analyze**

Find Root Cause of the Problem

**Improve**

Improve the Problem

**Control**

Make Sure it Doesn't Happen Again

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- **Black Belts – Engineers and Engineering Managers**
  - **Green Belts – Managers and Technicians**
  - **Yellow Belts – Everyone in the Organization**
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## Define

- **Problem – What is the issues**
- **Project – What do you want to fix first**

**“Well Begun is Half Done.....”**

**Mary Poppins**

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### Key Tool – Problem Statement

<b>Problem</b>			
<b>Scope</b> <i>(Is/Is Not)</i>		<b>Current State/Desired State</b>	
Is in the project	Is <u>NOT</u> in the project	Current State	Desired State
<b>Smart Goal</b>			

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### Problem

*It takes too long to clean up the kitchen after dinner*

### Scope

*(Is/Is Not)*

#### Is in the project

*Cleaning the kitchen  
 Dinner  
 At home  
 Washing dishes  
 Drying dishes  
 Sweeping  
 Wiping the table  
 Putting dishes away*

#### Is NOT in the project

*Washing the windows  
 Cleaning the oven  
 Cleaning the ceiling  
 Mopping the floor  
 Breakfast  
 Lunch  
 At my friends house  
 Washing the cabinets*

### Current State/Desired State

#### Current State

- 30 minutes
- 3 people
- Floor still dirty
- Fighting with siblings over tasks

#### Desired State

- 20 minutes
- 2 people
- Floor clean
- Peace in the kitchen

### Smart Goal

*Decrease the time and manpower to clean the kitchen from 30 minutes and 3 people to 20 minutes and 2 people by June 30, 2009*

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### Key Tool – Problem Statement

<b>Problem</b>			
It takes too long to make a name tent It took 7 minutes and should take only 1			
<b>Scope</b>		<b>Current State/Desired State</b>	
<i>(Is/Is Not)</i>			
<b>Is in the project</b>	<b>Is <u>NOT</u> in the project</b>	<b>Current State</b>	<b>Desired State</b>
Name Tents Marker Writing Folding Placing	Buying Materials Making Paper Supplying Materials Badges	Cumbersome Disorganized Sloppy Time Consuming Frustrating	1 minutes Easy Neat Efficient
<b>Smart Goal</b>		Decrease the time it takes to make a name badge from 7 Minutes to 1 minute	

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**Student Example**



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## Measure

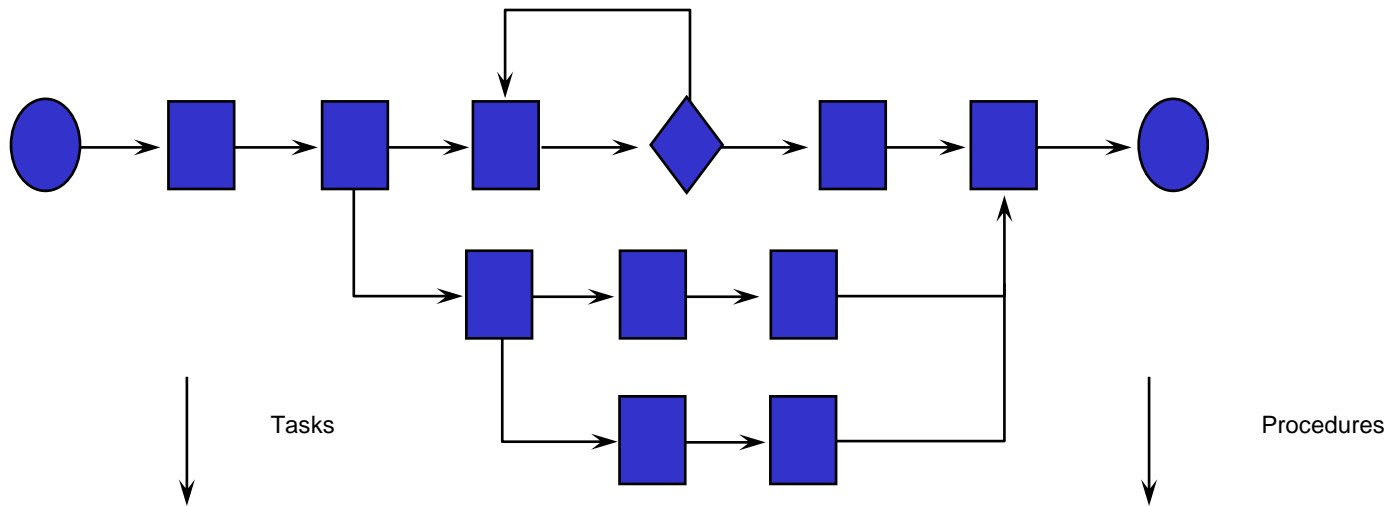
- **Understand the Process**
- **Map The Process**
- **Gather Data on the Process**

**Walk the Process to Understand the Process**

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## Key Tool – Process Mapping



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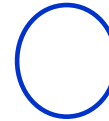
## **Tips**

- **Clarify Process Boundaries (Where does it start and stop?)**
- **Involve People Who Know (Focus On) The “As Is”**
- **Identify process steps, decision points, data collection, inspection points, built-in delays, etc**
- **Do not start “problem solving”**
- **Do NOT do it solo**

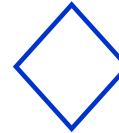
## **Symbols**



– **Process Step or Operation**



– **Quality Check, Inspection or Measurement**



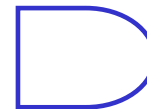
– **Decision**



– **Transport or Movement of Material or Transmission of Information**



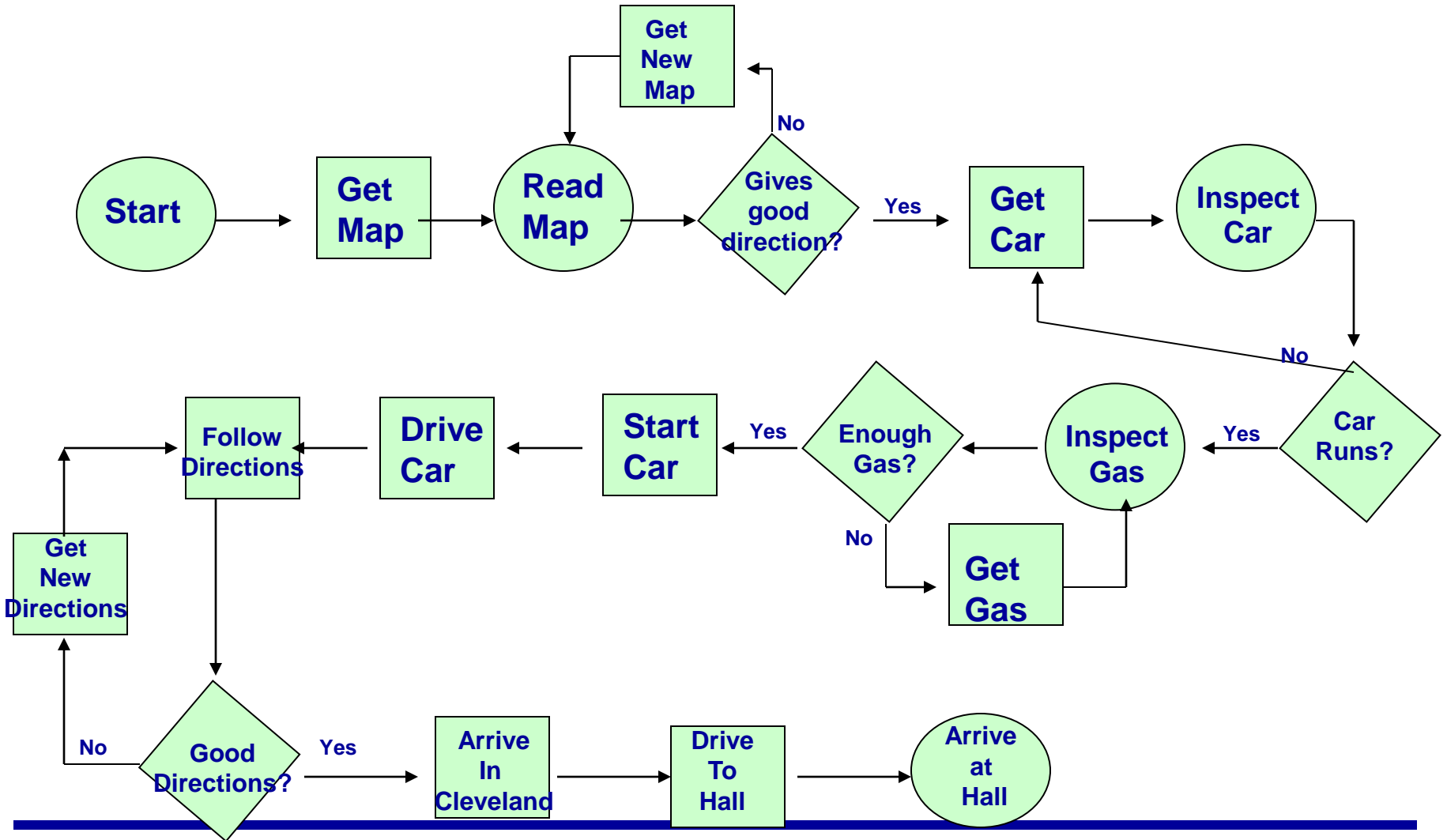
– **Documentation**



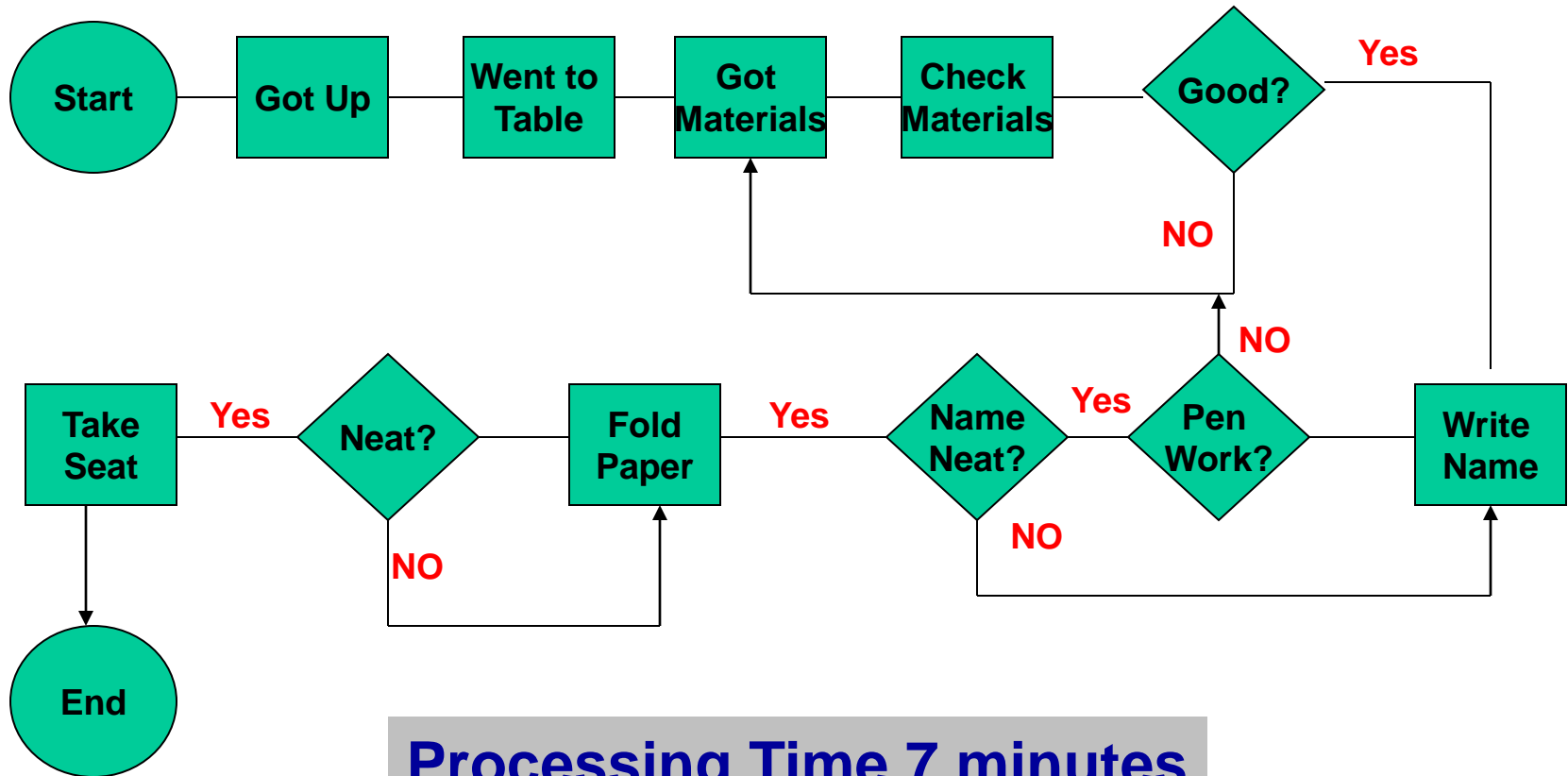
– **Delay**

## Driving to Rock and Roll Hall of Fame

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**Processing Time 7 minutes**

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**Student Example**

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## Analyze

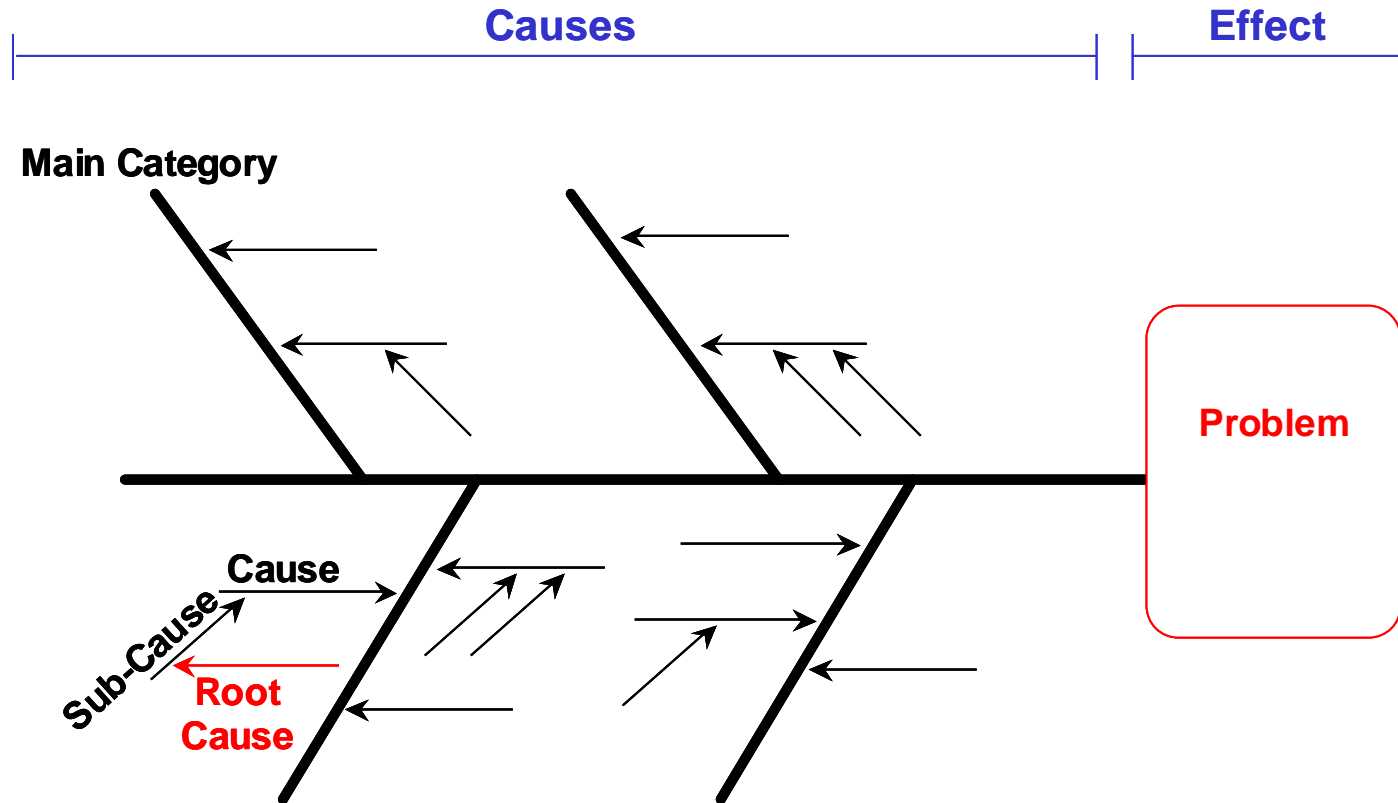
- **Find the Root Cause(S) of the Problem**
- **Prioritize the Root Cause**
- **Determine on which to take action**

**Find the Root Cause to Fix The Problem at the Root Cause**

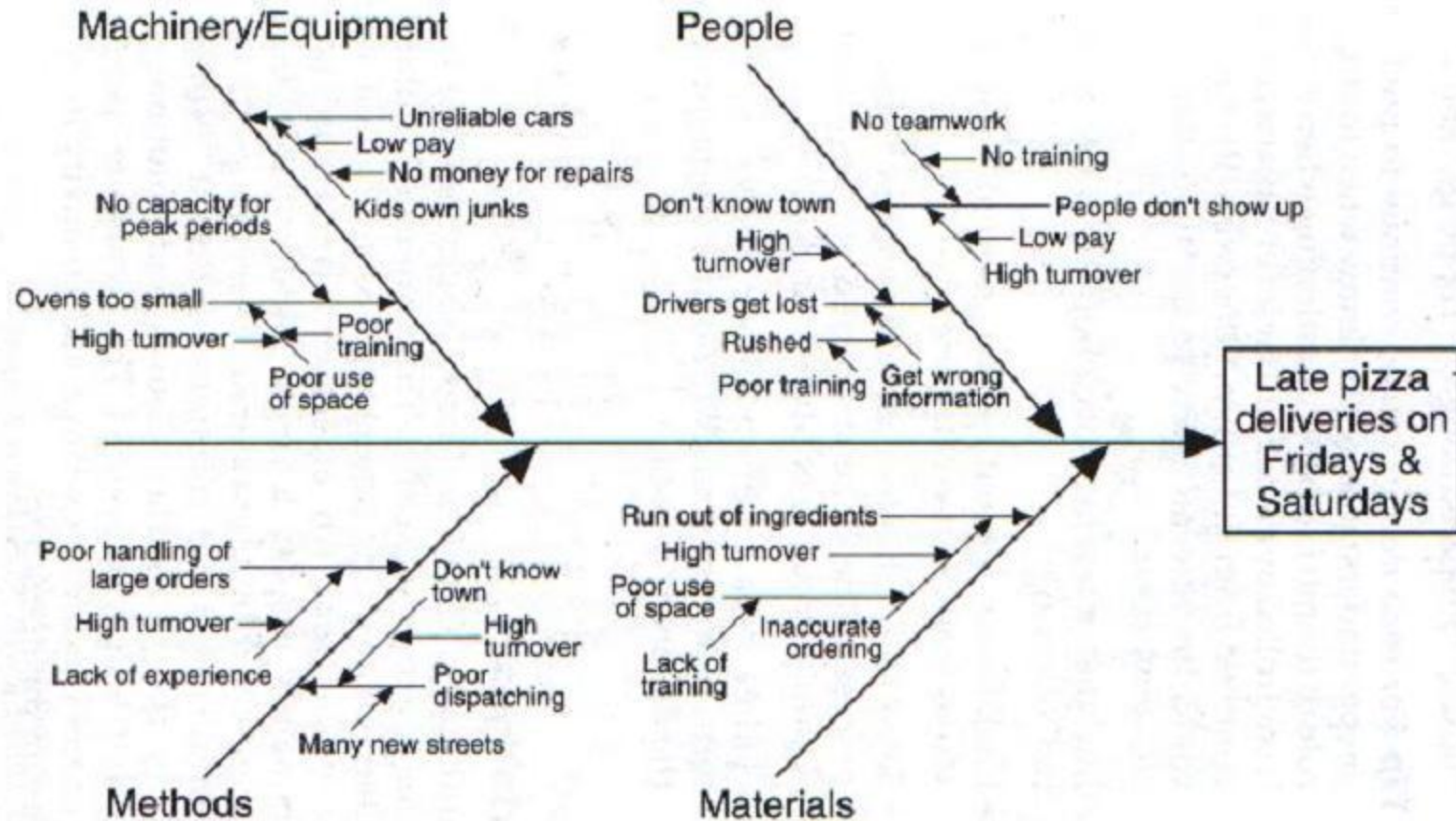
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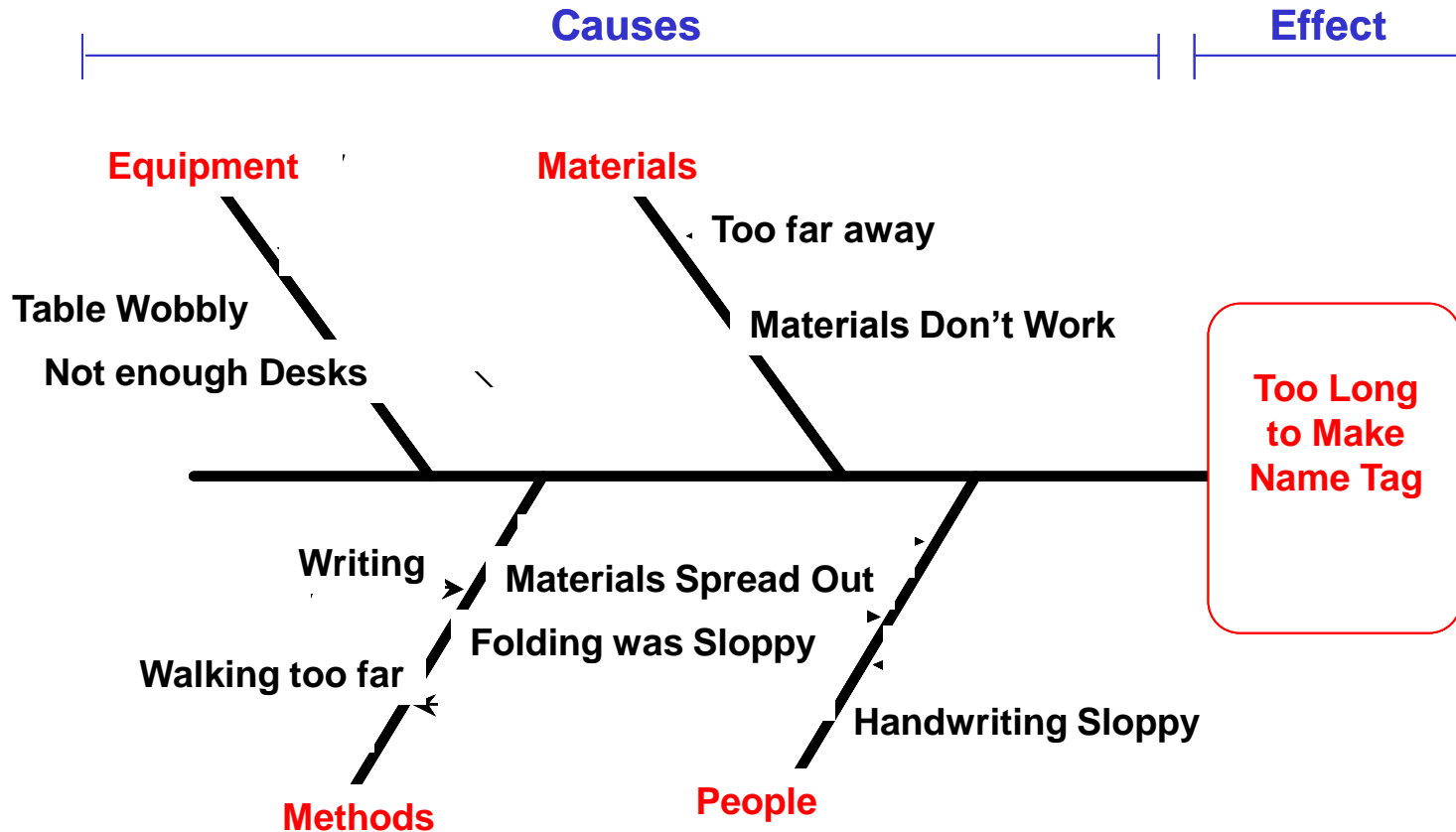
## Key Tool – Cause and Effect Diagram



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**Student Example**



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## Improve

- **Determine Best Course of Action to Fix The Root Cause**
  - **Determine What Can be Fixed and What Can Not**
  - **Implement the Solution**
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<b>Improve Phase</b>	
<b>Control</b>	<b>No Control</b>
<b>Move Materials Closer</b>	<b>Have Name Tents Pre-Printed</b>
<b>Throw Out Bad Pens</b>	<b>Buy More Materials</b>
<b>Pre Fold</b>	<b>Buy More Desks</b>
<b>Group Materials Together</b>	<b>Not Use Name Tents</b>
<b>Have Materials At Each Desk</b>	

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**Student Example**

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## Control

- **Insure Solution is Implemented**
  - **Insure People Using the New Process Are Trained**
  - **Make Sure No Mistakes Can Occur**
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## Key Tools – Standard Operating Procedure & Poke Yoke

- **SOP**
    - **Get Creative**
    - **Find Different Ways to Deliver SOPs**
    - **Train Using SOPs**
      - **Videos**
      - **Web**
      - **Posted Signs**
      - **Written Instructions**
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**Student Example**

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