

Medical Laboratory

NTQF Level -III

Learning Guide -32

Unit of Competence	Prevent and Eliminate MUDA
Module Title:	Preventing and Eliminate MUDA
LG Code:	HLT MLT3 M06 LO3-LG-32
TTLM Code:	HLT MLT3 TTLM 1019v1

LO No: Eliminate wastes/MUDA

Medical laboratory services Level III	Date: October 2019	Page 1
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This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics –

- Preparing and implementing Plan of MUDA elimination.
- Necessary attitude and ***the ten basic principles for improvement***
- Tools and techniques to eliminate wastes/MUDA
- Reducing and eliminate Wastes/MUDA in accordance with OHS and organizational requirements.
- Reporting Improvements gained by elimination of waste/MUDA.

This guide will also assist you to attain the learning outcome stated in the cover page.

Specifically, upon completion of this Learning Guide, **you will be able to –**

- Prepare and Implement Plan of MUDA elimination.
- Adopt Necessary attitude and the ten basic principles for improvement to eliminate waste/MUDA.
- Use Tools and techniques to eliminate wastes/MUDA based on the procedures and OHS.
- Reduce and eliminate Wastes/MUDA in accordance with OHS and organizational requirements.
- Report Improvements gained by elimination of waste/MUDA to relevant bodies.

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below 3 to 6.
3. Read the information written in the information “Sheet 1, Sheet 2, Sheet 3 and Sheet 4, ---” **in page ---, ---, --- and ---** respectively.
4. Accomplish the “Self-check 1, Self-check t 2, Self-check 3 and Self-check 4” ,---” **in page - --, ---, --- and ---** respectively
5. If you earned a satisfactory evaluation from the “Self-check” proceed to “Operation Sheet 1, Operation Sheet 2 and Operation Sheet 3 ” **in page ---.**
6. Do the “LAP test” **in page – ---**

1.1. Adopting the Necessary Attitude

- First you must adopt an attitude that supports your ability to see waste. Waste is hard enough to find when you want to find it; if you don't want to find it, or if your response to find it is denial or resistance, then it will never be possible for you to root out waste and make your work environment stress free.
- It is very important that you understand that one purpose of discovering waste is to take the frustration out of your work.
- Many people will resist seeing the waste in their work. Just don't let it be you. You may hear yourself or others saying things like: "Let's not fix what is not broken." "Can't we live well enough alone?" "This is just another attempt to make us work harder for the same amount of money." "It looks good on paper, but it will never work on the floor." "We tried that twenty years ago. It didn't work then; it won't work now." "That is not my job." And so on.
- You know the lines. You have probably said one or two of them at one time or another. We all have. Resistance is normal. Just don't let it keep you from learning to see the waste in your work. In the end, you are the one who suffers most from the results of waste.

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What kind of negative attitude for identifying and elimination of waste is mostly observed?
Write at least three.(6 points)

Note: Satisfactory rating - 3 points

Unsatisfactory - below 3 points

Answer Sheet

Score = _____
Rating: _____

Name: _____

Date: _____

Short Answer Questions

1. _____

The Ten Basic Principles for Improvement

1. Throw out all of your fixed ideas about how to do things.
2. Think of how the new method will work-not how it will not.
3. Don't accept excuses. Totally deny the status quo.
4. Don't seek perfection. A 50 percent implementation rate is fine as long as it is done on the spot.
5. Correct mistakes the moment they are found.
6. Don't spend a lot of money on improvements.
7. Problems give you a chance to use your brain.
8. Ask "Why?" at least five times until you find the ultimate cause.
9. Ten people's ideas are better than one person's. 10.Improvement knows no limit.

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Write at least four out of the ten basic principles of improvement.(8 points)

Note: Satisfactory rating - 3 points

Unsatisfactory - below 3 points

Answer Sheet

Score = _____
Rating: _____

Name: _____

Date: _____

Short Answer Questions

1. _____

Some Tools and Techniques to eliminate Wastes/Muda.

- 5S
- Layout improvement
- Brainstorming
- Andon
- U-line
- In-lining
- Unification
- Multi-process handling & Multi-skilled operators
- A.B. control (Two point control)
- Cell production line
- Line balancing
- Build in quality at each process
- Etc.

5S (Five S): Implementing 5S/workplace organization to eliminate Wastes/Muda.

Layout improvement: Is to plan the placement of machineries, raw materials, workers, etc. in order to produce raw materials, parts or products economically.

When the layout of a shop floor is decided, it is necessary to plan considering production conditions and environmental conditions appropriately. Layout improvement is important technique to avoid "Muda, Mura and Muri" due to placement in production activities.

Brainstorming

Brainstorming can be defined as the methodology used to encourage every individual in the KPT to express freely their opinions or give ideas in an open discussion. Brainstorming can be used to list down all the problems faced by an organization, their causes and the

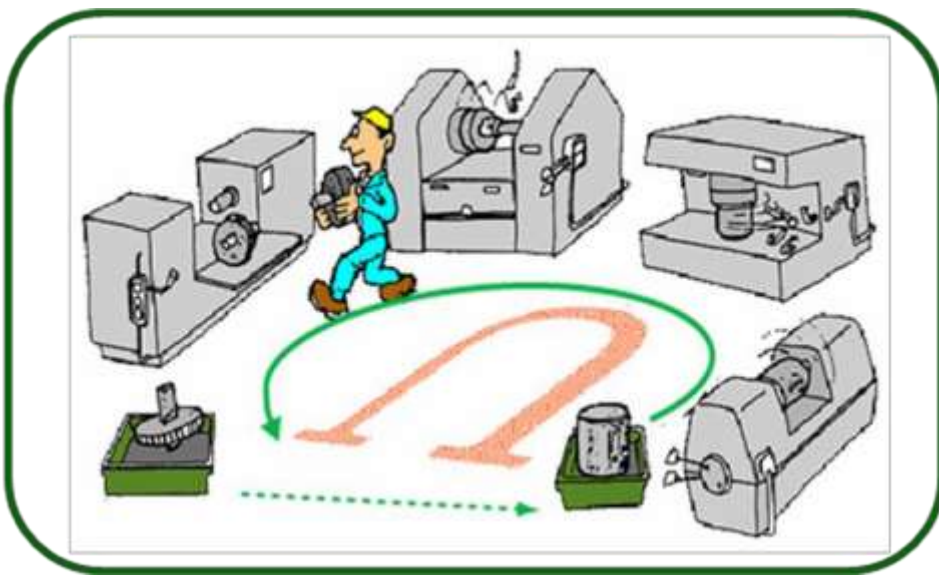
potential effects if a certain suggestion is implemented. To ensure the success of the brainstorming process, it is important for the KPT to follow the following rules:

- i. The subject for brainstorming should be clear and accurate. For example, members may brainstorm to identify the causes and reasons why a certain task cannot be completed on schedule.
- ii. Each member will give only one opinion / idea at each turn regardless of the number of ideas he / she may have.
- iii. A tension-free atmosphere must be maintained to encourage free expression of ideas.
- iv. Every idea expressed should be written on the black / white board, flip chart or noted down by a secretary.
- v. At the end of the brainstorming session, all the ideas expressed should be evaluated one by one and short-listed.
- vi. Voting is used to list the ideas according to priority. The prioritization is based on the number of votes received for each idea.

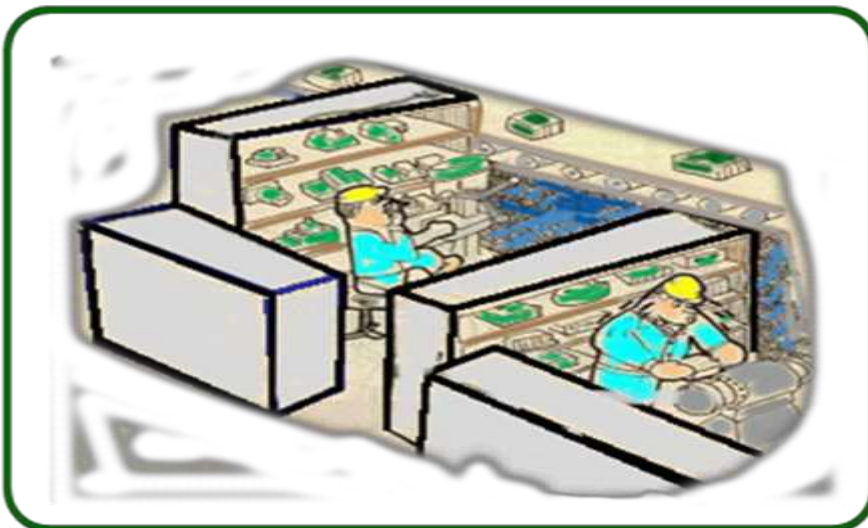
Andon: Is an indicator informing team leaders and supervisors of the current workshop situation with color boards, flash lights, and automated announcement. Types of Andon

- 1) Calling “Andon” -Used for requesting parts.
- 2) Warning “Andon” -Used to inform occurrence of irregularities on the lines.
- 3) Progress “Andon” -Used to identify the progress of operation on the lines with a short Takt Time.

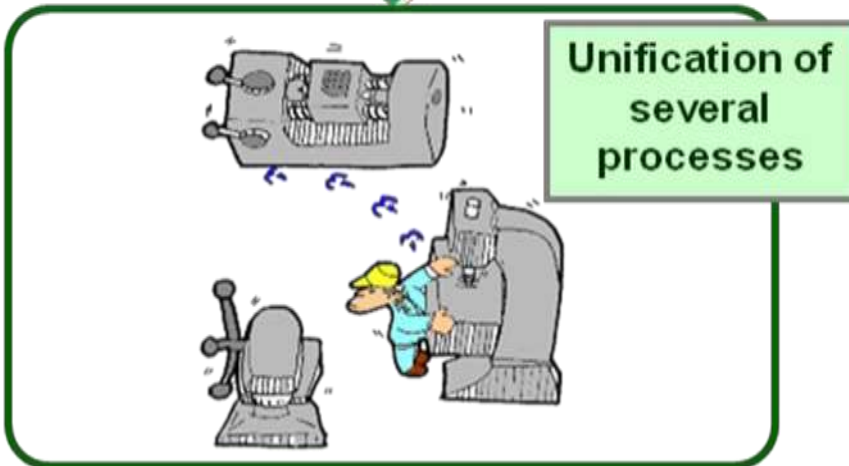
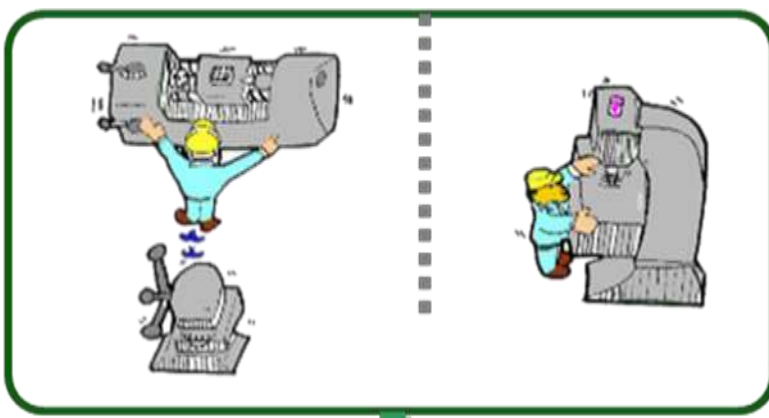
U-line: Is a layout in which the inlet and outlet are positioned in the same direction to avoid walking back for a single operator.



In-lining: Is a way to make the production lines simple and effective by integrating the parts processing into the main line in the unit production.



Unification: Even if a flowing line cannot be formed, odd operations can be combined together in a place into an operator's work



Multi-process handling and Multi-skilled operators

-Multi-process handling- means that a single operator manages multiple machines and processes in product processing and assembling. This is the primary factor for constructing lines by a small number of operators.

-A multi-skilled Operator- can deal with several machines or processes as described above. The supervisor can make a flexible placement of operators when someone within the same team or section is absent.

control (Two point control):Is a devised automatic control function. It controls the machine movement when they come to start or stop working depending upon the number of work pieces piled up between the preceding process and the following process.

A.B. control is used as a tool for time control to realize Just in Time(JIT)



Cell production line: This is a production line that a single operator manages all the machining or assembly operations in unit production.

Advantages

- ✓ Quality assurance can be ensured.
- ✓ The production output or efficiency of each operator can be clarified.
- ✓ Operators can obtain a feeling of work achievement.

Line balancing: Refers to the state where there is a difference in time required for each process of a production line. It is determined that the line balance is good if this difference is small (usually smaller than 15%), but in a bad case the line balance should be improved by levelling out the work time through shortening that of a very time-consuming process and increasing loads of processes consuming less time.

Build in quality at each process

1. Quality should be built into each process.
2. Guarantee the quality in each process.
 - Do not make Defect
 - Do not pass defect
 - Work to standard

The machine stops, if abnormality is caused.

Medical laboratory services Level III	Date: October 2019	Page 11
	Author: Kebebe tadesse (bsc)	

- Worker stops operation, if he/she finds abnormality.
- Don't send the next process the defects.
- Abnormality will understood simply.
- "Visual control" visually control the states, ANDON,
- Production analysis board, Standardized work chart etc.

Kanban System

It's a *TOYOTA Production System manufacturing tool*. Kanban is not inventory control system rather it is scheduling system.

In production it tells us:

- ✓ What to produce
- ✓ When to produce it
- ✓ How much to produce

Kanban prevents over production and it is used to give instruction for production and conveyance in every process

Medical laboratory services Level III	Date: October 2019	Page 12
	Author: Kebebe tadesse (bsc)	

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Write at least one type of waste/Muda that is eliminated by applying the following tools and techniques. (12 points)

- 5S
- Layout improvement
- Brainstorming
- Andon
- U-line
- In-lining
- Unification
- Multi-process handling & Multi-skilled operators
- A.B. control (Two point control)
- Cell production line
- Line balancing
- Build in quality at each process

Note: Satisfactory rating - 3 points

Unsatisfactory - below 3 points

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

Short Answer Questions

Medical laboratory services Level III	Date: October 2019	Page 13
	Author: Kebebe tadesse (bsc)	

4.1. Eliminate the seven types of Wastes/Muda.

How to Eliminate Overproduction Wastes

- In order to balance capacity and load without overproducing, you must implement the advanced methods of lean production:
 - ✓ Full work
 - ✓ Line balancing
 - ✓ Pull production using kanban.
 - ✓ Quick-changeover operations.
 - ✓ Level production - small-lot, mixed production.

How to Eliminate Inventory Wastes

- ✓ U-shaped manufacturing cells, layout of equipment by process instead of operation.
- ✓ Production leveling
- ✓ Regulating the flow of production
- ✓ Pull production using kanban
- ✓ Quick changeover operations

How to Eliminate Motion Wastes

- ✓ Gradually switch to flow production
 - ✓ Create U-shaped cell layout of equipment
 - ✓ Make standardization through
 - ✓ Increase training
 - ✓ Increase operator awareness about motion during an operation
- Where as many kinds of movement may be unnecessary, work is the movement you do to add value to the product. Movement that does not add value is waste. Find ways to

reduce the amount of movement to do your value added work. Start by looking at the movement of your feet, then your hips, shoulders, arms, hands and fingers.

How to Eliminate Conveyance/Transportation Wastes

- Basically, conveyance waste is corrected by redesigning equipment layout to create a flow between operations. Then you will be able to take out much of the complexity in the conveyance system and decrease material handling to a minimum. Some of the lean production methods that address conveyance flow:
 - ✓ U-shaped manufacturing cells
 - ✓ Flow production
 - ✓ Multi skill workers
 - ✓ Standing to perform operations
 - ✓ Higher utilization rate
 - ✓ Water beetles (material handlers in the kanban system of pull production)

How to Eliminate Waiting/Idle Time Wastes

- ✓ Production leveling
- ✓ Product-specific layout
- ✓ Mistake-proofing
- ✓ Human automation
- ✓ Quick changeover
- ✓ Autonomous maintenance
- ✓ Line balancing

How to Eliminate Defect Wastes

- ✓ Standard operations
- ✓ Mistake-proofing devices
- ✓ Full-lot inspection
- ✓ Building quality in at each process
- ✓ Flow production

Medical laboratory services Level III	Date: October 2019	Page 16
	Author: Kebebe tadesse (bsc)	

- ✓ Elimination of the need to pick up and set down work pieces
- ✓ Improvement of jigs using human automation
- ✓ Promotion of value analysis and value engineering
- To reduce defects, their root cause must be found. Inspection that only sorts out the defective parts is not a solution to defective waste; it is actually one of the major defect-related wastes. Until you initiate back-to-the-source inspection and build quality into every process through standardization, the effects of defects will continue to disrupt the flow of goods and decrease productivity.

How to Eliminate Processing Wastes

- ✓ More appropriate process design
- ✓ Review of operations
- ✓ Improvement of jigs using automation
- ✓ Thorough standardization
- ✓ Promotion of value analysis(VA) and value engineering(VE) techniques

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Write at least two methods how to eliminate each of the seven deadly wastes.(14 points)

Note: Satisfactory rating - 3 points

Unsatisfactory - below 3 points

Answer Sheet

Score = _____
Rating: _____

Name: _____

Date: _____

Short Answer Questions

1. _____

Kaizen Effect Evaluation Sheet

Name of the process: _____

Work Place: _____

Problem Solving Title: _____

Part one –Quantitative Results

S.No	Improvement Indicators	Before Kaizen	Target	After Kaizen	Improvement (%)	Remark
1	Muda Elimination Indicators					
	1.1 Tools& Equipment					
	1.2 Parts Saving					
	1.3 Raw Material saving					
	1.4 Transportation					
	1.5 Motion in Meter					
	1.6 Transaction Time					
	1.7 Excess Stock/Inventory					
	1.8 Expired material/Stock)					
2	Productivity indicators					
	2.1 Lead time					
	2.2 Machine down time					
	2.3 Frequency of Machine failure					
	2.4 Production volume per day					
	2.5 Labor saving					
	2.6 labour productivity)					
	2.7 Delivery Time					
3	Quality Indicators					
	3.1 Defect rate					
	3.2 Raw Material damage in %					
	3.3 Number of Customer complaints					
4	Other Indicators					
	4.1 Number of New Inventions					
	4.2 Minimized Cost of Production					

Part Two –Qualitative Results

1. Describe the Qualitative results and change that are achieved by Muda

Elimination/Reduction based on the indicators listed below

S.No	Improvement Indicators	Description of the Result
1	Muda Elimination capacity of Workers	
2	New inventions and Improvements by workers	
3	Motivation of workers	
4	Awareness about Safety	
5	Corporate culture of kaizen	
6	Team work	
7	Transaction Time	

Name of Worker: _____ -

Signature: _____ -

Date _____

Name of Leader : _____

Signature : _____

Date : _____

1. The documents of the already identified wastes in several processes or work areas are analyzed.
2. Rank the improvements that are needed. Focus on improvements on the process with the greatest total when you add up the magnitude of its wastes.
3. Choose the first process to be improved from the workshop checklist.
 - a. Using the more detailed waste-finding checklists provided, find more specific instances of waste.
 - b. Observe the types and magnitude of the detailed waste.
4. Set target

What? Decrease/Eliminate the amount of the waste specified.

When? By the End of ----

How many? Minimize the problem from –to –
5. Prepare Activity Plan

	Why?	What?	Where?	Who?	When?	How?
	Objectives	Items to be implemented	Location	Person(s) charge	Time/Duration	Method
P						
D						
C						

6. Examine causes of the waste.
7. Brainstorm improvement ideas.
8. Implement the countermeasure.
9. Check / confirm the result against the target set and if it is ok establish new operational standard if not revise your plan.

LAP Test	Practical Demonstration
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Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within --- hour.

Task 1: Choose the first process to be improved, set target and prepare action plan.

Task 2: Set countermeasure to eliminate/reduce the wastes, implement them and check the result.

Task 3: Prepare a report by using the Appropriate Format.

List of Reference Materials

1- BOOKS

- : Identifying Waste on the Shopfloor (1996).
- Ethiopian Kaizen Manual (2002)