MAYO CLINIC

Lean II
5S / Visual
Management

Rochester Area Quality Council
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High-level Comparison of Process Improvement Methodologies

Program	Lean	Six Sigma	Theory of Constraints - TOC
Theory	Eliminate waste	Reduce variation	Manage constraints
Focus	Workflow	Problems	Systems constraints
Approach	PDSA (Plan-Do-Study-Act) Employee involvement	DMAIC (Define, Measure, Analyze, Improve, Control) Black/Green belt led project team	1 - Identify the constraint (s) 2 - Exploit that constraint to its fullest capability 3 - Subordinate all other actions 4 - Elevate the constraint
Primary Impact	Reduced flow time	Uniform process output	Fast throughput
Criticisms	Statistical or system analysis not valued	System interaction not considered Process improved independently	Minimal worker input Data analysis not valued

What is Value?

- **Attributes of a product or service whose characteristics are identified by the customer (voice of the customer)**
  - **most often reflected in quality, cost, speed of delivery, and personal attention**

- **What the customer expects of a product or service**

- **The patient experience**
  - **e.g. intangibles such as environment**
  - **personal care/touch which support Mayo's primary value: "The needs of the patient come first.")**

What is Waste?

- **Breakdown of waste…**

  Incidental Work **does not add value but is <u>required</u> in order to fulfill the patient/client request**

  (e.g., flying specimens into Rochester for testing)

  Pure Waste **does not add value <u>and</u> isn't required in the fulfillment of the patient/client request**

Types of Waste

Waiting	Inventories	Overproduction
Transportation / Material Movement	Motions (movement)	Re-prioritization
Over-processing	Defects	Mis-utilization of skills

Lean versus typical improvement methods

Value Add	Incidental Work	Waste

Current process lead time

Value Add	Incidental Work	Waste

Traditional process improvement focuses on improving efficiency in the value-add activities:
- Work longer, harder, faster
- Add more people, equipment, or both

Value Add	Incidental Work	Waste

Lean focuses on improving the value stream by systematically eliminating waste:
- Increase capacity & velocity of processes
- Work smarter / safer

Lead Time

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The 5S's - the original Japanese words

整理 • **Seiri** = **Sort**

整頓 • **Seiton** = **Set in Order**

清掃 • **Seiso** = **Shine**

清潔 • **Seiketsu** = **Standardize**

躾 • **Shitsuke** = **Sustain**

5S in detail

Sort

To separate needed items from the un-needed items (using "red-tag" Exercise)

Set In Order

To arrange for **easy** access and visualization

Shine

To ensure the area is cleaned and kept clean

Standardize

To ensure sort, set-in-order, and shine are consistently implemented by all

Sustain

Hard-wire gains

5S

Why do 5S?

- **Benefits of adopting a 5S program:**

  - **Opens up floor space/counter space**
  - **Eliminates time spent searching**
  - **Reduces training time**
  - **Improves process flow**
  - **Eliminates waste**
  - **Reduces equipment breakdowns**
  - **Improves change-over time**
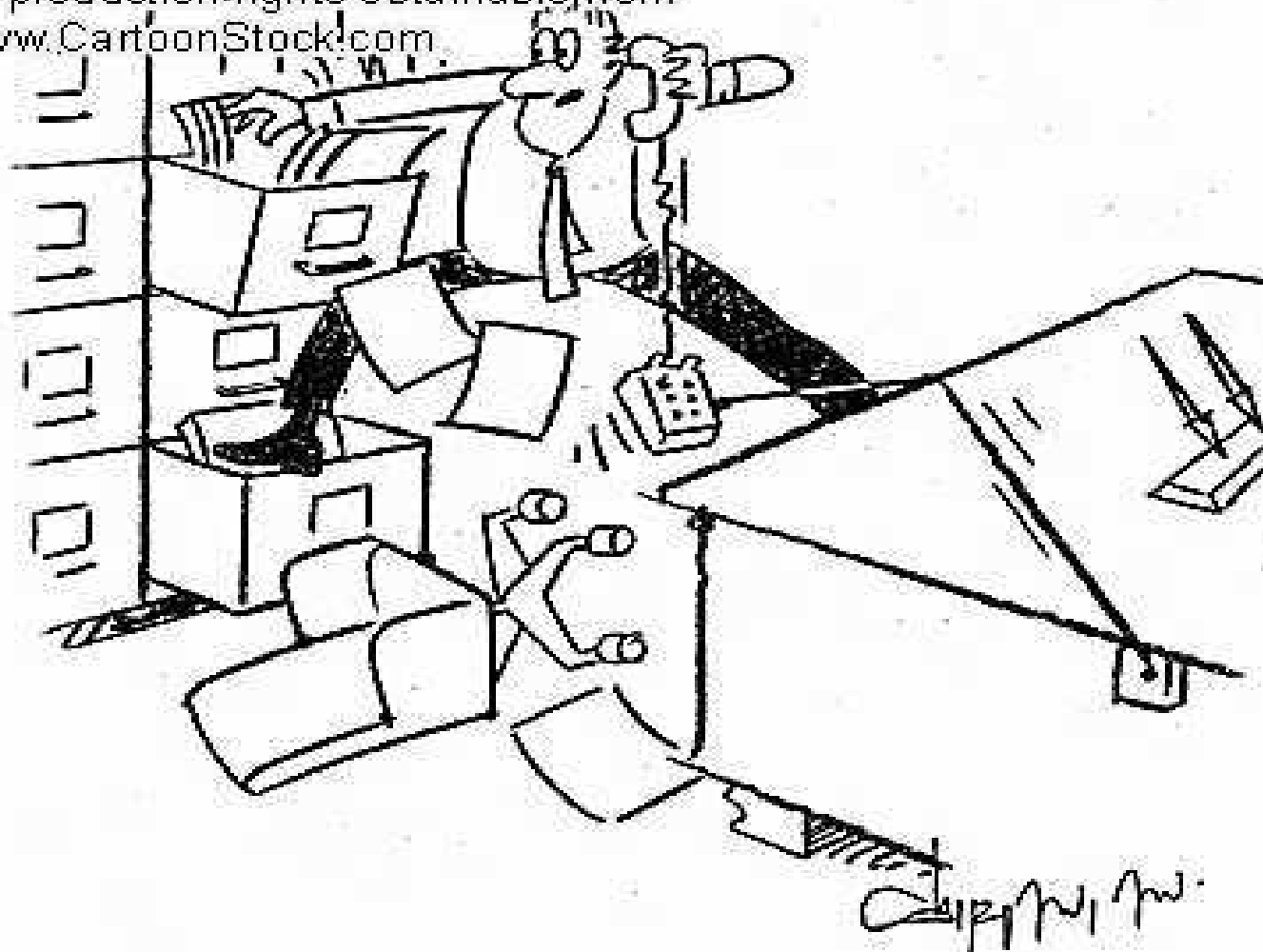 - **Reduces employee STRESS**
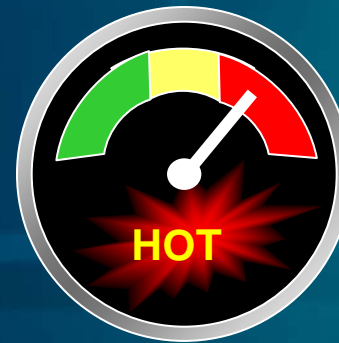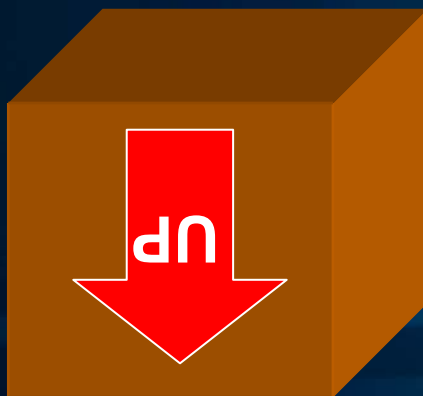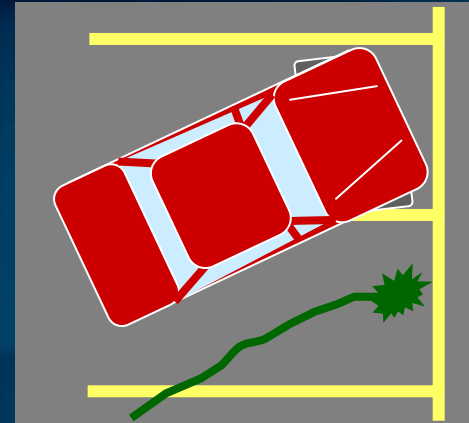
Why do 5S?

We don't have enough space!

Why Do 5S?
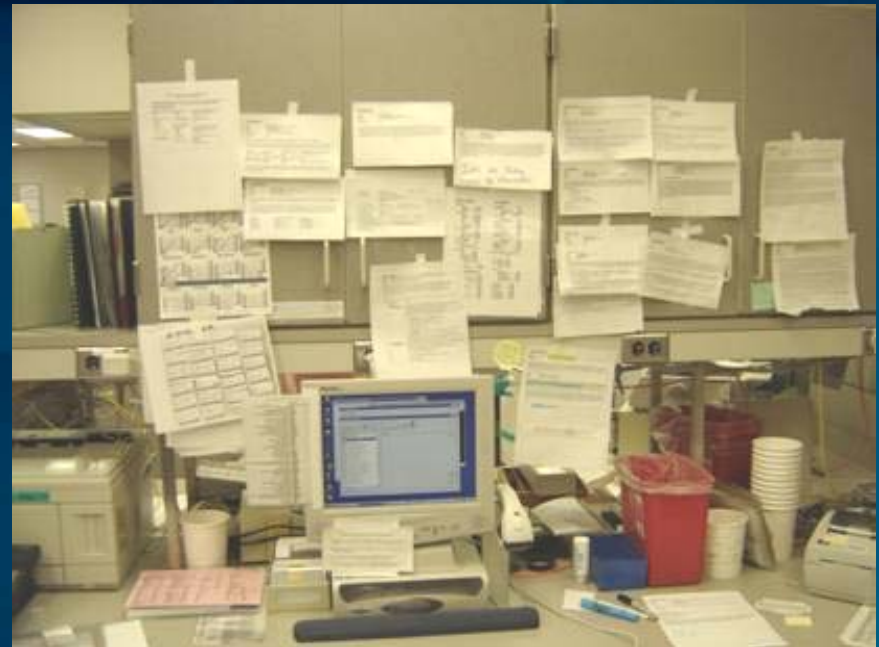
I can't find what I'm looking for!

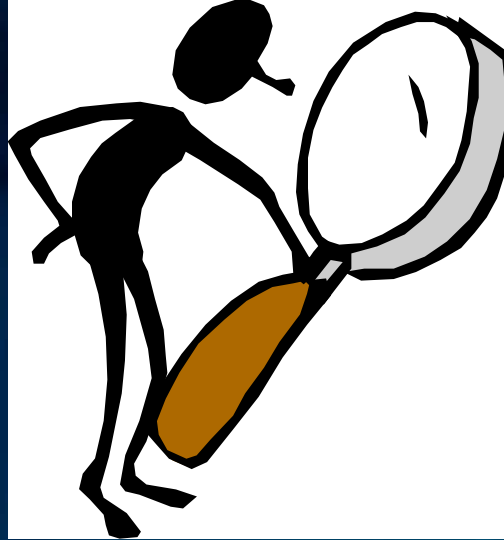"I have your file right here in front of me, Mr Simonson."

Goal: Making Abnormal Conditions Obvious
(in everyday life)
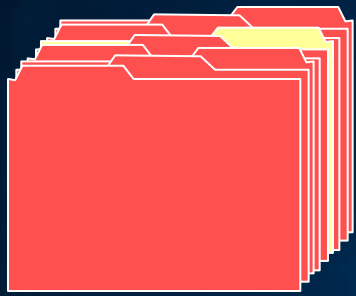
So how do I get started?

Start with a small, focused area

Identify a location where all 5S's can be implemented in a short period of time.

This will provide you with a "model" for implementing 5S throughout the rest of your work area.

1S – Sort…..Seiri….Organization

Definition

Remove from the work place

- All the supplies, materials, tools and paper work not required for doing the work
- It is the waste, by-products, empty containers, papers and information generated that is no longer necessary

When in doubt, move it out!

1S: Sort

RED TAG

Category	1. Raw Material 2. In-process stock 3. Semi-Finished goods 4. Products	5. Machine and other Equipment 6. Dies and Jigs 7. Tools and supplies 8. Other	
Item Name:			
Manufacturing No.:			
Quantity:	Value:	$	(Total)

Conduct a "Red Tag" exercise

Objectives for Red-tagging

- Determine exactly what items are required in the work area to do the required tasks

- Determine the minimum and maximum quantities that should be stored in the work area.

- Determine the off-line storage location for items that are seldom used.

Three Questions To Ask During Sort

1. **"What do I *NEED* at my workstation to do the required tasks?"**

2. **"How much do I *NEED* at my workstation to complete my job every hour/shift/day?**

3. **"Are there any *OBSTACLES* within my work area?"**

What To Look For

- **Facility**: machines, equipment, work tables, desks, chairs, carts, fittings, pallets
- **Stock**: Paper products, printer cartridges, old printer paper, old posters
- **Locations**: shelves, rooms, work stations
- **Documents**: minutes, notices, circulars, office reports, drafts, quotations, memos, numerical data
- **Holders**: Folders, files, cabinets, tools boxes, file boxes, desks
- **Stationary**: paper, forms, pens/pencils, paperclips, phones, staplers, pads
- **Extras**: books, magazines, trophies, newspaper
- **Machines**: Copiers, computers, faxes, paper shredders

Beware of excuses when sorting!

- *"We may need it!"*

- *"When we need it, we will not be able to get it!"*

- *"There is a cost to throwing this away!"*

- *"It took a long time to prepare it!"*

- *"It cost a lot to prepare it!"*

- *"What if we get busy?!"*

1S - Sort

Setting up a Red Tag Holding Area

- Determine a location for the Red Tag Holding Area.

- Set up the Red Tag Holding Area and put up a Red Tag Holding Area sign.

- Identify a Red Tag Holding Area manager.

- Write and post rules and standards for the Red Tag Holding Area including item disposition rules.

Red Tag Area

Red Tag Area Manager

Jan Krahn

No unauthorized removal of items from this area.

Contact Jan Krahn for removal of items.

1S - Sort

Review and use the Item Disposition List as the criteria for red tagging.

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Item Disposition List

Purpose: To help you decide what to do with red tagged Items

Directions:

1 - For each red tagged item, determine the category within which it belongs.

2 - Determine the action required and write it on the red tag and/or the Unneeded Items Log.

3 - Take the appropriate action.

Category	Action
Obsolete	Sell
	Hold for depreciation
	Give away
	Throw away
Defective	Return to supplier
	Recycle
Scrap	Remove from area to proper location
Trash/garbage	Throw away
	Recycle
Unneeded in this area	Remove from area to proper location
Used about once per day	Carry with you
	Keep at place of use
Used about once per week	Store in area
Used less than once per month	Store where accessible in plant
Seldom used	Store in distant place
	Sell
	Give away
	Throw away
Use unknown	Find out use
	Remove form area to proper location

Red Tag Example

- **Fill out red-tag for each type of item**
  - Item classification
  - Item ID and quantity
  - Reason for red tagging
  - Work area
  - Date
  - Value (optional)

- **If you have multiple quantities of the same item, only fill out 1 red tag.**

Item # 10

Item Description: Old Manuals

Location: TECAN

Reason for Red Tagging: Obsolete

Red Tagged By: John Doe

Date: 1/15/2006

Red Tagging "in action"

Red Tagging "in action"

Red Tagging "in action"

Potential Failure Point #1

- **The area looks good now. We removed truck loads of stuff and now have all of this extra space. We don't need to go forward with the next four steps.**

  If you stop now, freed up space will be squandered and unnecessary items will creep back into the area.

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"I'm the Clutter Fairy. I'll come back …
I'm gonna need a much bigger wand!"

Results of Sort

- **Creation of extra work space**
- **Safety improvements**
- **Process improvements**
- **Sample flow becomes more visible**
- **Feels like a better (less clutter) place to work**
- **Quality improvements**

Results of a Proper Sort

Before 1S

After 1S

Non functional equipment

???

Multiple sharps containers

After implementing red tag sort, usable bench space was created.

2S Set in Order...Seiton...Orderliness

Definition

- **Every piece of equipment, storage location, consumable, tool, etc. in the workplace must have a home.**

- **Arrange and identify everything for ease of use.**

"A place for everything, and everything in its place"
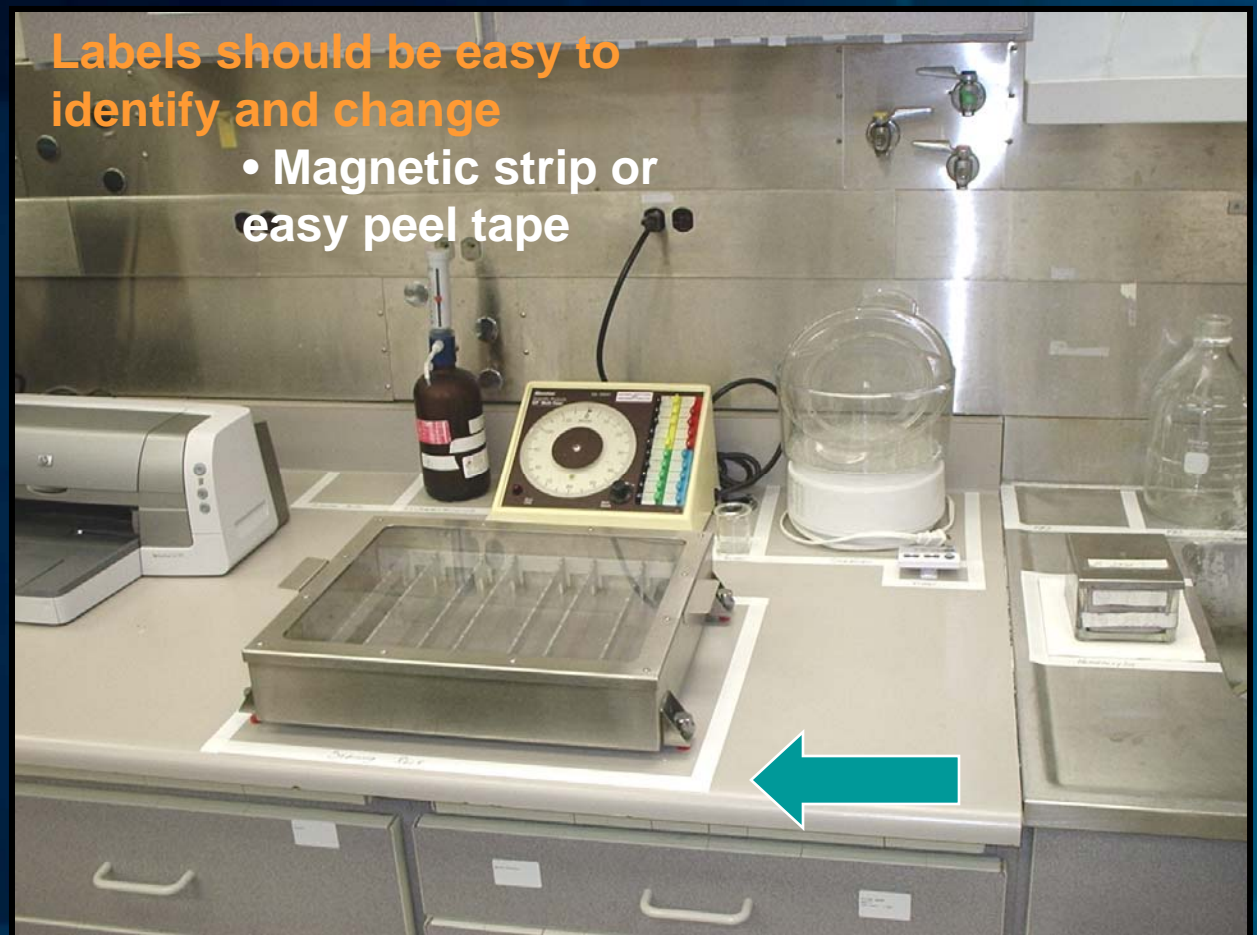
Set In Order

Steps to "Set In Order"

- **Identify it (label it)**
- **Determine how much/how many should be there**
- **Make an outline for it**
- **Give it an address if necessary**

All items should be easy to find, retrieve, and put away.

2S – Set in Order

Identify "home locations" by making visual outlines for all items. Make locations **VISUAL** by using tape, stencils, or shadow boards.
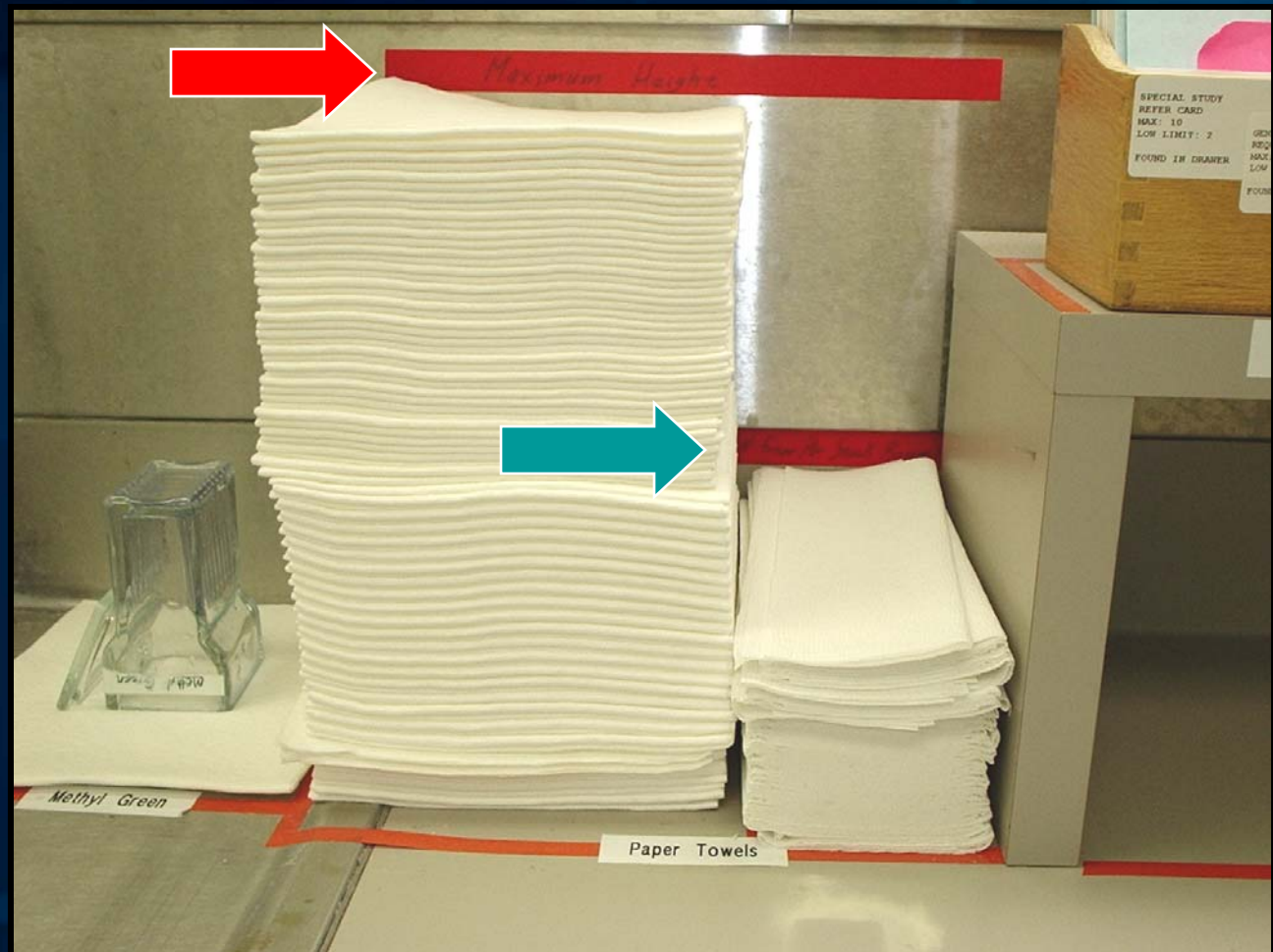

Labels should be easy to identify and change
- Magnetic strip or easy peel tape

2S – Set in Order

- **Identify item to be stored at each home location. Label each storage location with name of item.**

Identify MINIMUM and MAXIMUM amounts of each item that will be located in area.

Use open storage versus closed storage whenever possible.

Set in Order is not just for physical items

- **Traffic flow should be identified and marked (ex. aisles)**

- **Dangerous areas and items should be identified (ex. flammable storage locations)**

- **Signs should be in place to identify different functional locations within your area.**

Some tips for Setting in Order:

- **Start by identifying home locations for larger items first, then smaller items**

- **Define item placement by frequency of use**

- **Group items that are used together (ex. pipette and tips)**

- **Put items that may be hard to handle (too heavy or awkwardly shaped) in a location that is easy to access**

- **Items should be easy to find, use, and put back**
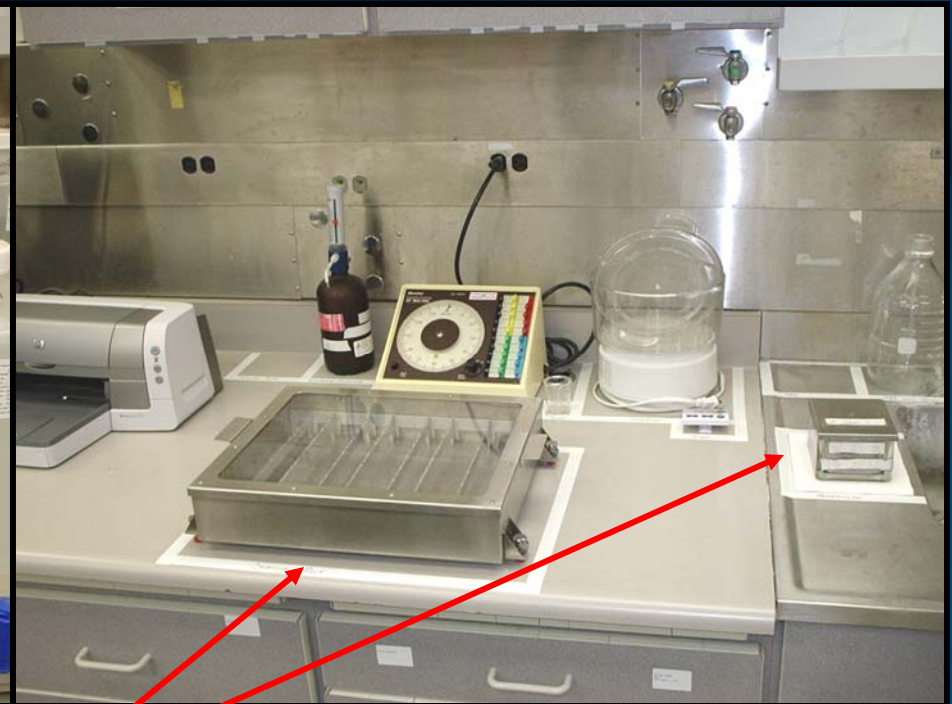
- **Make good arrangement a habit**

Results of Set in Order

- **Eliminates the need to search for tools & supplies**
- **Safety is improved with organized workplaces**
- **Improved Productivity**
- **Less waste of motion (tools & supplies are located where needed…at point of use)**

Examples of 2S "Set in Order"

Before

After

Items are outlined so that it is obvious when something is out of place.

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Examples of 2S "Set in Order"

Before

After

Items are labeled to make identification easier.

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Examples of 2S "Set in Order"

3S - Shine…Seiso….Cleanliness

Definition

Making sure that every ……..

- tool
- piece of equipment
- square foot on the floor
- working surface
- writing surface
- piece of furniture
- wall
- aisle
- rest area
- meeting place
- storage place

.

is swept, cleaned and free of grim, dirt and grease, properly painted & sealed, and kept that way

"If it doesn't get dirty, it doesn't have to be cleaned."

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Process for Implementing Shine

- Schedule time for a major cleaning.

- Identify cleaning material that is required

- Clean everything in the boundary area

- Inspect to verify area is acceptably clean

- Allocate time daily to clean
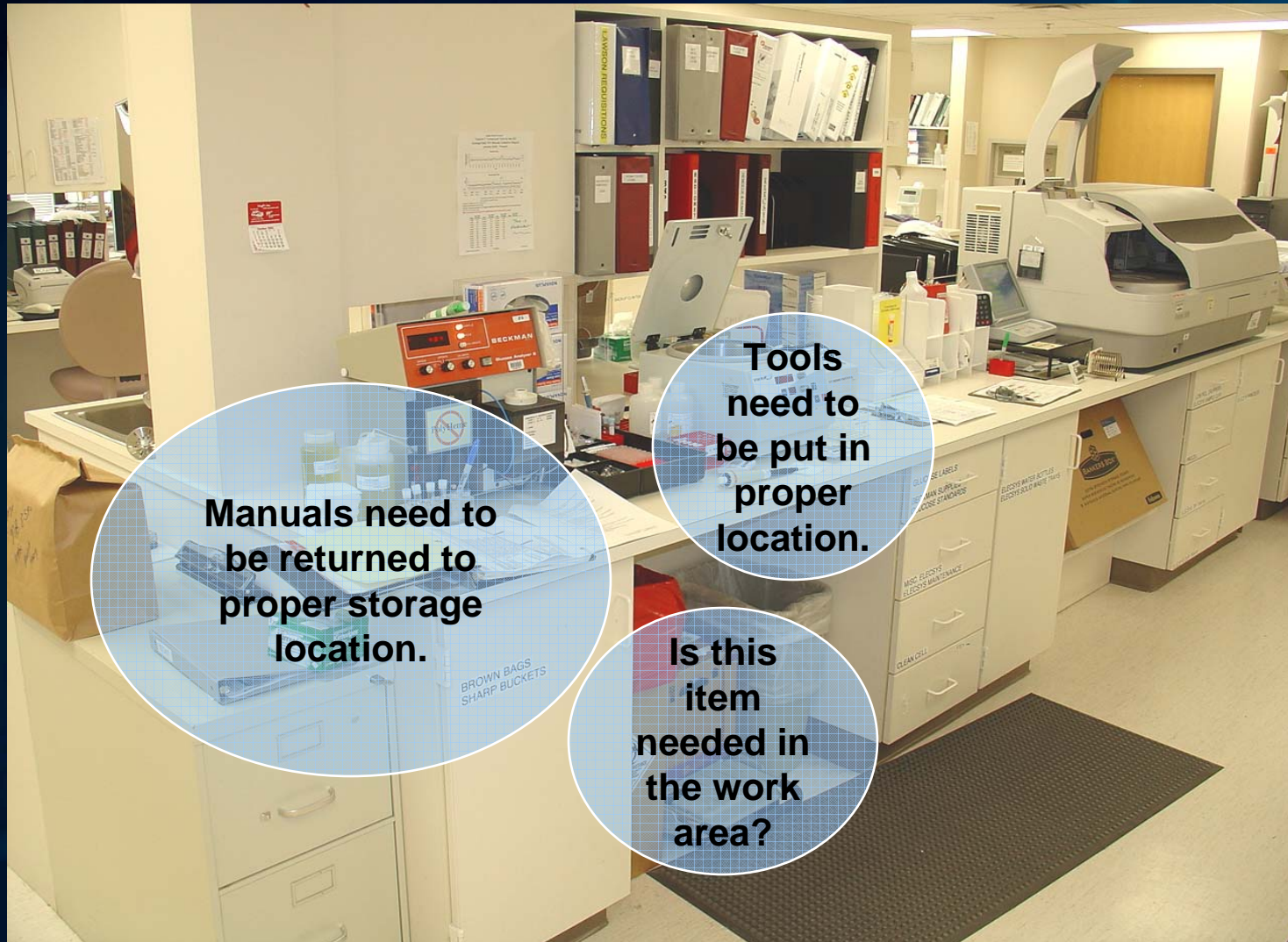
- Reinforce the behaviors

3S - Shine

Develop an initial cleaning plan for the area to:

- **Determine the tasks required to clean and maintain the area**

- **Identify who will perform each task**

- **Determine what frequency each task is to be completed**

- **Identify material and tools required to clean and maintain the area**

MAYO CLINIC	Initial Cleaning Plan			

Target Area: _____

Directions:
1 - Identify the target area and enter it above.
2 - Decide what the task is and where it should happen, and list it in the appropriate column below.
3 - Decide who will perform the task and when, and list it below.
4 - Determine which materials and tools you need and list them below.

Task No.	Task and Location	Who	When	Materials and Tools Needed

Tips When Implementing 3S

- **Look for hints of problems in your work area and address as needed:**
  - –Water leaks
  - –Missing equipment
  - –Brittle tubing, frayed wires
  - –Shortages of consumables
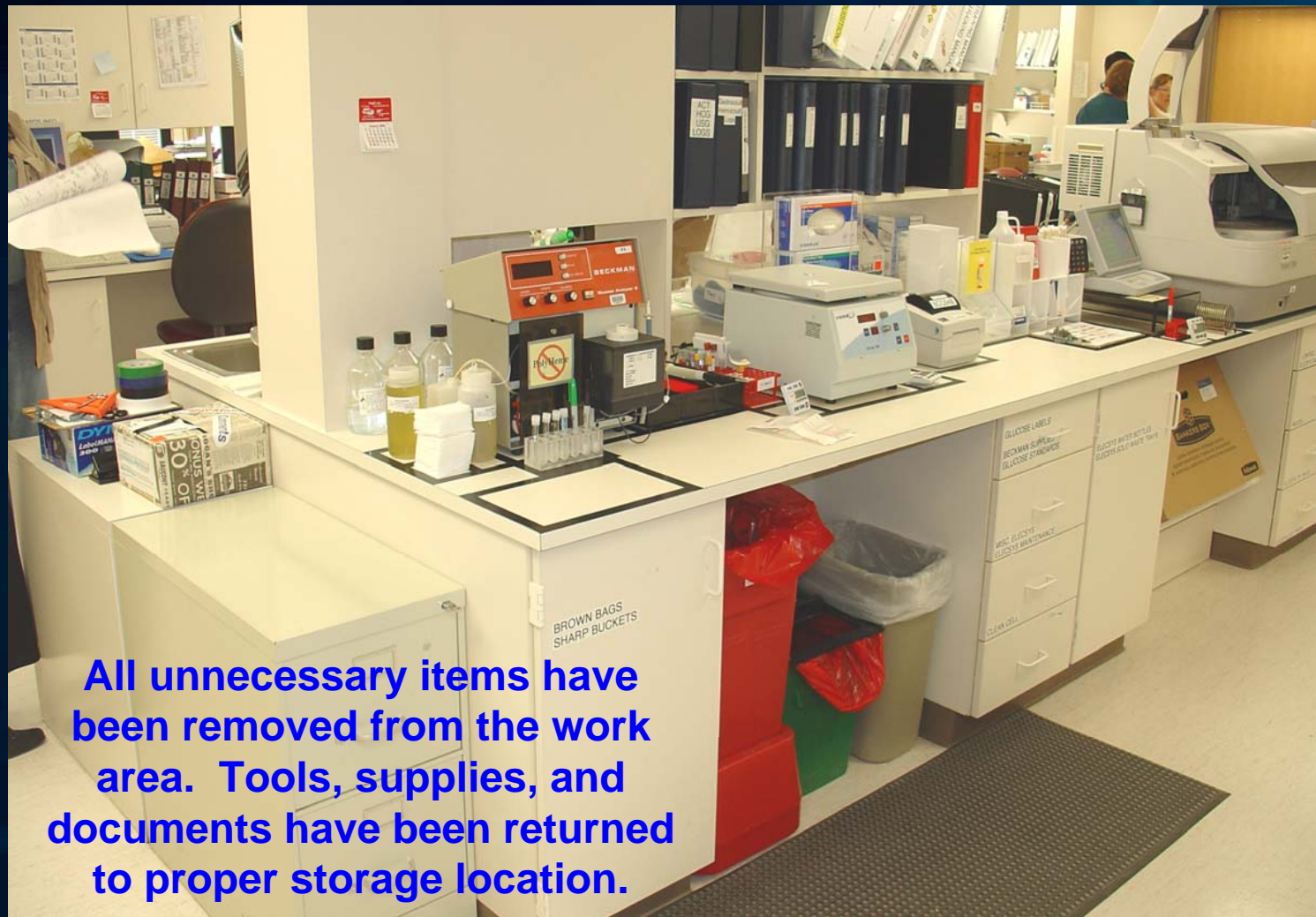 - –Signs of non-functional equipment

Examples of 3S "Shine"

Examples of 3S "Shine"

All unnecessary items have been removed from the work area. Tools, supplies, and documents have been returned to proper storage location.

Potential Failure Point #2

- **The area really looks good now. It's clean and well organized. We are disciplined so we don't need to standardize. It will be self sustaining.**

    Everyone has a different idea of what "clean" is. Standardization gets everyone on the same page.

3S - Results of Implementing Shine

- **Cleaner & more satisfying place to work**
- **Quality improvement**
- **Safer place to work (fewer accidents)**

4S – Standardize..Seiketsu..Best Practice

Definition

- Procedures, practices and activities are executed consistently and at regular time intervals
    - Ensures that Sorting, Storing and Shining are maintained and protected
    - Standardizes the methods required to maintain 1S, 2S, and 3S using standard work and visual management.

Make 5S a habit by integrating it into your everyday work.

Visual Management

- **Those working in a value stream can easily see upstream and downstream process steps and can react quickly to issues**
- **Supervisor/lead can easily monitor entire process and can quickly react to issues**
- **Operational metrics visible, real-time, to operators**
- **Andon lights or mailbox flags indicate state of equipment**

THE PAOMNNEHAL PWEOR OF THE HMUAN MNID

- "I cdnuolt blveiee that I cluod aulaclty uesdnatnrd what I was rdgnieg.

  Aoccdrnig to a rscheearch at Cmabrigde Uinervtisy, it deosn't mttaer in what oredr the ltteers in a wrod are, the olny iprmoatnt tihng is that the first and last ltteer be in the rghit pclae. The rset can be a taotl mses and you can sitll raed it wouthit a porbelm. This is bcuseae the huamn mnid deos not raed ervey lteter by istlef, but the wrod as a wlohe.

  Amzanig, huh?"

As a means of patient identification, how effective is just checking the spelling of a patient's last name?

Visual Management Examples

Standardize - Visual Control

- Use visual controls to identify standard methods for 1S, 2S, and 3S

- Standards for Waste are clearly displayed

- One sign each to identify what goes where
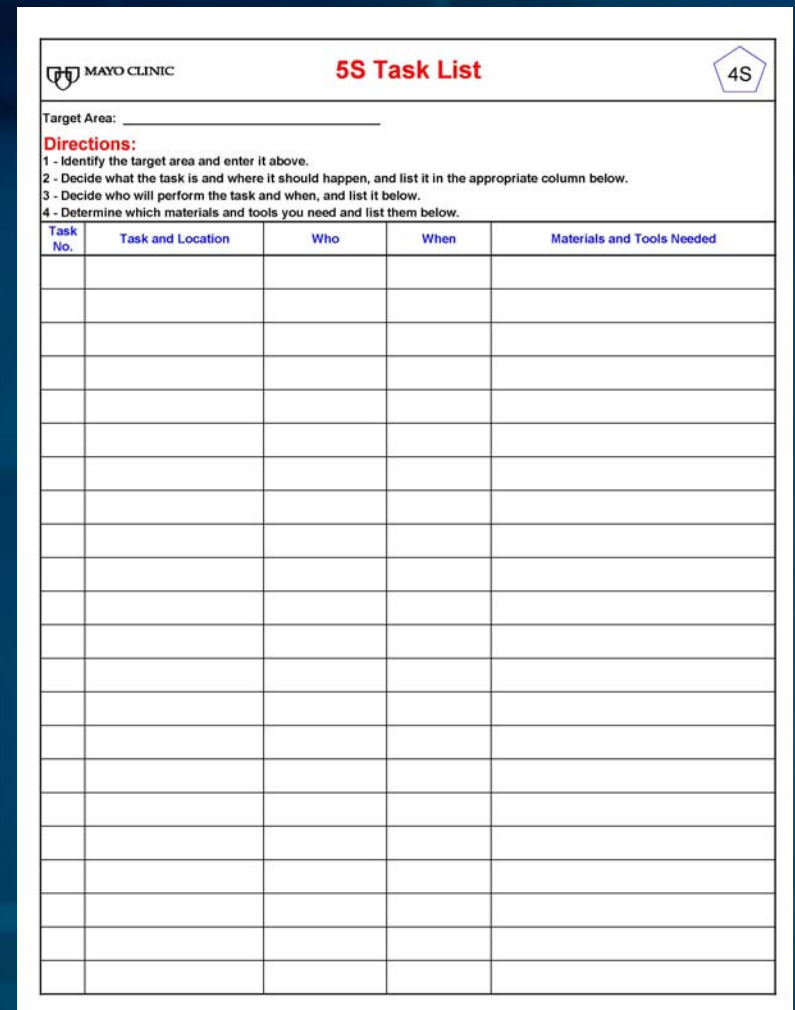
Standardize - Visual Control

- Standardize each storage location if similar storage locations exist for a single process

- Reduces confusion for people that work in the area

This picture is also posted on the cabinet door as a reminder of how the standard locations should look.

Implementing Standardization

- Develop standard work for 5S procedures using 5S Task List.

- Assign responsibilities and publish schedule: who cleans, what, where and when, how often.
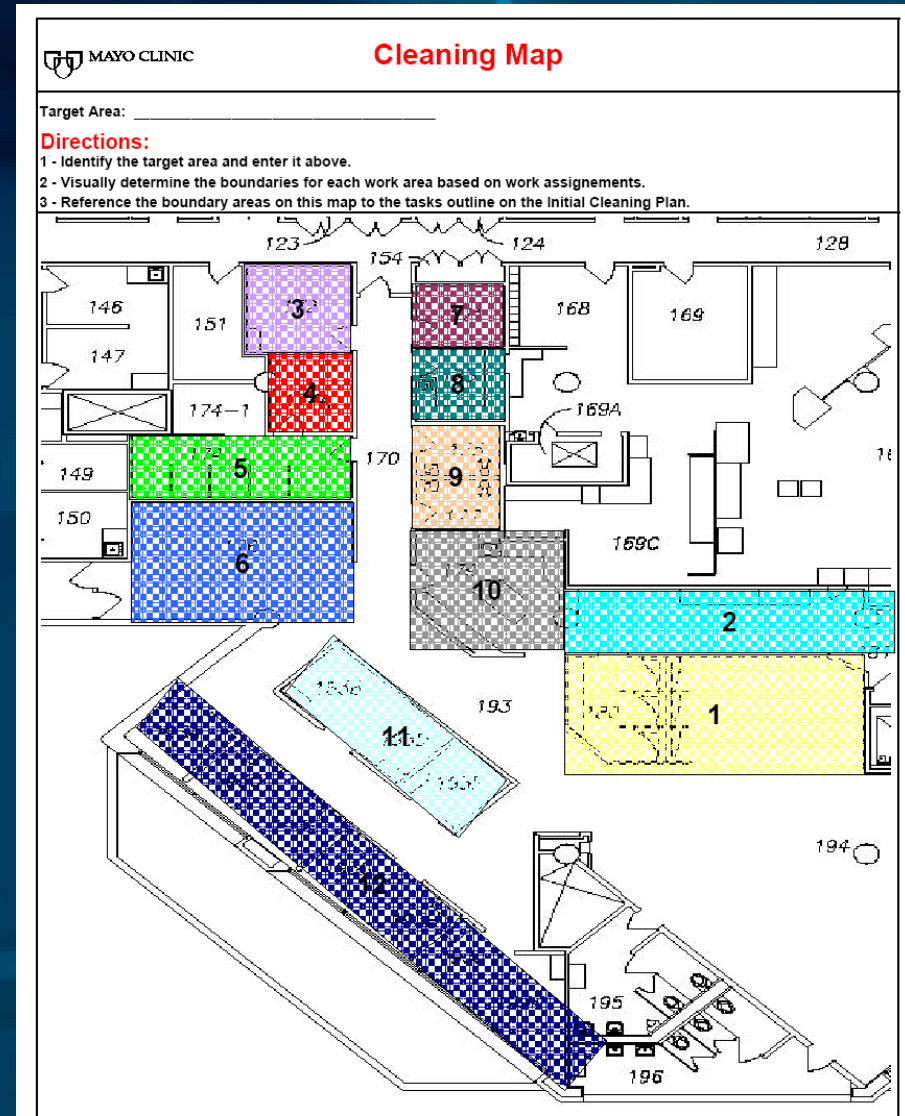
- Post this schedule on the 5S Communication Board.

4S - How to Implement Standardize

- Develop a visual "cleaning map" to supplement the cleaning plan.

- Assign areas within a work area to a specific person or position for cleaning and 5S maintenance.

4S - How to Implement Standardize

Example of 5S cycle reviewing chart

Sort	Daily	Weekly	Monthly	6 months	Who
Review red tag strategy for the first floor				✔	Leadership Team
Audit stock rooms in the first floor			✔		Materials Handlers
Review red tag items with more than 6 months in storage				✔	5S Team Coordinator
Walk through shop floor checking for red tag items (shouldn't be there)	✔				Team Members
Set in Order					**Who**
Review tool identifications			✔		Team Members
Review floor markings			✔		Team Members

5S - Sustain..Shitsuke….Discipline

Definition

- **Create and maintain a favorable 5S atmosphere in the work place.**

- **Both management and operations have the responsibility for sustaining 5S's**

Create an atmosphere that encourages everyone to think about 5S everyday.

5S - How to Implement Sustain

The Role of Management

- **Participate in 5S education: on going training of all employees on 5S principles**
- **Help to create teams for implementation**
- **Provide resources: time and money**
- **Visible supporting 5S's: e.g., get personally involved in red tagging**
- **Create a reward system for those who implement 5S**

5S - How to Implement Sustain

The Role of Individual **Contributor**

- **Learn about 5S's**
- **Help to educate your co-workers**
- **Promote 5S's**
- **Always be attentive about your own area as to its conformance to 5S's**
- **Be proactive when it comes to work for the department 5S's goals**
- **Share opportunities to improve 5S's**
- **Participate in 5S activities**

5S - Sustain

- **Develop a 5S "communication board" for your work area.**

- **Locate the board in a visible location so that everyone can see it.**

- **Information on the communication board should include:**

  - Daily cleaning plan and map

  - Most recent 5S audit

  - 5S performance graph

  - 5S training plan

  - Improvement idea suggestion sheet

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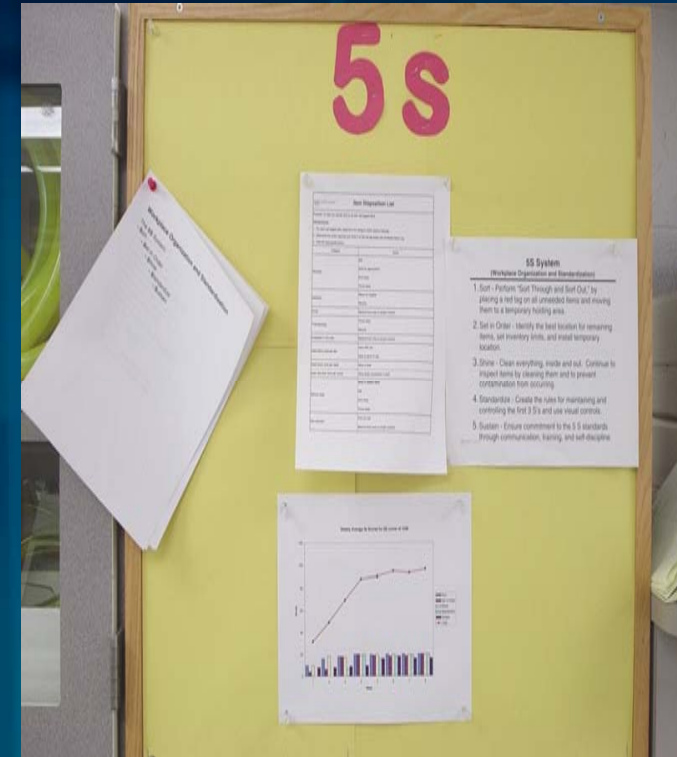
5S "Sustain Tools"

- •**Develop goals for 5S and track actual performance visually.**

- • **Post visual tracking sheets on 5S communication board.**

Total Points
(100 possible points)

5S Elements
(20 possible points for each element)
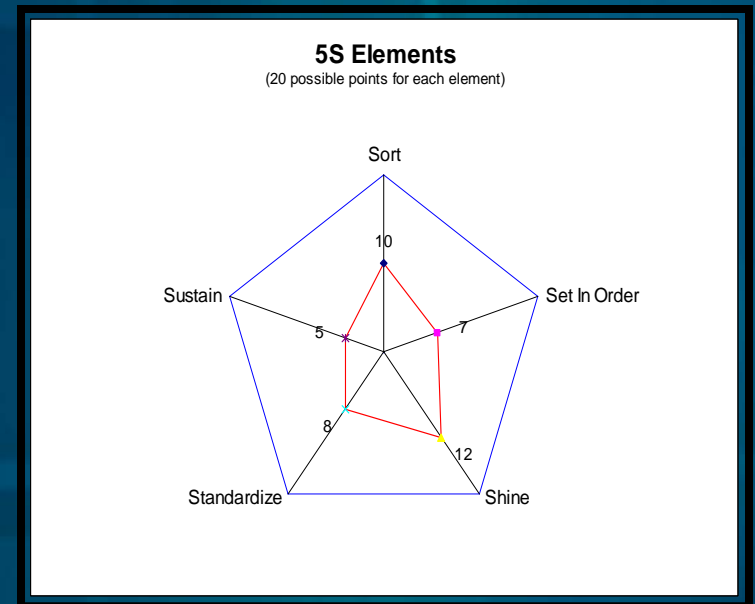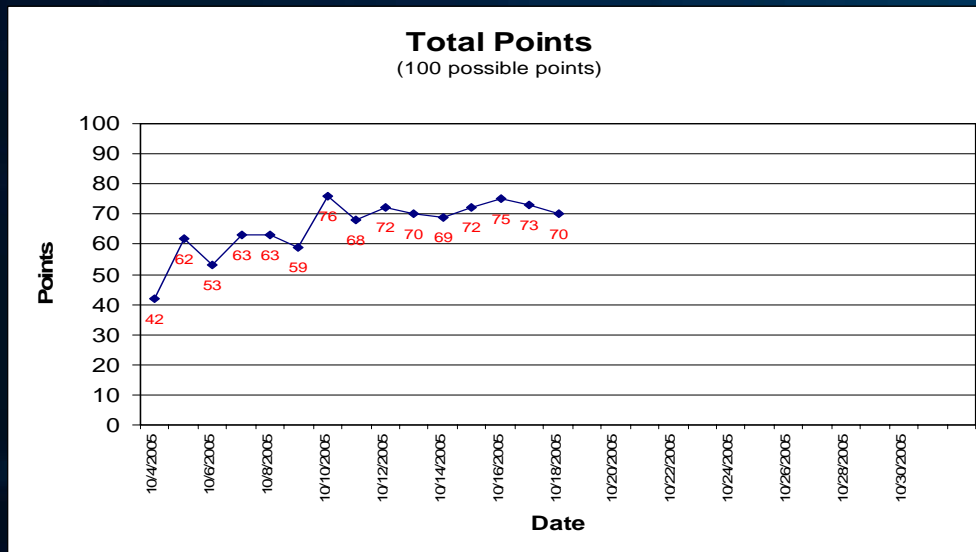
5S Tools

Description of 5S Tool	When to Apply Tool
Sort Checklist	1S
Red Tag	1S
Item Disposition List	1S
Unneeded Items Log	1S
Red Tag Sign	1S
Red Tag Manager Sign	1S
Item Removal Rules	1S
Set In Order Checklist	2S
Shine Checklist	3S
Initial Cleaning Plan	3S
Standardize Checklist	4S
Cleaning Plan Map	4S
Sustain Checklist	5S
Sustain Planning Worksheet	5S
Training Plan	5S
Workplace Scan Checklist	5S
5S Data	5S
5S Graphs	5S
Continuous Improvement List	5S

How to Ensure Success in 5S

- Find a small area to start with
- Get others involved
- Look for supporters and early adopters
- Make it fun
- Don't forget to apply all 5S's
- Share your successes - take before and after pictures for comparison

Hospital Supply Area

Hospital Supply Area

1 min 27 seconds to find an service manual from the bench and back!

5 seconds to find an service manual from the bench and back!

Vascular / Interventional Radiology Kaizen
Oct. 29 – Nov. 1, 2007

Before

After

Before

After

7 team members from interventional radiology participated, including 1 Radiologist.

"The task seemed overwhelming at the beginning of the week and it was wonderful to see it together in the end."
- Kaizen Team Member

GOALS	Baseline	Goal	Event Results	% Improved	30 Day Results (% improved from baseline)
Amount of NVA time spent searching for product in Procedure Room	RT = 5.0 min. LA = 2.0 min. Trainee = 10.0 min.	< 3 min.	RT = 1.2 min. LA = 1.1 min. Trainee = 2.0 min.	76% 45% 80%	RT = 1.5 min. (70%) LA = 1.1 min. (45%) Trainee = 2.1 min. (79%)
Amount of NVA time spent searching for product in Supply Room	RT = 6.0 min. LA = 5.0 min. Trainee = 11.5 min.	< 3 min.	RT = 4.0 min. LA = 2.1 min. Trainee = 5.0 min.	33% 58% 57%	RT = 1.1 min. (82%) LA = 1 min. (80%) Trainee = 3.2 min. (72%)
Distance travelled acquiring product in Procedure Room	RT = 109 ft. LA = 69 ft. Trainee = 201 ft.	< 50 ft.	RT = 56 ft. LA = 42 ft. Trainee = 74 ft.	49% 39% 63%	RT = 42 ft. (61%) LA = 39 ft. (43%) Trainee = 50 ft. (75%)
Distance travelled acquiring product in Supply Room	RT = 147 ft. LA = 172 ft. Trainee = 264 ft.	< 100 ft.	RT = 149 ft. LA = 63 ft. Trainee = 156 ft.	0% 63% 41%	RT = 46 ft. (69%) LA = 49 ft. (72%) Trainee = 115 ft. (56%)
# of items out of place/out of stock/overstocked in Supply & Procedure room	x	0	0	✔	Average of 2 per audit
# of standardized procedure rooms	0	1	1	100%	5

Additional Resources

Toyota Production System, by Yasuhiro Monden

Gemba Kaizen, by Pascal Dennis

Lean Thinking, by James Womack

5 Pillars of the Visual Workplace, by Hiroyuki Hirano