Based on August 2012GC Occupational standard

Ethiopian TVET-System

BASIC CLERICAL WORKS

LEVEL-I

Based on August 2012GC Occupational standard

Module Title: Applying Quality Standards

TTLM Code: EISBCW1 TTLM0919V1

This module includes the following Learning Guides

LG13: Assessing own work

LG Code: EIS BCW1 MO 05 LO-1 LG-13

LG14: Assessing quality of Services Rendered

LG Code: EIS BCW1 MO 05 LO-2 LG-14

LG15: Record Information

LG Code: EIS BCW1 MO 05 LO-3 LG-15

LG16: Studying cause of quality deviations

LG Code: EIS BCW1 MO 05 LO-4 LG-16

LG17: Completing Documentation

LG Code: EIS BCW1 MO 05 LO-5 LG-17

Instruction Sheet	LG13: Assessing own work

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics –

At the end of the module the learner will be able to:

- Checking complete work against organizational standards
- Demonstrating an understanding on how the work activities and completed work relate to the next process
- Identifying and isolating faulty services
- Recording and reporting faults and any identified causes

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 –

- Check completed work against workplace standards relevant to the operations being undertaken.
- Demonstrate an understand on how the work activities and completed work relate to the next process and to the final appearance of the activity.
- Identify and isolate faulty pieces or final products in accordance with company policies and procedures.
- Record and report faults and any identified causes in accordance with workplace procedures.

Learning Activities

1. Read the specific objectives of this Learning Guide.
2. Read the information written in the “Information Sheets 1” in pages 3-8.
3. Accomplish the “Self-check” in page 9.
4. If you earned satisfactory, proceed to “Lap Test on page 10. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Activity #1.

5. Do the “LAP test” (if you are ready) and show your output to your teacher. Your teacher will evaluate your output either satisfactory or unsatisfactory. If unsatisfactory, your teacher shall advice you on additional work. But if satisfactory you can proceed to Learning Guide 23.

   - ❖ Your teacher will evaluate your output either satisfactory or unsatisfactory. If unsatisfactory, your teacher shall advice you on additional work. But if satisfactory you can proceed to the next topic.

Information Sheet 1	Checking complete work against organizational standards

1.1- The word *quality* has many meanings:

- ❖ A degree of excellence.
- ❖ Conformance with requirements.
- ❖ The totality of characteristics of an entity that bear on its ability to satisfy stated or implied needs.
- ❖ Fitness for use.
- ❖ Fitness for purpose.
- ❖ Freedom from defects, imperfections or contamination.
- ❖ Delighting customers.

Quality

Is the degree to which a set of inherent characteristics fulfills a need or expectation that is stated, general implied or obligatory?

In the new definition, the implication is that quality is relative to what something should be and what it is. The something may be a product, service, decision, document, piece of information or any output from a process. Environmental, safety, security and health problems are in fact quality problems because an expectation or a requirement has not been met.

Quality policy

Quality policy is a document jointly developed by management and quality experts to express the quality objectives of the organization, the acceptable level of quality and the duties of specific departments to ensure quality.

Your quality policy should:

- State a clear commitment to quality.
- Recognize customer needs and expectations.
- Be actively supported by senior management.
- List the quality objectives you want to achieve.
- Be understood by everyone in the organization.
- Be consistent with your organization's goals.
- Be maintained throughout your organization.
- Be applied throughout your organization.

Responsibility and authority

Define quality system responsibilities, give quality system personnel the authority to carry out these responsibilities, and ensure that the interactions between these personnel are clearly specified. And make sure all of this is well documented.

This requirement must be met for those who:

- Manage quality system work.
- Perform quality system work.
- Verify quality system work.

Resources

Identify and provide the resources that people will need to manage, perform, and verify quality system work.

Make sure that:

- Only trained personnel are assigned.
- Managers have the resources they need to verify work.
- Internal auditors have the resources they need.

1.2 Management representative

Appoint a senior executive to manage your quality system and give him or her necessary authority.

This senior executive must ensure that your quality system is developed and implemented. This executive must:

- Monitor the performance of your quality system.
- Control the performance of your quality system.
- Report on the performance of your quality system.
- Help improve the performance of your quality system.
- Act as your organization's spokesperson on quality.

Quality system

Develop a quality system and a manual that describes it. Your quality system should ensure that your products conform to all specified requirements.

Your quality manual should:

- State your quality policy.
- List your quality objectives.
- Provide an overview of your quality system.
- Describe the structure of your organization.
- Discuss your quality system procedures.
- Introduce your quality documents and records.
- Teach people about your quality system.
- Control quality system work practices.
- Guide the implementation of your quality system.
- Explain how your quality system will be audited.

Quality Assurance

Quality Assurance is a system of management activities involving planning, implementation, assessment, and reporting to make sure that the end product (i.e., environmental data) is of the type and quality needed to meet the needs of the user.

Quality Control

Quality Control is the overall system of operational techniques and activities that are used to fulfill requirements for quality. The QC activities are used to produce and document the quality of the end product.

1.3 Quality Management Plan (QMP)?

A QMP is a formal plan that documents an entity's management system for the environmental work to be performed.

The QMP is an "umbrella" document which describes the organization's quality System in terms of the organizational structure, functional responsibilities of management and staff, lines of authority, and required interfaces with those planning, implementing, and assessing all environmentally related activities conducted.

1.4 Quality system procedures

Develop and implement quality system procedures that are consistent with your quality policy.

- Develop your procedures for all areas of your quality system.
- Document your procedures, and keep them up to date.

  Each procedure should:

  - Specify its purpose and scope.
  - Describe how an activity should be carried out.
  - Describe who should carry out the activity.
  - Explain why the activity is important to quality.
  - Describe when and where it should be carried out.
  - Explain what tools and equipment should be used.
  - Explain what supplies and materials should be used.
  - Explain what documents and records should be kept.
- Procedures may also refer to detailed work instructions that explain exactly how the work should be done.

Quality planning

Develop quality plans that show how you intend to fulfill quality system requirements. You are expected to develop quality plans for products, processes, projects, and customer contracts.

- Your quality plans should list the quality objectives you intend to achieve, and the steps you intend to take to achieve these objectives.
- When you construct your quality plan, consider the following questions:
  - Do you need to purchase any new equipment or instruments, or any new inspection and test tools?

- Do you need to carry out any special training in order to fulfill all quality system requirements?
- Do you need to improve design, production, testing, inspection, installation, or servicing procedures?
- Do you need to improve your quality measurement and verification procedures?
- Do you need to develop any new measurement methods or instruments?
- Do you need to clarify your organization's standards of acceptability?
- Do you need to develop any new documents, forms, reports, records, or manuals?
- Do you need to allocate more resources in order to achieve the required levels of quality?

1.5 Quality management standards

Quality management system (QMS) standards establish a framework for how a business manages its key processes. They can help whether your business offers products or services and regardless of your size or industry. They can also help new businesses start off on the right foot by ensuring processes meet recognized standards, clarifying business objectives and avoiding expensive mistakes.

To comply with the standard you'll first need to implement a QMS. Implementing a QMS can help your business to:

- achieve greater consistency in the activities involved in providing products or services
- reduce expensive mistakes
- increase efficiency by improving use of time and resources
- improve customer satisfaction
- market your business more effectively
- exploit new market sectors and territories
- manage growth more effectively by making it easier to integrate new employees

- constantly improve your products, processes and systems

For example, the quality system of a manufacturing business might include looking at more efficient manufacturing processes or speeding up distribution.

1.3.1 The ISO 9001:2008 standard

ISO 9001:2008 is the key internationally agreed standard for quality management systems. It is used by over 951,000 businesses in 175 countries worldwide (source: British Standards Institution (BSI), 2010).

The ISO 9001:2008 standard has four elements:

- **management responsibility** - ensuring top level management shows commitment to the quality system and develops it according to customers' needs and the business' objectives
- **resource management** - ensuring the people, infrastructure and work environment needed to implement and improve quality systems are in place
- **product realization** - delivering what customers want, looking at areas such as sales processes, design and development, purchasing, production or service activities
- **Measurement, analysis and improvement** - checking whether you have satisfied customers by carrying out other measurements of your system's effectiveness

Self – Check- 1	Written Test

Name: _____ Date: _____

Instruction: Answer all the questions listed below, if you have some clarifications- feel free to ask your teacher.

1- What is Quality? 2 point
2- What is Quality policy? 2 point
3- What is Quality Assurance and Quality control? 2 point
4- Explain Quality Management Plan? 2 point
5- Explain and list the standard has four elements? 2 point

Information Sheet 2	Demonstrating an understanding on how the work activities and completed work relate to the next process

1.1 The Six-Factor Model of Personality in the Workplace

The following are the six-factor model with job performance and other job-related activities. Motivation, deviation, absences, and job satisfaction are related to the five factors. This is a review of the relation between the Six-factor model of personality and performance in the workplace.

I. Motivation in the Workplace

Motivation is the driving force by which humans achieve their goals. Motivation is said to be intrinsic or extrinsic. The term is generally used for humans but it can also be used to describe the causes for animal behavior as well. According to various theories, motivation may be rooted in a basic need to minimize physical pain and maximize pleasure, or it may include specific needs such as eating and resting, or a desired object, goal, state of being, ideal, or it may be attributed to less-apparent reasons such as selfishness, morality, or avoiding mortality.

II. Job Satisfaction

Job satisfaction has been defined as a pleasurable emotional state resulting from the consideration of one's job; an affective reaction to one's job; and an attitude towards one's job. Weiss (2002) has argued that job satisfaction is an attitude but points out that researchers should clearly distinguish the objects of cognitive evaluation which are affect (emotion), beliefs and behaviors.

III. Departure in the Workplace

Workplace deviance occurs when an employee voluntarily pursues a course of action that pressures the well-being of the individual or the organization.

Employees who had a positive perception of their workplace were less likely to pursue deviant behavior. Research indicates that personality acts as a moderating factor: workplace deviance was more likely to be endorsed with respect to an individual when both the perception of the workplace was negative and emotional stability.

IV. Performance in the Workplace

Of the five factors, the single factor of carefulness is the most predictive of job performance.

V. Absences

Job absence is very much a part of job performance: employees are not performing effectively if they do not even come to work. Shy, careful employees are much less likely to be absent from work, as opposed to extraverted employees who are low on carefulness.

VI. Teamwork

Oftentimes in the workplace the ability to be a team player is valued and is critical to job performance. Although this strengthen the case that job performance is related to the five-factor model via increased cooperativeness among coworkers, the role of personality by implying that actual job performance (task performance) is related to cognitive ability and not to personality .

1.2 Using 5S to Increase Performance in the Workplace

5S is the name of a workplace organization methodology that uses a list of five Japanese words which are **seiri** (Sorting), **seiton** (Straightening or setting in order / stabilize), **seiso** (Sweeping or shining or cleanliness / systematic cleaning),**seiketsu** (Standardizing) and **shitsuke** (Sustaining the discipline or self-discipline). Translated into English, they all start with the letter "S". The list describes how to organize a work space for efficiency and effectiveness by identifying and storing the items used, maintaining the area and items, and sustaining the new order. The decision-making process usually comes from a dialogue about standardization which builds a clear understanding among employees of how work should be done. It also instills ownership of the process in each employee.

The QCDSM program ensures this will happen on a daily basis. In addition to QCDSM, members of senior management must carry out periodic inspections of each target area. One common error by senior management is never being visible on the factory floor.

1.5 5S provides the foundation for improving performance through continuous improvement. It focuses on:

- Increasing quality by removing waste from the workplace.
- Provide reduction in operating costs by reducing non value added activities.
- Improving delivery by simplifying processes and removing obstacles
- Improving safety through improved housekeeping and identification of hazards

Provide an environment where continuous improvement is embraced through workers problem solving and suggestions, thereby improving morale.

Simply put, 5S works best if the implementation of the program is based on the 5S Performance Improvement Formula:

P=Q+C+D+S+M

Where;

- **P** - Increase productivity.
- **Q** - Improve product quality.
- **C** - Reduce manufacturing costs.
- **D** - Ensure on-time delivery.
- **S** - Provide a safety working environment
- **M** - Increase worker morale.

QUALITY AT WORK

"Do to others as you would have them do to you"Have you realized the importance of Quality in your daily life? Imagine the scooter/car you bought yesterday refuses to start today.

In every situation you must have chosen the "quality" brand with faith. You choose quality in every walk of your life. Without Quality in each service you are receiving every day you feel miserable. We demand quality. Quality is important for YOU. So is for EVERYONE. When we demand quality we have the duty to deliver quality also. As a member of society continuously motivated for a "QUALITY" life we also do our part unconsciously. Imagine the satisfaction you gain by giving proper directions to a lost person. You have given a quality service. We derive tremendous satisfaction out of doing a good turn or quality work at any moment. Greater will be our satisfaction if we extend this "Quality" aspect into each moment of our life.

Quality is more important than we realize. Quality makes life what it is.

We as professionals in software are responsible for the quality of our products. Imagine yourself typing a 5-page document and the application crashes without saving your work. Imagine as a data entry operator after entering 50 fields losing the data by pressing a wrong key. What it does to you? The faith placed in the product is shaken and you will be pretty scared to repeat the job despite many reassurances. Faith once lost cannot be regained. As a software developer it may be a mere bug to you. But to the user it is more than that. The quality of software depends on putting quality at each stage of software development cycle.

Quality is not someone's responsibility. It is everyone's responsibility. A wrongly connected transistor in 250 W music system can make it DUMB. A loosely fitted nut in a scooter can smash the scooter. Quality at every stage of product development is essential for delivering a Quality Product.

1.6 Think Quality, Write Quality Code, deliver Quality product.

Quality belongs to none. Quality cannot be qualified or quantified. You have done some work. There will always be a better way to do it. Quality is the BEST you can do. Imagine a painter - he is never satisfied with his work. Every time he looks at the painting he will feel like adding one line here and another there. He ponders, He wonders, He beautifies his creation. If we at our professional arts of conceptualization design, coding, testing look at our work with such an artistic eye Quality will be come naturally into our products. Continuous improvements, zeal for perfection are needed to build quality at work. Together we can make it.

Self – Check- 2	**Written Test**

Name: _____ Date: _____

Instruction: Answer all the questions listed below, if you have some clarifications- feel free to ask your teacher

1. List and explain Six-Factor Model of Personality in the Workplace? 5 points

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2. Explain the quality at work? 5 points

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Information Sheet 3	Demonstrating an understanding on how the work activities and completed work relate to the next process

2.1 Monitoring, evaluation and feedback

Monitoring and evaluation of the work undertaken will be conducted while the work is being operated. Also work activities are supervised after the completion of its operation. These are the things to be considered when

a. **Receiving Materials:**

1. Match the packing slip to the items received and ensures that the materials are destined on tour department.
2. That you are receiving the materials indicated on the purchase order with regard to quantity and discount.
3. That the materials are in acceptable condition.
4. That terms regarding installation and/or set-up of equipment are met.

b. **Receiving Reports**

Whenever goods are received:

- ❖ The person receiving the goods must document, using the administrative software, that all goods were received for each requisition before any payment can be made to the vendor.
- ❖ Any exceptions must be noted so that partial payments can be processed or defective goods can be returned.

c. **Return of Merchandise**

When merchandise is received which is incomplete or defective, the supervisor will return the materials to the supplier or to the store where it was bought and make arrangements with the vendor for replacement.

d. Make an Inventory Report of the Materials

All materials received must be listed and be reported to monitor how many materials are already on hand, purchased or damaged. *Effective management checks* are an important means of providing assurance of the integrity and security of the benefit processes. They are also useful in identifying training needs; indicating possible weaknesses in procedure and ensuring the section meets its accuracy target set for Best Value Performance Indicators purposes.

- ✓ ***Methodology***

The teacher will be the assessor. Students will be randomly assigned that will:

1.) Act as Quality Checker;

2.) Responsible for monitoring and coordinating the checking arrangements and;

3.) Must generate reports when receiving the equipment's. The Quality checker will record the date of receipt, name of the materials purchased, quantity, and official receipt number, signature of the person who bought the materials and signed his name afterwards. The Quality checker will identify if the materials are in good condition or damage and /or needing for replacements. This will also be recorded on his report.

- ✓ ***Feedback***

Once the Quality checker has completed all the reports, the assessor will check if the Quality Checker provides all the data needed in the report.

Example of Log Report *(to be completed by the Quality checker)*

Date Received	**O.R. #**	**Item Name**	**Quantity**	**Signature**	**Quality Checker**

Example of Assessment of Materials Received *(to be completed by the Quality checker)*

Quality Checker:			**Date:**
Item Name	**Total no. in Good Condition**	**Total no. of Errors**	**Comments**

Self – Check- 3	Written Test

Name: _____ Date: _____

Instruction: Answer all the questions listed below, if you have some clarifications- feel free to ask your teacher

1. Identify Monitoring, evaluation and feedback? 5 points

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Lo1: Information Sheet 4	Identifying and isolating faulty services

3.1 Identifying and isolating faulty services

- Make a space plan and measure the area where the desk will sit to ensure the right fit. Decide whether the desk will be straight or a corner unit, and how the desk will be supported, and plan accordingly. Straight desks are a simpler project, but corner units afford more workspace and often allow for the best use of the available area.

- Purchase supplies for the project, including counter tops, support system, and any brackets that may be required. Counter top can be cut at the time of purchase, or ordered to fit, so be certain to have exact measurements to ensure a correct fit without further cutting. Collect all tools needed for the project before beginning.

- Prepare your support system before assembling your desk. The simplest support solution is to use kitchen cabinets, metal filing cabinets, or sturdy plastic or medal drawers. This will make your desk both sturdy and easy to move and requires no tools, cutting, or drilling. This support solution is particularly idea for granite, metal, or stone counter top materials which are difficult to cut or drill.

- Install the chosen support system, ensuring that it is both the proper height, and level, before applying counter tops. If you've chosen cabinets or other form of freestanding support, be certain they're positioned at appropriate intervals to support the weight of the counter top.

- Affix the counter top to the support system one section at a time. If your counter is a heavy material, such as granite or stone, be certain the support system is sufficient to harbor the weight before applying the next section of counter. Once all sections of counter are installed, use a level to check that there the desk is even and level.

- Apply the end cap finishing kit where necessary and add any brackets that might be required to anchor the counter top. This step is optional but may be necessary to ensure your desk is both attractive and stable.

3.2 Identifying All Potential Failure Causes

When confronted with a systems failure, there is often a natural tendency to begin disassembling hardware to search for the cause. This is a poor approach. Failed hardware can expose precious information and safeguards are necessary to prevent losing that information from careless remove procedures. One must know what to look for prior to disassembling failed hardware.

Faults that come and go are the worst ones to track down, since just when you think you know the cause of the problem and intend to do something about it can disappear, leaving you wondering whether or not it's cured.

The most serious random problem is a spontaneous reboot, which can be caused by a faulty, bad mains interference, or overheating, particularly of the CPU. This is often caused by failure of the CPU fan, but this is easy enough to check -- just open up the case and see if the fan is still spinning. If your cooling arrangements are not broken but simply insufficient (this can happen, particularly in the case of Athlon processors, which generate a lot of heat), you'll need to upgrade your CPU heat sink and/or fan to bring its top temperature down to a more sensible level.

However, your computer is most likely to go wrong when you've just changed something, for instance when you've installed a new stick of RAM, a soundcard, hard drive, or a new CPU. Even though this may work perfectly well, you may have disturbed one of the cables inside your PC at the same time, giving you a completely unrelated problem; or if you've been over clocking your CPU, it may stop working when a new PCI card is installed.

- **Power Supplies**

If your PC won't boot up, no LEDs illuminate on the PC's front panel, and you can't hear your hard drives or cooling fans spin up, you may have a problem with your mains supply, or a faulty or dead computer PSU (Power Supply Unit). Faulty power

supplies can also cause random reboots: these can also mean that your power supply is working properly but is under such a heavy load that occasionally the voltages sag a bit, or even collapse.

- **BIOS Beep Codes**

If the power supply is working, booting your PC will light the front panel-power LED and let the BIOS perform a Power-On Self-Test, or POST. This initializes system hardware; tests RAM the keyboard, serial and parallel ports, initialize the floppy drive and hard disk controller, and diagnose any basic problems. If none are found, you'll get one short beep from the internal PC speaker. A combination of long or short beeps signifies a problem, and in most cases your PC will refuse to carry on. Although many 'beep codes' are similar from motherboard to motherboard, you really need to refer to the manual to find out what each sequence of beeps signifies.

- **Cable Issues**

Another source of sometimes weird hardware faults is internal cabling. For instance, if the IDE cable connecting your motherboard and hard drive is not inserted correctly, your drive may not be detected by the BIOS at all. One of the conductors on all IDE cables will either be colored red or have writing printing on it, so make sure these identification marks match up with pin one on your hard drive, and pin one on the motherboard socket.

1.2 Summary on How to Fix and Avoid General Protection Faults

If you usually get a general protection fault when your computer has been running for a certain length of time, then overheating is a likely cause. You may have to reduce the level of over clocking or replace a fan that isn't working. When the problem occurs after the addition of new memory, remove or replace it to see if this cures the problem. If you can't do any of this yourself, get an engineer to do it for you.

- When the fault always occurs soon after turning on your computer, it may be caused by a driver used by one of the programs that loads at start up or by Windows itself. You can try a Windows install but choose the repair option,

which will fix corrupt or missing files without losing your data or programs. If the fault always happens when a particular program is running, uninstall and then re-install it. Also, check the supplier's website for a later version of the program or drivers and install them.

- Actually finding the cause of the general protection fault can be a time-consuming process and you can speed this up by using a tool that will automate the task. One of the best I've found for this is Registry Patrol, which, despite its name, does much more than just sort out the PC's registry. It will, in fact, undertake a deep scan of the whole computer, sorting out all the drivers and DLLs that are the most likely cause of general protection faults. As a bonus, it will also fix all types of other problems so that you end up with a machine that starts quicker, runs better and is less likely to crash. Registry Patrol comes with a guarantee that it will do what it promises and is available to try as a free download from the company's website (www.registrypatrol.com). Once you've installed it and run the scan, your PC will run as it did when it was new and general protection faults will be a thing of the past.

3.3 Security Issues That Can Ultimately Affect Business Operations and Integrity.

- **Benefits**

Because most data is stored on computers and almost all communication is done on an organization's computer network, the security of the data is crucial for the success of an organization. Monitoring workplace computers can be done using a variety of software products that monitor computer networks. This software can also be used to monitor or track employee activity and productivity as well. This ensures data is secure by using the software to block certain websites, alert information technology staff of potential threats, such as computer viruses, as well as monitor computer and Internet usage by employees.

- **Effects**

Monitoring workplace computers can secure data stored on computer systems, as well as ensure employees are using workplace computers for business purposes.

Some monitoring software comes highly recommended at a reasonable cost and can be customized to an organization's needs. This requires some additional efforts by management or information technology staff, but proves it's a valuable tool to ensure the security of business data and integrity. Although computer workplace monitoring has become a necessity, employees often don't understand the reasons for computer monitoring and may feel violated or micro-managed.

- **Considerations**

When considering using computer monitoring software in the workplace, do extensive research on different products and services. Although some software is costly, it may be worth the investment to protect the integrity of a business. If an organization decides to use this software--inform employees. Allow employees to see the software and its capabilities by demonstrating its features in a group setting. Be open and honest regarding how the software will be used and how it will add security to the business. Talk to employees about their rights regarding computer monitoring. The Texas Workforce Commission has policies for workplace computer monitoring and employees should be aware of those policies. Also allow employees to ask questions in a private setting if they wish.

3.4 Using appropriate measuring instruments

If you've shopped around for just the right desk for your space, but haven't found exactly what you're looking for, consider building your own. Counter top desks are a unique way to modify your work area. Whether starting with a brand new section counter top, or repurposing old counters after a remodel, counter top desks make a sturdy addition to your office furnishings. A moderately simple do-it-yourself project, building a counter top desk is considerably less expensive than having a custom desk built, and requires less than one day'sork to complete from start to finish.

Self – Check- 4	Written Test

Name: _____ Date: _____

Instruction: Answer all the questions listed below, if you have some clarifications- feel free to ask your teacher

1. Identifying All Potential Failure Causes? 5 points

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Information Sheet 5	Recording and reporting faults and any identified causes

4.1 Recording and reporting faults and any identified causes

- Fault Reporting is a maintenance concept that increases operational availability and that reduces operating cost through three mechanisms.
    - ❖ Reduce labor-intensive diagnostic evaluation
    - ❖ Eliminate diagnostic testing down-time
    - ❖ Provide notification to management for degraded operation

4.2 Recording and reporting faults and any problem

No serious attempt to use measurement for software quality assurance (QA) would be complete without rigorous means of recording the various problems that arise during development, testing, and operation. No software developer consistently produces perfect software the first time. Thus, it is important for developers to measure those aspects of software quality that can be useful for determining

- ❖ How many problems have been found with a product?
- ❖ How effective are the prevention, detection and removal processes?
- ❖ When the product is ready for release to the next development stage or to the customer
- ❖ How the current version of a product compares in quality with previous or competing versions?

- Fault occurs when a human error results in a mistake in some software product. That is, the fault is the encoding of the human error. For example, a developer might misunderstand a user interface requirement, and therefore create a design that includes the misunderstanding. The design fault can also result in incorrect code, as well as incorrect instructions in the user manual. Thus, a single error can result in one or more faults, and a fault can reside in any of the products of development.

We describe the observations of development, testing, system operation and maintenance problems in terms of incidents, faults and changes. Whenever a problem is observed, we want to record its key elements, so that we can then investigate causes and cures.

In particular, we want to know the following:

1. *Location*: Where did the problem occur?
2. *Timing*: When did it occur?
3. *Mode*: What was observed?
4. *Effect*: Which consequences resulted?
5. *Mechanism*: How did it occur?
6. *Cause*: Why did it occur?
7. *Severity:* How much was the user affected?
8. *Cost:* How much did it cost?

The eight attributes of a problem have been chosen to be (as far as possible) mutually independent, so that proposed measurement of one does not affect measurement of another; this characteristic of the attributes is called orthogonally.

Orthogonally can also refer to a classification scheme within a particular category. For example, cost can be recorded as one of several pre-defined categories, such as *low* (under $100,000), *medium* (between $100,000 and $500,000) and *high* (over $500,000). However, in practice, attempts to over-simplify the set of attributes sometimes result in non-orthogonal classifications. When this happens, the integrity of the data collection and metrics program can be undermined, because the observer does not know in which category to record a given piece of information.

Example: Riley describes the data collection used in the analysis of the control system software for the Eurostar train (the high-speed train used to travel from Britain to France and Belgium via the Channel tunnel). [Riley 1995] In the Eurostar software problem-reporting scheme, faults are classified according to only two attributes, cause and category, as shown in Table 5.1. Note that "cause" includes notions of timing and location. For example, an error in software implementation could also be a deviation

from functional specification, while an error in test procedure could also be a clerical error.

4.3 Hence, Eurostar's scheme is not orthogonal and can lead to data loss or corruption

Cause	Category
error in software design	category not applicable
error in software implementation	Initialization
error in test procedure	logic/control structure
deviation from functional specification	interface (external)
hardware not configured as specified	interface (internal)
change or correction induced error	data definition
clerical error	data handling
other (specify)	Computation
	Timing
	other (specify

On the surface, our eight-category report template should suffice for all types of problems. However, as we shall see, the questions are answered very differently, depending on whether you are interested in faults, incidents or changes.

- ***Incidents***

An incident report focuses on the external problems of the system: the installation, the chain of events leading up to the incident, the effect on the user or other systems, and

the cost to the user as well as the developer. Thus, a typical incident report addresses each of the eight attributes in the following way.

- **Incident Report**

Location: such as installation where incident observed - usually a code (for example, hardware model and serial number, or site and hardware platform) that uniquely identifies the installation and platform on which the incident was observed.
Timing: CPU time, clock time or some temporal measure. Timing has two, equally important aspects: real time of occurrence (measured on an interval scale), and execution time up to occurrence of incident (measured on a ratio scale).
Mode: type of error message or indication of incident (see below)
Effect: description of incident, such as "operating system crash," "services degraded," "loss of data," "wrong output," "no output". Effect refers to the consequence of the incident. Generally, "effect" requires a (nominal scale) classification that depends on the type of system and application.
Mechanism: chain of events, including keyboard commands and state data, leading to incident. This application-dependent classification details the causal sequence leading from the activation of the source to the symptoms eventually observed. Unraveling the chain of events is part of diagnosis, so often this category is not completed at the time the incident is observed.
4.4 proposes the following classification of symptoms. The scheme can be quite useful, but it blurs the distinction between mode and effect:

- operating system crash
- program hang-up
- program crash
- input problem
    - correct input not accepted
    - wrong input accepted
    - description incorrect or missing
    - parameters incomplete or missing
- output problem

- wrong format
- incorrect result/data

- incomplete/missing
- spelling/grammar
- cosmetic

- failed required performance
- perceived total product failure
- system error message
- other
- service degraded
- loss of data
- wrong output
- no output

The second notion of mode relates to the *conditions of use* at the time of the incident. For example, this category may characterize what function the system was performing or how heavy the workload was when the incident occurred.

4.5 Only some of the eight attributes can usually be recorded at the time the incident occurs. These are:

- location
- timing
- mode
- effect
- severity

The others can be completed only after diagnosis, including root cause analysis. Thus, a data collection form for incidents should include at least these five categories.

When an incident is closed, the precipitating fault in the product has usually been identified and recorded. However, sometimes there is no associated fault. Here, great care should be exercised when closing the incident report, so that readers of the

report will understand the resolution of the problem. For example, an incident caused by user error might actually be due to a usability problem, requiring no immediate software fix (but perhaps changes to the user manual or recommendations for enhancement or upgrade). Similarly, a hardware-related incident might reveal that the system is not resilient to hardware failure, but no specific software repair is needed.

Sometimes, a problem is known but not yet fixed when another, similar incident occurs. It is tempting to include an incident category called "known software fault," but such classification is not recommended because it affects the orthogonally of the classification. In particular, it is difficult to establish the correct timing of an incident if one report reflects multiple, independent events; moreover, it is difficult to trace the sequence of events causing the incidents. However, it is perfectly acceptable to cross-reference the incidents, so the relationships among them are clear.

The need for cross-references highlights the need for forms to be stored in a way that allows pointers from one form to another. A paper system may be acceptable, as long as a numbering scheme allows clear referencing. But the storage system must also be easily changed. For example, an incident may initially be thought to have one fault as its cause, but subsequent analysis reveals otherwise. In this case, the incident's "type" may require change, as well as the cross-reference to other incidents.

The form storage scheme must also permit searching and organizing. For example, we may need to determine the first incident due to each fault for several different samples of trial installations. Because an incident may be a first manifestation in one sample, but a repeat manifestation in another, the storage scheme must be flexible enough to handle this.

Faults

An incident reflects the user's view of the system, but a fault is seen only by the developer. Thus, a fault report is organized much like an incident report but has very different answers to the same questions. It focuses on the internals of the system, looking at the particular module where the fault occurred and the cost to locate and fix it. A typical fault report interprets the eight attributes in the following way:

Fault Report

Location: within-system identifier, such as module or document name. The IEEE Standard Classification for Software Anomalies, [IEEE 1992], provides a high-level classification that can be used to report on location.

Timing: phases of development during which fault was created, detected and corrected. Clearly, this part of the fault report will need revision as a causal analysis is performed. It is also useful to record the time taken to detect and correct the fault, so that product maintainability can be assessed.

Mode: type of error message reported, or activity which revealed fault (such as

A typical change report may look like this:

Change Report

Location: identifier of document or module affected by a given change.

Timing: when change was made

Mode: type of change

Effect: success of change, as evidenced by regression or other testing

Mechanism: how and by whom change was performed

Cause: corrective, adaptive, preventive or perfective

Severity: impact on rest of system, sometimes as indicated by an ordinal scale

Cost: time and effort for change implementation and test.

Self – Check- 5	**Written Test**

Name: _____ Date: _____

Instruction: Answer all the questions listed below, if you have some clarifications- feel free to ask your teacher

1. List and explain a typical fault report interprets the eight attributes? 2 points.

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Instruction	LG14: Assessing quality of Services Rendered

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics –

- *Checking quality* Services rendered
- *Evaluating service rendered*
- Identifying causes of any identified faults
- Taking corrective actions

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 –

- *Check quality* Services rendered
- *Evaluate service rendered*
- Identify causes of any identified faults
- Take corrective actions

Learning Activities

1. Read the specific objectives of this Learning Guide.
2. Read the information written in the “Information Sheets 1” in pages 3-6.
3. Accomplish the “Self-check” in page 7.
4. If you earned satisfactory, proceed to “Lap Test on page 8. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Activity #1.
5. Do the “LAP test” (if you are ready) and show your output to your teacher. Your teacher will evaluate your output either satisfactory or unsatisfactory. If unsatisfactory, your teacher shall advice you on additional work. But if satisfactory you can proceed to Learning Guide 24.

   - Your teacher will evaluate your output either satisfactory or unsatisfactory. If unsatisfactory, your teacher shall advice you on additional work. But if satisfactory you can proceed to the next topic.

Information Sheet 1	*Checking quality* Services rendered

1.1 Standard and working materials, articles and products

Workplace standards and procedure

Workplace Procedure is a set of written instructions that identifies the health and safety issues that may happen from the jobs and tasks that make up a system of work.

Quality Check May includes:

- Visual inspection
- Physical measurements
- Check against specifications/preferences

A safe working procedure should be written when:

- designing a new job or task
- changing a job or task
- introducing new equipment
- reviewing a procedure when problems have been identified, example from an accident or incident investigation

1.2 The safe working procedure should identify:

- the teacher for the task or job and the students who will undertake the task
- the tasks that are to be undertaken that pose risks
- the equipment to be used in these tasks
- the control measures that have been formulated for these tasks
- any training or qualification needed to undertake the task
- the personal protective equipment to be worn
- action to be undertaken to address safety issues that may arise while undertaking the task

1.3 Types and Work-Related Errors

A. Quantity of work *(untimely completion, limited production)*

1. Poor prioritizing, timing, scheduling
2. Lost time

❖ Tardiness, absenteeism, leaving without permission

❖ Excessive visiting, phone use, break time, use of the Internet

❖ Misuse of sick leave

3. Slow response to work requests, untimely completion of assignments
4. Preventable accidents

B. Quality of work *(failure to meet quality standards)*

1. Inaccuracies, errors
2. Failure to meet expectations for product quality, cost or service
3. Customer/client dissatisfaction
4. Spoilage and/or waste of materials
5. Inappropriate or poor work methods

Work Behavior Which Result in Performance Problems

A. Inappropriate behavior (often referred to as "poor attitude*")*

- ✓ **Negativism, lack of cooperation, hostility**
- ✓ Failure or refusal to follow instructions
- ✓ Unwillingness to take responsibility ("passing the buck")
- ✓ Insubordination
- ✓ Power games

B. Resistance to change

- ✓ Unwillingness, refusal or inability to update skills
- ✓ Resistance to policy, procedure, work method changes
- ✓ Lack of flexibility in response to problems

C. Inappropriate interpersonal relations

- ✓ Inappropriate communication style: over-aggressive, passive
- ✓ Impatient, inconsiderate, argumentative
- ✓ Destructive (Critical) humor, sarcasm, horseplay, fighting (abrasives)
- ✓ Inappropriate conflict with others, customers, co-workers, supervisors

D. Inappropriate physical behavior

- ✓ Smoking, eating, drinking in inappropriate places

- ✓ Sleeping on the job
- ✓ Alcohol or drug use
- ✓ Problems with personal hygiene
- ✓ Threatening, hostile, or intimidating behavior

1.3 Quality measurement and workplace procedures

The enterprise quality management of your business must commence with a thorough comprehension of 'quality management' and its associated systems and concepts. To help you understand the terminology used in quality systems the following broad definitions are provided:

Quality Management System (QMS)

Quality management can be defined as the total of activities and decisions performed in an organization to produce and maintain a product with desired quality levels against minimal costs. **A QMS** can therefore be defined as management of a system to ensure quality product'.

Quality Assurance

Quality Assurance, or QA for short, refers to a procedure for the systematic monitoring and evaluation of individual aspects of a production line, process, service, or facility to ensure that standards of quality are being met.

• Two **key principles characterize QA:**

– "fit for purpose" (the product should be suitable for the intended purpose)
– "right first time" (mistakes should be eliminated)

QA includes regulation of the quality of raw materials, assemblies, products and components, services related to production, and management, production and inspection processes. It is important to realize also that quality is determined by the intended users, clients or customers, not by society in general; it is not the same as 'expensive' or 'high quality'. Even goods with low prices can be considered quality items if they meet a market need. QA is more than just testing the quality of aspects of a product, service or facility, it analyses the quality to make sure it conforms to specific predetermined standard.

Quality Control

Quality control is the testing of completed products to uncover defects, and reporting to management who make the decision to allow or deny the release of the product within the broader Quality Management System

1.5 What are the basic steps involved in a quality management system (qms)

The information provided below, on the steps involved in a QMS, is provided to increase your understanding of the total system. It is likely that in the workplace you are only going to be involved with a quality assurance process and possibly quality control.

All quality management systems aim to:

- identify objectives for the management system (usually described in outcome terms)
- plan and document a production process which will deliver those objectives
- implement the process in the plan
- monitor the outcomes of the process
- review the actual outcomes against objectives, with adjustments as required

1.6 Corrective actions and workplace procedures

Implement standard corrective action and standard procedure. One of the main pieces of documentation used by a workplace to manage Quality Assurance and Quality Control is a Standard Operating Procedure (SOP). This is a written document or instruction detailing all steps and activities of a process or procedure. Remember that the complexity of a process or procedure will determine the complexity of the SOP.

Standard Operating Procedures can cover a range of areas from “in house” work instructions and procedures to formal Australian Standards. Common SOP’s could include:

- ✓ Work schedules
- ✓ Job card/sheet/plans/specifications
- ✓ Standard operation sheets
- ✓ Material safety data sheets (msds)
- ✓ Diagrams/sketches

- ✓ Regulations/legislation
- ✓ Manufacturer/workplace guidelines, policies and procedures
- ✓ Australian standards.

1.7 Maintain accurate work records with work specifications

In every workplace you are required to identify and keep records. The records that you are required to keep will be determined by your job tasks.

1.8 Commonly used records are:

- ✓ Physical records,
- ✓ Preparing and processing basic financial transactions,
- ✓ Establishing and maintaining a cashbook and reconciling and preparing invoices.

1.9 The record keeping and administration requirements have many common factors related to the:

- ✓ Types of records
- ✓ Legislative requirements
- ✓ Ethical standard
- ✓ Technology and equipment used

1.10 Inspections of materials, component parts and final products

It has its own inspecting procedures.

The following are tips of the items to be inspected while a given supervisor undertake.

Accumulation Time

- ➢ If the maximum accumulation time of 320 days is nearing, WM was contacted for removal
- ➢ Within 3 days of reaching the 55-gallon or 1-quart limit, the container was marked with the date the quantity limit was reached, and a request was sent to WM for prompt removal

Container Condition

- ➢ Free of structural defects, dents, and leaks, and severe rusting
- ➢ Clean and free of chemical residue and any debris

Container Management

- ➢ Containers are kept closed (except when adding or removing waste). Containers are considered closed when all lids, gaskets, and locking rings are in place and secured.

- If funnels are left in place, they must be latched and provide a seal that prevents release of waste.
- Containers are not overfilled.

Secondary Containment

- Is in place for containers holding liquid waste or other dispersible waste (such as dust, powders, or shavings)
- Is clean, free of debris, residue, and rainwater.

Incompatible Materials

- Container is compatible with the type of waste
- Incompatible wastes are segregated into separate containers
- Wastes are separated from incompatible materials stored nearby
- Hazardous wastes are not mixed with universal or common hazardous waste

1.11 Requirements that may require an administrative or engineering remedy

Note: Some of these items may not apply to all WAAs, depending on the storage area location

- Protected from foot and vehicular traffic
- Sheltered from rain or rainwater runoff
- Proper signs and identification are in place at entrance
- A telephone is readily available and operational
- Access is limited to authorized personnel only and area is locked when not in use
- Signs/instructions are posted for segregation and identification
- Floor have skit/slip prevention surfaces in place

Maintenance

- Adequate aisle space is maintained around hazardous waste containers
- Spill response and cleanup materials and supplies are present or their location is clearly identified
- Personal protective equipment (PPE) as recommended in material safety data sheets (MSDSs) is present or location is identified
- General area is clean and free of debris
- Floor surfaces are clean, free of cracks, and in good repair
- Fire extinguishers with current annual inspection are present (if applicable)
- Safety showers/eyewashes are available and functional (if applicable.)

Self – Check 1	Written Test

Name: _____ Date: _____

Instruction: Answer all the questions listed below, if you have some clarifications- feel free to ask your teacher.

1. **List and Explain types and work-related errors? 10 point**

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Information Sheet 2	Evaluating service rendered

2.1 Work standard and relevant operation

The student must tell material properties to product and process quality. These are the factors that must be taken into consideration when choosing the right material for their components and assemblies:

1. **Selection of material**

Material selection is one of the most common tasks for this competency. The ability to assess the material's impact on the performance of a product is crucial for reliable performance. Sometimes, buyers are also considering the label or name of the company which are producing great quality of materials and are known in the market.

2. Testing of material

The testing of material properties is widely understood to be the key to obtaining data for a project, performing failure analysis, or understanding material interactions. Material testing also provides information on the quality of incoming and outgoing products. Inspection test equipment and techniques are demonstrated for a wide range of materials and assemblies during the class.

3. Cost of material

The cost of material is also considered when buying or selecting materials for a specific project. The amount may vary but never taken for granted the quality and the reliability of the material. Will you buy material which is less expensive but worst quality? Will you buy material which you cannot afford? People look for places which can meet their standards and right cost for materials to buy.

Before planning and designing takes place, you should evaluate the material options and system requirements. Teachers should add several useful reference manuals to their libraries.

2.2 The characteristic of the materials to be used for specific project must be:

- ***of good quality***

  This is the most important factor when choosing materials to buy. Products with good quality are long-lasting and safe to use because you know that it follows certain standards before being commercialized.

- ***Reliable***

  It means that you can be sure that it will perform its function well, will operate safely and will give the best it could give.

- ***suitable for the application/purposes***

  Choose the materials which are very necessary to make the project possible. Making a list of products/materials to buy is a good trait of a wise consumer. Products which are not to be used must be crossed out.

- ***low cost***

  It doesn't mean that you will choose for the less expensive one and exclude the quality. Low cost means you can afford to buy the materials without hurting your pocket and assure of better quality.

Self – Check 2	Written Test

Name: _____ Date: _____

Instruction: Answer all the questions listed below, if you have some clarifications- feel free to ask your teacher.

1. **Explain the characteristic of the materials to be used for specific project? 2 point**

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Information Sheet 3	Identifying causes of any identified faults

3.1 Identifying causes of any identified faults

- Make a space plan and measure the area where the desk will sit to ensure the right fit. Decide whether the desk will be straight or a corner unit, and how the desk will be supported, and plan accordingly. Straight desks are a simpler project, but corner units afford more workspace and often allow for the best use of the available area.

- Purchase supplies for the project, including counter tops, support system, and any brackets that may be required. Counter top can be cut at the time of purchase, or ordered to fit, so be certain to have exact measurements to ensure a correct fit without further cutting. Collect all tools needed for the project before beginning.

- Prepare your support system before assembling your desk. The simplest support solution is to use kitchen cabinets, metal filing cabinets, or sturdy plastic or medal drawers. This will make your desk both sturdy and easy to move and requires no tools, cutting, or drilling. This support solution is particularly idea for granite, metal, or stone counter top materials which are difficult to cut or drill.

- Install the chosen support system, ensuring that it is both the proper height, and level, before applying counter tops. If you've chosen cabinets or other form of freestanding support, be certain they're positioned at appropriate intervals to support the weight of the counter top.

- Affix the counter top to the support system one section at a time. If your counter is a heavy material, such as granite or stone, be certain the support system is sufficient to harbor the weight before applying the next section of counter. Once all sections of counter are installed, use a level to check that there the desk is even and level.

- Apply the end cap finishing kit where necessary and add any brackets that might be required to anchor the counter top. This step is optional but may be necessary to ensure your desk is both attractive and stable.

3.2 Identifying All Potential Failure Causes

When confronted with a systems failure, there is often a natural tendency to begin disassembling hardware to search for the cause. This is a poor approach. Failed hardware can expose precious information and safeguards are necessary to prevent losing that information from careless remove procedures. One must know what to look for prior to disassembling failed hardware.

Faults that come and go are the worst ones to track down, since just when you think you know the cause of the problem and intend to do something about it can disappear, leaving you wondering whether or not it's cured.

The most serious random problem is a spontaneous reboot, which can be caused by a faulty, bad mains interference, or overheating, particularly of the CPU. This is often caused by failure of the CPU fan, but this is easy enough to check -- just open up the case and see if the fan is still spinning. If your cooling arrangements are not broken but simply insufficient (this can happen, particularly in the case of Athlon processors, which generate a lot of heat), you'll need to upgrade your CPU heat sink and/or fan to bring its top temperature down to a more sensible level.

However, your computer is most likely to go wrong when you've just changed something, for instance when you've installed a new stick of RAM, a soundcard, hard drive, or a new CPU. Even though this may work perfectly well, you may have disturbed one of the cables inside your PC at the same time, giving you a completely unrelated problem; or if you've been over clocking your CPU, it may stop working when a new PCI card is installed.

- **Power Supplies**

If your PC won't boot up, no LEDs illuminate on the PC's front panel, and you can't hear your hard drives or cooling fans spin up, you may have a problem with your mains supply, or a faulty or dead computer PSU (Power Supply Unit). Faulty power

supplies can also cause random reboots: these can also mean that your power supply is working properly but is under such a heavy load that occasionally the voltages sag a bit, or even collapse.

- **BIOS Beep Codes**

If the power supply is working, booting your PC will light the front panel-power LED and let the BIOS perform a Power-On Self-Test, or POST. This initializes system hardware; tests RAM the keyboard, serial and parallel ports, initialize the floppy drive and hard disk controller, and diagnose any basic problems. If none are found, you'll get one short beep from the internal PC speaker. A combination of long or short beeps signifies a problem, and in most cases your PC will refuse to carry on. Although many 'beep codes' are similar from motherboard to motherboard, you really need to refer to the manual to find out what each sequence of beeps signifies.

- **Cable Issues**

Another source of sometimes weird hardware faults is internal cabling. For instance, if the IDE cable connecting your motherboard and hard drive is not inserted correctly, your drive may not be detected by the BIOS at all. One of the conductors on all IDE cables will either be colored red or have writing printing on it, so make sure these identification marks match up with pin one on your hard drive, and pin one on the motherboard socket.

1.2 Summary on How to Fix and Avoid General Protection Faults

If you usually get a general protection fault when your computer has been running for a certain length of time, then overheating is a likely cause. You may have to reduce the level of over clocking or replace a fan that isn't working. When the problem occurs after the addition of new memory, remove or replace it to see if this cures the problem. If you can't do any of this yourself, get an engineer to do it for you.

- When the fault always occurs soon after turning on your computer, it may be caused by a driver used by one of the programs that loads at start up or by

Windows itself. You can try a Windows install but choose the repair option, which will fix corrupt or missing files without losing your data or programs.
If the fault always happens when a particular program is running, uninstall and then re-install it.

- Also, check the supplier's website for a later version of the program or drivers and install them.

- Actually finding the cause of the general protection fault can be a time-consuming process and you can speed this up by using a tool that will automate the task. One of the best I've found for this is Registry Patrol, which, despite its name, does much more than just sort out the PC's registry. It will, in fact, undertake a deep scan of the whole computer, sorting out all the drivers and DLLs that are the most likely cause of general protection faults. As a bonus, it will also fix all types of other problems so that you end up with a machine that starts quicker, runs better and is less likely to crash.

Registry Patrol comes with a guarantee that it will do what it promises and is available to try as a free download from the company's website (www.registrypatrol.com). Once you've installed it and run the scan, your PC will run as it did when it was new and general protection faults will be a thing of the past**.**

Self – Check 3	**Written Test**

Name: _____ Date: _____

Instruction: Answer all the questions listed below, if you have some clarifications- feel free to ask your teacher.

1. Identifying All Potential Failure Causes? 5 point.

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Information Sheet 4	Taking corrective actions

1.1. Corrective Actions

Corrective action is a reaction to any of the cause/non-conformance mentioned above & can be divided in two phases of action: 1) Identification of root cause: for this purpose, TQM tools such as fish-bone or cause & effects analysis can be practiced. Your CAPA would be appropriate & effective if & only if you have identified the root cause of problem. 2) Taking necessary actions: in order to address the root cause takes necessary immediate action/s. The effectiveness of the corrective action taken has to be verified periodically through a systematic approach of PDCA (Plan - Do - Check - Act) cycle.

Examples of corrective actions:

- Error Proofing
- Visible or Audible Alarms
- Process Redesign
- Product Redesign
- Training or enhancement/ modification of existing training programmed
- Improvements to maintenance schedules
- Improvements to material handling or storage

Preventive Actions

Preventive action is any proactive methodology used to determine potential discrepancies before they occur and to ensure that they do not happen (thereby including, for example, preventive maintenance, management review or other common forms of risk aversion). Corrective and preventive actions both include investigation, action, review, and further action if so required

Preventive action is prediction of problem & trying to avoid the occurrence (fail safe) through self-initiated action/s & analysis related with your processes / products. This can be initiated with the help of active participation of staff members / workers through improvement teams, improvement meetings, management review, customer feedback

& deciding own goals quantized in terms of business growth, reducing rejections, utilizing the equipment's effectively etc.

- Longer term actions designed to determine the *effectiveness of corrective actions*
- Actions designed to ensure the "prevention" or recurrence of deviations.
- Preventive actions do not have to be initiated or completed prior to closing the investigation.
- Preventive actions should be tracked, monitored for completion, and trended in a quality system.
- Preventive actions must focus on 'system' evaluations and 'system' level continuous improvement.
- Quality system improvement is more important than corrective actions (band-aid fixes necessary to just release a batch).

Self – Check 4	**Written Test**

Name: _____ Date: _____

Instruction: Answer all the questions listed below, if you have some clarifications- feel free to ask your teacher.

1. Write and discuss examples of corrective actions: 5 points

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Introduction	LG15: Record Information

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics –

- **Record information**

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 –

- Record basic information on the quality performance in accordance with workplace procedures
- Maintain records of work quality according to the requirements of the company

Learning Activities

1. Read the specific objectives of this Learning Guide.
2. Read the information written in the “Information Sheets 1” in pages 3-6.
3. Accomplish the “Self-check” in page 7.
4. If you earned satisfactory, proceed to “Lap Test on page 8. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Activity #1.
5. Do the “LAP test” (if you are ready) and show your output to your teacher. Your teacher will evaluate your output either satisfactory or unsatisfactory. If unsatisfactory, your teacher shall advice you on additional work. But if satisfactory you can proceed to Learning Guide 25.

- Your teacher will evaluate your output either satisfactory or unsatisfactory. If unsatisfactory, your teacher shall advice you on additional work. But if satisfactory you can proceed to the next topic.

Information Sheet 1	Recording basic information on the quality performance

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1.1 Quality performance record and measurement

Quality Standards

Standards are sets of rules that outline specification of dimensions, design of operation, materials and performance, or describe quality of materials, products or systems. These standards should cover the performance expectations of the product for particular applications. The intent of standards is to provide at least minimum quality, safety or performance specifications so as to ensure relatively uniform products and performance, and to remove ambiguity as to the suitability of certain commercial products for particular applications. Following standards may reduce the risk of error in working.

Table: shows the Quality System Elements required by ISO 9000 in the making of the final product.

Quality System Requirements		Contents
1	Management responsibility	Define and document commitment, policy and objectives, responsibility and authority, verification resources and personnel. Appoint a management representative and conduct regular reviews of the system
2	Quality system	Establish and maintain a documented quality system ensuring that products conform to specified requirements
3	Contract Review	Ensure that customer's contractual requirements are evaluated and met
4	Product development	Plan, control and verify product development to ensure that specified requirements are met
5	Document control	System for control and identification of all documents regarding quality, e.g. procedures, instructions, and specifications

6	Purchasing	Ensure that purchased products conform to specified requirements
7	Product identification and traceability	System to identify and control traceability of product at all stages from raw materials through production to the final product as delivered to the customer
8	Process control	Ensure and plan the control of production which direct- ly effects quality by documented work instructions, monitoring and control of processes
9	Inspection and testing	Inspect and test incoming products, intermediate and final product; establish product conformance to specified requirements and identify non-conforming pro- ducts; maintain inspection and test records
10	Inspection, measuring and test equipment	Selection and control of equipment to ensure reliability and accuracy in measuring data
11	Inspection and test status	For the whole process the products shall be identified and clearly marked concerning test status, including indication of conformance or non-conformance
12	Control of non-conforming products	Identification, documentation, evaluation, isolation (if possible) and disposition of non-conforming products
13	Corrective actions	Prevention of reoccurrence of failures (non-conformance)
14	Handling, storage packaging and delivery	Protection of the quality of the product during hand- ling, storage, packaging and delivery
15	Quality records	Records, including those which demonstrate that the specified requirements have been met, shall be control- led and maintained
16	Internal Quality Audits	Regular, planned internal audits shall be carried out, documented and recorded to verify the effectiveness of the quality system

17	Training	Training requirements at all levels shall be identified and the training planned, conducted and recorded
18	Cleaning and Disinfection	Although not required by the ISO 9000 standards, these two points should be given special attention in all food companies
19	Personal hygiene	

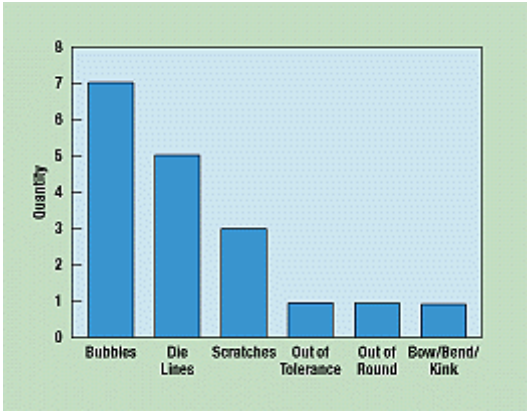
Customer Service

According to Turban et al, 2002, "**Customer service** is a series of activities designed to enhance the level of customer's satisfaction – that is, the feeling that a product or service has met the customer's expectation". Its importance varies by product, industry and customer.

1.2. Data record and presentation techniques

a. Pareto Diagrams

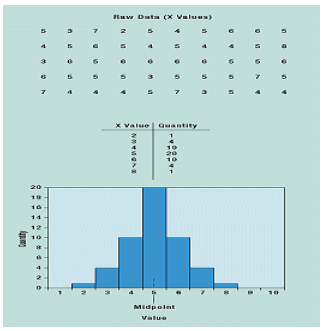
The Pareto diagram is named after Vilfredo Pareto, a 19th-century Italian economist. are caused by 20% of the potential sources. A Pareto diagram puts data in a hierarchical order (Figure), which allows the most significant problems to be corrected first. The Pareto analysis technique is used primarily to identify and evaluate nonconformities, although it can summarize all types of data. It is perhaps the diagram most often used in management presentations. To create a Pareto diagram, the operator collects random data, regroups the categories in order of frequency, and creates a bar graph based on the results.



a. Fish bone diagram

A fish bone diagram displays all contributing factors and their relationships to the outcome to identify areas where data should be collected and analyzed. The major areas of potential causes are shown as the main bones, Later the subareas are

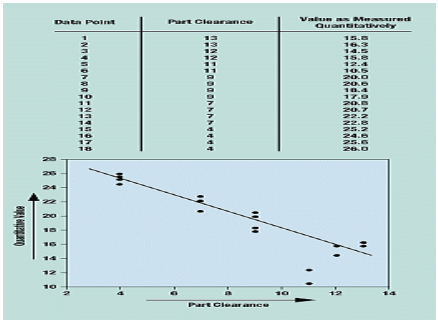
depicted. Thorough analysis of each cause can eliminate causes one by one, and the most probable root cause can be selected for corrective action. Quantitative information can also be used to prioritize means for improvement, whether it is to machine, design, or operator.



Histograms

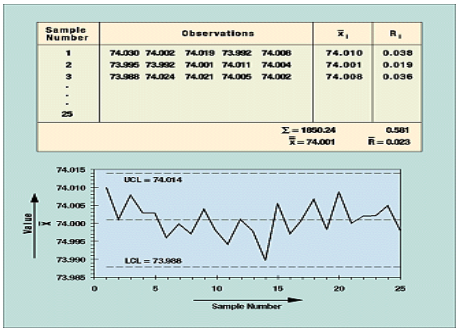
The histogram plots data in a frequency distribution table. What distinguishes the histogram from a check sheet is that its data are grouped into rows so that the identity of individual values is lost. Commonly used to present quality improvement data, histograms work best with small amounts of data that vary considerably. When used in process capability studies, histograms can display specification limits to show what portion of the data does not meet the specifications. After the raw data are collected, they are grouped in value and frequency and plotted in a graphical form. A histogram's shape shows the nature of the distribution of the data, as well as central tendency (average) and variability.

c. Scatter Diagrams



A scatter diagram shows how two variables are related and is thus used to test for cause and effect relationships. It cannot prove that one variable causes the change in the other, only that a relationship exists and how strong it is. In a scatter diagram, the horizontal (x) axis represents the measurement values of one variable, and the vertical (y) axis represents the measurements of the second variable.

d. Control Charts



A control chart displays statistically determined upper and lower limits drawn on either side of a process average. This chart shows if the collected data are within upper and lower limits previously determined through statistical calculations of raw data from earlier trials (Figure).

In preparing a control chart, the mean upper control limit (UCL) and lower control limit (LCL) of an approved process and its data are calculated.

1.2 Work quality record establishment and maintenance

Maintenance is the combination of all technical and associated administrative actions intended to retain an item in, or restore it to, a state in which it can perform its required function. Many companies are seeking to gain competitive advantage with respect to cost, quality, and service and on-time deliveries. The effect of maintenance on these variables has prompted increased attention to the maintenance area as an integral part of productivity improvement. Maintenance is rapidly evolving into a major contributor to the performance and profitability of manufacturing systems. In fact, some see maintenance as the "last frontier" for manufacturing.

In their article "Make Maintenance Meaningful" P.K. Kauppi and PaavoYlinen describe the bulk of maintenance procedures as being as:

- **Preventive maintenance**—the prevention of equipment breakdowns before they happen. This includes inspections, adjustments, regular service and planned shutdowns.
- **Repair work**—repairing equipment and troubleshooting malfunctions in an effort to return the equipment to its previous condition. These repairs may be reactive or preventive.
- **Improvement work**—searching for better materials and improved design changes to facilitate equipment reliability. Repair work is often a part of improvement work.

Self – Check 1	Written Test

Instruction: **Answer all the questions listed below, if you have some clarifications- feel free to ask your teacher**

1. **Explain and discuss Quality performance record and measurement? 5 point**

_____

_____

Information Sheet 2	maintaining records of work quality

2.1 Quality Management Principles and Quality standards

The Inspectorate applies the eight fundamental Quality Management Principles defined in the ISO 9001:2008 Standard which are fundamental rules for leading and operating an organization aimed at continually improving performance over the long term by focusing on both internal and external customers while addressing their expectations.

Customer Focus: Organizations depend on their customers and therefore should understand current and future customer needs, should meet customer requirements and strive to exceed customer expectations.

Leadership: Leaders establish unity of purpose and direction of the organization. They should create and maintain the internal environment in which people can become fully involved in achieving the organization's objectives.

Involvement of people: People at all levels are the essence of an organization and their full involvement enables their abilities to be used for the organization's benefit.

Process approach: A desired result is achieved more efficiently when activities and related resources are managed as a process.

System approach to management: Identifying, understanding and managing interrelated processes (including outsourced processes, where applicable) as a system contributes to the organization's effectiveness and efficiency in achieving its objectives.

Continual improvement: Continual improvement of the organization's overall performance should be a permanent objective of the organization.

Factual approach to decision making: Effective decisions are based on the analysis of data and information.

Mutually beneficial supplier relationships: An organization and its supplier are interdependent and a mutually beneficial relationship enhances the ability of both to create value.

This basic management strategy utilizes the talents of all employees to the benefit of the organization in particular and society in general, and provides a positive outcome for all stakeholders.

2.2 Information record and company requirement

Recording information is important to take administrative decision and launch better waste management plan. Information can be recorded by different materials and equipment's.

i. Information recording medium

A recording medium is a physical material that holds data expressed in any of the existing recording formats. With electronic media, the data and the recording medium is sometimes referred to as "software" despite the more common use of the word to describe computer software. With (traditional art) static media, art materials such as crayons may be considered both equipment and medium as the wax, charcoal or chalk material from the equipment becomes part of the surface of the medium.

Some recording media may be temporary either by design or by nature. Volatile organic compounds may be used to preserve the environment or to purposely make data expire over time. Data such as smoke signals or skywriting are temporary by nature. Depending on the volatility, a gas (e.g. atmosphere, smoke) or a liquid surface such as a lake would be considered a temporary recording medium if at all.

i. Data and information storage

A data storage device is a device for recording (storing) information (data). Recording can be done using virtually any form of energy, spanning from manual muscle power in handwriting, to acoustic vibrations in phonographic recording, to electromagnetic energy modulating magnetic tape and optical discs.

A storage device may hold information, process information, or both. A device that only holds information is a recording medium. Devices that process information (data storage equipment) may either access a separate portable (removable) recording medium or a permanent component to store or retrieve information.

Electronic data storage is storage which requires electrical power to store and retrieve that data. Most storage devices that do not require vision and a brain to read data fall into this category. Electromagnetic data may be stored in either an analog or digital format on a variety of media. This type of data is considered to be electronically encoded data, whether or not it is electronically stored in a semiconductordevice, for it is certain that a semiconductor device was used to record it on its medium. Most electronically processed data storage media (including some forms of computer data storage) are considered permanent (non-volatile) storage, that is, the data will remain stored when power is removed from the device. In contrast, most electronically stored information within most types of semiconductor (computer chips) microcircuits are volatile memory, for it vanishes if power is removed.

Electronic data storage is easier to revise and may be more cost effective than alternative methods due to smaller physical space requirements and the ease of replacing (rewriting) data on the same medium. However, the durability of methods such as printed data is still superior to that of most electronic storage media. The durability limitations may be overcome with the ease of duplicating (backing-up) electronic data.

2.3 Data storage equipment uses either:

- ❖ Portable methods (easily replaced),
- ❖ Semi-portable methods requiring mechanical disassembly tools and/or opening a chassis, or
- ❖ Inseparable methods meaning loss of memory if disconnected from the unit.

The following are examples of those methods:

A. PORTABLE METHODS

- Hand crafting
- Flat surface
- Print making
  - Photographic
- Fabrication
  - Automated assembly
  - Textile
  - Molding
  - Solid freeform fabrication
- Cylindrical accessing

- Memory card reader/drive
- **Tape drive**
  - Mono reel or reel-to-reel
  - Compact Cassette player/recorder
- **Disk accessing**
  - Disk drive
  - Disk enclosure

- Cartridge accessing/connecting (tape/disk/circuitry)
- Peripheral networking
- Flash memory devices

B. SEMI-PORTABLE METHODS

- Hard disk drive
- Circuitry with non-volatile RAM

C. INSEPARABLE METHODS

- Circuitry with volatile RAM
- Neurons

2.2 Interpret work instructions, specifications, standards and patterns

The Interpretation Guidelines Manual sets out the Employment Standards Branch's interpretation of the organization employment Standards Act and Regulation, which first came into effect on waste management, is important to deliver satisfying cleaning service.

2.4 communicate effectively within defined workplace procedures

- **Four Styles for Effective Communication**

Have you ever met someone that you just couldn't get through to? While there could be many reasons for this, one of the most common reasons is that your communication "style" is different than the other persons' communication style. The good news is that this gives you an easy way to quickly improve the effectiveness of your communication by adapting your communication style to match theirs. Let me illustrate what I mean my wife and I have quite different styles of communication. She loves details and I just want the bottom line. When I get home from work at the end of the day and she asks me "how was your day?" I am likely to respond with a simple "fine", or maybe give her a quick summary of one or two of the most important events. But when I ask her the same question, I had better be prepared to hear the story of her entire day in excruciating (for me) detail. Because of my communication style, I don't need or want the details, but because of her communication style, she needs and wants to give them.

Style #1 - The bottom line person

The bottom line person is easy to spot because they just want the facts and nothing but the facts. Because of this, many times they can be perceived as bossy and insensitive. The bottom line person is extremely goal oriented and their major motivation is to get things done. They'll take a project and run with it. Here are some tips for communicating with a bottom line person:

- Be efficient and businesslike
- Get to the point
- Set and clarify goals and objectives
- Give them conclusions. Only provide details if asked.
- Solve problems and objections
- Talk in terms of results not methods.

Style #2 - The people person

You know the people person… they're the life of the party and lots of fun. They love people and love total. Their natural sociability allows them to talk for long periods of time about almost anything. They have an attractive personality and are enthusiastic, curious, and expressive. Here are some tips for communicating with the people person:

- Leave plenty of time for talk and social niceties
- Ask them about their family, children etc. And be prepared to talk about yours
- If possible, let them "experience" what you are communicating
- Talk in terms of people and stories

Style #3 - The "can't we all get along" person

The person with a "get along" communication style typically has a low key personality and is calm, coolant collected. They tend to be patient, well balance and happily reconciled with life. "Get along" people are the largest percentage of the population and they are typically competent and steady workers who do not like to be involved in conflict. When there is conflict they may be called upon to

mediate the problem. They are good listeners and usually have many friends. One of their major motivations is to avoid offending anyone. Here are some tips for communicating with the “can’t we all get along” person:

- Don’t come on too strong
- Earn their trust in small steps.
- Don’t ask for big decisions fright away.
- Provide plenty of reassurance.

  Talk in terms of security. Something to think about: How can you use testimonials, guarantees, or examples to better communicate with a “get along” person that you know?

Style #4 - The detail person

These are the “facts and figures” people. They love to gather details and organize things. They tend tube deep, thoughtful, analytical, serious and purposeful. Because their communication style includes anteed for details, they sometimes hesitate to make decisions if they feel that they don’t have enough facts. They love lists, charts, graphs and figures. Because they pay so much attention to details, they can sometime be seen as being pessimistic.

Tips for communicating with the detail person

- Make sure you are well prepared
- Have plenty of facts and figures
- Be prepared for skepticism
- Answer all of their questions
- Go relatively slow

  Give them time to think something to think about: how can the people person who loves to talk communicate better with the detail person who wants facts and figures?

Self – Check 2	Written Test

Instruction: **Answer all the questions listed below, if you have some clarifications- feel free to ask your teacher**

1. What are the following are examples of **portable methods? 5 points**

_____
_____
_____
_____
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_____
_____
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_____
_____

Instruction	LG16: Studying cause of quality deviations

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics –

- **Studying cause of quality deviations**

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 –

- Investigate and report causes of deviations from final products in accordance with workplace procedures
- Recommend suitable preventive action based on workplace *quality standards* and identified causes of deviation from specified quality standards of materials or final product

Learning Activities

1. Read the specific objectives of this Learning Guide.
2. Read the information written in the “Information Sheets 1” in pages 3-5.
3. Accomplish the “Self-check” in page 6.
4. If you earned satisfactory, proceed to “Lap Test on page 7. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Activity #1.
5. Do the “LAP test” (if you are ready) and show your output to your teacher. Your teacher will evaluate your output either satisfactory or unsatisfactory. If unsatisfactory, your teacher shall advice you on additional work. But if satisfactory you can proceed to Learning Guide 26.

❖ Your teacher will evaluate your output either satisfactory or unsatisfactory. If unsatisfactory, your teacher shall advice you on additional work. But if satisfactory you can proceed to the next topic.

Information Sheet 1	Identify faults of deviation from specified quality standards

1.1 A Standard Procedure for Quality Assurance Deviation Management

What is a Deviation?

A Deviation is a departure from standard procedures or specifications resulting in non-conforming material and/or processes or where there have been unusual or unexplained events which have the potential to impact on product quality, system integrity or personal safety.

Types of Deviations:

Following are some examples of deviations raised from different functional areas of business:

- **Production Deviation** - usually raised during the manufacture of a batch production.
- **Quality Improvement Deviation** - may be raised if a potential weakness has been identified and the implementation will require project approval.
- **Audit Deviation** - raised to flag non-conformance identified during internal, external, supplier or corporate audits.
- **Customer Service Deviation** - rose to track implementation measures related to customer complaints.
- **Technical Deviation** - can be raised for validation discrepancies. For example: changes in Manufacturing Instruction.
- **Material Complaint** - rose to document any issues with regards to non-conforming, superseded or obsolete raw materials/components, packaging or imported finished goods.
- **System Routing Deviation** - raised to track changes made to Bill of materials as a result of an Artwork change.

When to Report Deviation:

A Deviation should be raised when there is a deviation from methods or controls specified in manufacturing documents, material control documents, standard operating procedure for products and confirmed out of specification results and from the occurrence of an event and observation suggesting the existence of a real or potential quality related problems.

A deviation should be reported if a trend is noticed that requires further investigation.

All batch production deviations (planned or unintended) covering all manufacturing facilities, equipment's, operations, distribution, procedures, systems and record keeping must be reported and investigated for corrective and preventative action.

Reporting deviation is required regardless of final batch disposition. If a batch is rejected a deviation reporting is still required.

Different Levels of Deviation Risks:

For the ease of assessing risk any deviation can be classified into one of the three levels 1, 2 & 3 based on the magnitude and seriousness of a deviation.

- **Level 1: Critical Deviation**

  Deviation from Company Standards and/or current regulatory expectations that provide immediate and significant risk to product quality, patient safety or data integrity or a combination/repetition of major deficiencies that indicate a critical failure of systems

- **Level 2: Serious Deviation**

  Deviation from Company Standards and/or current regulatory expectations that provide a potentially significant risk to product quality, patient safety or data integrity or could potentially result in significant observations from a regulatory agency or a combination/repetition of "other" deficiencies that indicate a failure of system(s).

- **Level 3: Standard Deviation**

Observations of a less serious or isolated nature that are not deemed Critical or Major, but require correction or suggestions given on how to improve systems or procedures that may be compliant but would benefit from improvement (e.g. incorrect data entry).

How to Manage Reported Deviation:

The department Manager or delegate should initiate the deviation report by using a standard deviation form as soon as a deviation is found. Write a short description of the fact with a title in the table on the form and notify the Quality Assurance department within one business day to identify the investigation.

QA has to evaluate the deviation and assess the potential impact to the product quality, validation and regulatory requirement. All completed deviation investigations are to be approved by QA Manager or delegate. QA Manger has to justify wither the deviation is a Critical, Serious or Standard in nature. For a deviation of either critical or serious nature QA delegate has to arrange a Cross Functional Investigation.

For a standard type deviation, a Cross functional Investigation (CFI) is not necessary. Immediate corrective actions have to be completed before the final disposition of a batch. Final batch disposition is the responsibility of Quality Assurance Department.

Workplace Prevention and Response

- **Workplace Violence**

  Workplace violence can be any act of physical violence, threats of physical violence, harassment, pressure, or other threatening, disruptive behavior that occurs at the work site. Workplace violence can affect or involve employees, visitors, contractors, and other non-Federal employees.

- **Responsibilities**

  It is up to each employee to help make a safe workplace for all of us. The expectation is that each employee will treat all other employees, as well as customers and potential customers, with dignity and respect. You can and should expect management to care about your safety and to provide as

safe a working environment as possible by having preventive measures in place and, if necessary, by dealing immediately with threatening or potentially violent situations which occur.

- **Prevention of Workplace Violence**

  A sound prevention plan is the most important and, in the long run, the least costly portion of any agency's workplace violence program.

- **Identifying Potentially Violent Situations**

  If you ever have concerns about a situation which may turn violent, alert your supervisor immediately and follow the specific reporting procedures provided by your agency. It is better to err on the side of safety than to risk having a situation escalate.

- **Responding to Violent Incidents**

  No matter how effective agencies' policies and plans are in detecting and preventing incidents, there are no guarantees against workplace violence. Even the most responsive employers face this issue. When a violent incident does occur, it is essential the response be timely, appropriate to the situation, and carried out with the recognition that employees are traumatized and that the incident's aftermath has just begun.

- **Disclosure of Information**

  Disclosing information obtained from employees without their written consent. An exception to this prohibition however, is if an employee specifically threatens another person

Self – Check 1	Written Test

Name: _____ Date: _____

Instruction: Answer all the questions listed below, if you have some clarifications-feel free to ask your teacher.

1. What are the workplace prevention and response? 5 points

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Lo4:**Information Sheet 2**	Investigating and reporting causes of devastations from final output

2.1 Investigating and reporting causes of devastations from final output

Organizations quality standard May include:

- materials
- service
- output
- processes/procedures

Work deviation investigation and report

- Quality deviation is due to associated limits vs. specifications like:

✓ Reprocessing or Rework
✓ Unapproved changes
✓ Performing an activity without proper training
✓ Outside of operating parameters or in-process control limits
✓ Failure to follow written SOPs or approved batch record instructions
✓ Good documentation errors – missing entries, unexplained entries, improper corrections or edits to official records
✓ Environmental Monitoring over alert or action limit excursions
✓ Out of calibration
✓ Unplanned preventive maintenance or repairs to 'qualified' equipment or systems

When a deviation of internal controls is observed an investigation should be started to identify the root-causes causing the deviation. The primary aim of root-cause analysis (RCA) is to identify the root cause(s) of a problem in order to create effective corrective actions that will prevent that problem from ever occurring again. The root-cause is usually identified systematically through investigation.

Upon identification of the root cause a corrective action should be undertaken to stop the deviation. Implementing preventive actions, when possible, should

prevent occurrence of the problem again in the future. Make an *action plan* when required.

- Root Cause(s) – Thorough Investigations

✓ What vs. Why or How

- The 20: 80 (what: why/how) Rule
- Corrective Actions

✓ Batch release dependent

- Preventive Actions

✓ Batch release independent

The true purpose of a deviation investigation is to:

- Determine the root cause for the “deviation” \
- Implement appropriate and meaningful corrective actions, and
- Evaluate the implicated system (e.g., the training program) once a pattern of repeating deviations is noted.
- Batch release should be considered a separate and distinct QA function and activity! Product Impact Assessments should be done “collectively” (summation of all deviations) after an appropriate deviation investigation has been completed. All deviations must then be collectively evaluated at the time of final batch release.

Self-Check-2	Written Test

Name: _____ Date: _____

Instruction: Answer all the questions listed below, if you have some clarifications-feel free to ask your teacher.

1. List the work deviation investigation and report? 5 point

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_____

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_____

Information Sheet 3	Recommending suitable preventive actions

3.1 Recommended preventive action and quality standard

Corrective action and preventive action (CAPA, also called corrective action / preventive action) are improvements to an organization's processes taken to eliminate causes of non-conformities or other undesirable situations. CAPA is a concept within good manufacturing practice (GMP). It focuses on the systematic investigation of the root causes of non-conformities in an attempt to prevent their recurrence (for corrective action) or to prevent occurrence (for preventive action).

Corrective actions are implemented in response to customer complaints, undesired levels of internal nonconformity, nonconformities identified during an internal audit or adverse or unstable trends in product and process monitoring such as would be identified by SPC. Preventive actions are implemented in response to the identification of potential sources of non-conformity.

To ensure that corrective and preventive actions are effective, the systematic investigation of the root causes of failure is pivotal

Clearly identified sources of data which identify problems that will be investigated

- Root cause analysis to identify the cause of a discrepancy or deviation and suggest corrective actions to potentially prevent recurrence of a similar problem, or preventive action to ensure that discrepancies do not occur.
- Remedial corrections of a problem which is identified.

Implementation of Corrective & preventive actions is the path towards improvement & effectiveness of Quality Management system. Corrective actions are nothing but the action/s based on the problem identification. The problem or a non-conformance can be identified internally through staff suggestions, management reviews, document reviews or internal audits. Customer complaints / suggestions, customer rejections, non-conformities raised in customer / third party audits & recommendations by the auditors are the external sources which lead to find the ROOT CAUSE of the problem.

Self-Check 3	Written Test

Name: _____ Date: _____

Instruction: Answer all the questions listed below, if you have some clarifications-feel free to ask your teacher.

1. What are the recommended preventive action and quality standard? 5 point

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Instruction	LG17: Completing Documentation

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics: –

- ❖Recording information on quality parameters
- ❖Recording all process and outcomes

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 –

- ❖ Records Information on quality and other indicators of production performance
- ❖ Records all production processes and outcomes.

Learning Activities

1. Read the specific objectives of this Learning Guide.
2. Read the information written in the “Information Sheets 1” in pages 3-4.
3. Accomplish the “Self-check” in page 5.
4. If you earned satisfactory, proceed to “Lap Test on page 6. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Activity #1.
5. Do the “LAP test” (if you are ready) and show your output to your teacher. Your teacher will evaluate your output either satisfactory or unsatisfactory. If unsatisfactory, your teacher shall advice you on additional work. But if satisfactory you can proceed to Learning Guide 27.

- ❖ Your teacher will evaluate your output either satisfactory or unsatisfactory. If unsatisfactory, your teacher shall advice you on additional work. But if satisfactory you can proceed to the next topic

Information Sheet 1	Recording information on quality parameters

5.1 Recording information on quality parameters

Quality parameters May include:

- style/design/specifications
- durability
- service variations
- materials
- damage and imperfections

5.2 Quality Performance in Production Management

The challenge is increasing production while maintaining high quality. This process can be difficult to measure, but best way to gauge quality is to first measure it. Use key performance indicators (KPIs) to improve quality. KPIs help management to manage and measure both production and quality. Financial analysts and mangers also use KPIs as a measure of productivity.

- ❖ Identify the three most important processes in production. Examples include inventory purchases, assembly, distribution and accounts payable.
- ❖ Map out each process on a flow chart diagram. Start with first step in each process and end with the last step. This helps all parties involved in the process to visualize the process as well as where possible errors in production may occur.
- ❖ Identify the best way to manage production for each process. For instance, assembly can be managed with the number of items produced and distribution can be managed by the total number of items delivered.
- ❖ Define what an error or issue is within the process. For instance, for assembly, measure the number of errors or mistakes by determining how many of the total device being produced did not work or were permanent. For distribution, you could determine the number of errors by monitoring on-time delivery. The error depends on the process and your firm's definition of

quality.

Assign a quality metric to each production process. Combine Step 3 and 4. For instance, for assembly, one metric can be the number of products assembled incorrectly or the number of malfunctions. For distribution, the metric can be the number of on-time deliveries. Again, the metric depends on what's most important for your organization

5.3 Production process

The production process is concerned with transforming a range of inputs into those outputs that are required by the market.

The transforming resources include the buildings, machinery, computers, and people that carry out the transforming processes. The transformed resources are the raw materials and components that are transformed into end products.

Any production process involves a series of links in a production chain. At each stage value is added in the course of production. Adding value involves making a product more desirable to a consumer so that they will pay more for it. Adding value therefore is not just about manufacturing, but includes the marketing process including advertising, promotion and distribution that make the final product more desirable.

It is very important for businesses to identify the processes that add value, so that they can enhance these processes to the ongoing benefit of the business.

Types of process

There are three main types of process: **job, batch and flow production**.

- **Job production**

Job or \'make complete\' production is the creation of single items by either one operative or a team of operative\'s. Job production is unique in the fact that the project is considered to be a single operation, which requires the complete attention of the operative before he or she passes on to the next job. Examples from the service industries include cutting

hair, and processing a customer's\' order in a store.

- **Batch production**

The term batch refers to a specific group of components, which go through a production process together. As one batch finishes, the next one starts. For example, on Monday, Machine A produces a type 1 engine part, on Tuesday it produces a type 2 engine part, on Wednesday a type 3 and so on. All engine parts will then go forward to the final assembly of different categories of engine parts.

- **Flow production**

  Batch production is described as \'intermittent\' production and is characterized by irregularity. If the rest period in batch production disappeared it would then become flow production. Flow production is therefore a continuous process of parts and sub-assemblies passing on from one stage to another until completion.

Self – Check- 1	Written Test

Name: _____ Date: _____

Instruction: Answer all the questions listed below, if you have some clarifications- feel free to ask your teacher.

1. Explain the there are three main types of process? 10 points

_____

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_____

Information Sheet 2	Recording all process and outcomes

5.1 What is technical Documentation?

Technical documentation is a process that relies on good quality assurance practices, and quality assurance practices rely on good technical documentation. An understanding of the

standards for your industry and your organisation will be essential to your success.

Technical documents use facts, proof and evidence and are designed for use by technicians; be they systems analysts, statisticians, designers, programmers, economists, stockbrokers or building surveyors, to name just some specialist areas that require technical documentation.

Technical documents are more than just user documents. They present specific information and know-how needed to develop, produce, maintain or use a form of technology. Technical documentation can be in the form of models, prototypes, drawings, sketches, diagrams, blueprints, manuals or software, or presented as training or technical services.

5.2 The principles of good documentation

Good technical documentation clearly conveys its subject matter without errors or ambiguity, and by being easily and quickly comprehended it meets the demands of technical readers.

While specialist terms are necessary, plain English makes technical writing easier to read, and glossaries can help explain terms. Unexplained or overused argon is a common fault of technical writing.

Many technicians, understandably, develop the bad habit of using overly-specialist terms or jargon that no one else understands. While some terms are needed, jargon can mask meaning and make technical writing dense with nouns. Much of the jargon used in this way is picked up in the first place from poorly written documents.

Table 1: **Features and characteristics of a good document**

	Details
Contents listings	Show the user at a glance the overall contents and structure of the document. In text documents this could be a table of contents, or can also be supported by an index in longer documents, especially if the users might need to find specialist topics or sub-topics not listed in a table of contents.
Stated purpose	If the purpose of the items is provided a user can quickly start accessing what they need.
Navigation tools	A well-developed system of navigation includes features such as colour coding, table of contents, dividers, drop-down menus and icons and indexes.
Accurate	It should contain factual and correct information.
Accessible	In structure, it should include headings, subheadings, indexes and table of contents, etc. The language should also be clear and without unexplained jargon; if necessary, glossaries should be included to explain jargon and to spell out acronyms.
Clear	It should be easily understood by the intended audience without ambiguity in meanings.
Coherent	It should cohere through the logical association of all the parts to each other.
Concise	It should be concise in that it should contain only relevant information
Complete and comprehensive	It should be completeall aspects of the aim have been addressed, and comprehensive in that it should have all information on the subject.
Consistent	It must be consistent in the manner of style, format and presentation, including in the use of terms and spellings etc.
Objective	The writer must be impartial and not introduce personal opinions.

5.3 COMMON FAULTS IN TECHNICAL DOCUMENTATION

Table 1 could be used as a checklist against which documents are planned, as the basic requirements for good documentation. Table 2 on the next page lists common faults that would need to be remedied or corrected if found in drafts of documents or documents already produced and being reviewed.

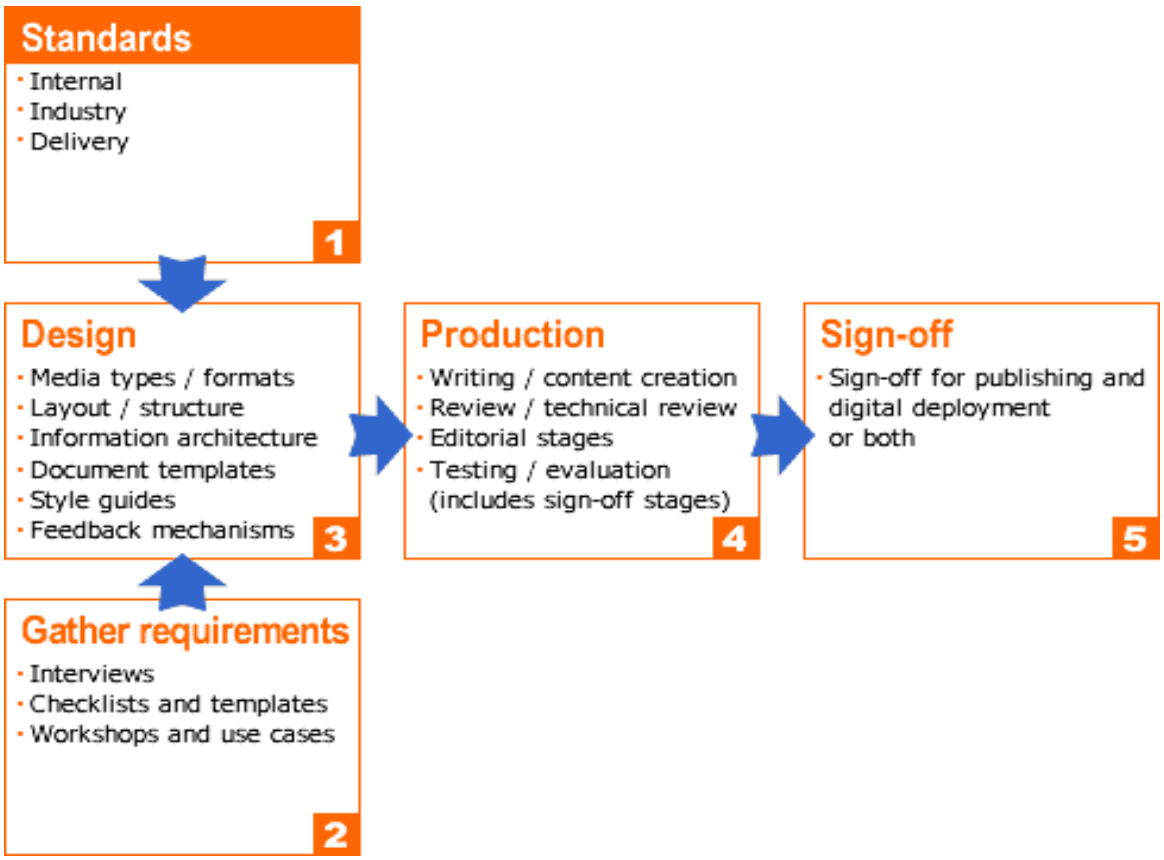
Table 2: Documentation review—checklist

Attribute that needs to be corrected or improved	Yes	No
Poorly stated objectives and or purpose		
Inappropriate physical structure and layout		
Inadequate explanations and descriptions		
Difficult language		
Costly methods, processes and production		
Poor quality of pictorial and written text		
Mismatch between the user's information requirements and the documents technical content		
Lack of instructional information in tutorials		
Careless use of fonts and page design		

Standards

Good technical documentation is written and structured within a framework of specific standards. Documentation standards provide guidelines for producing documents as well as for their reproduction or delivery to users.

Figure 1 below illustrates how standards are an essential starting point for creating technical documentation and are applied to the design of documents and their later development and production. Standards also apply to client sign-off on technical documentation.


Standards
Internal
Industry
Delivery
1
Design
Media types / formats
Layout / structure
Information architecture
Document templates
Style guides
Feedback mechanisms
3
Production
Writing / content creation
Review / technical review
Editorial stages
Testing / evaluation (includes sign-off stages)
4
Sign-off
Sign-off for publishing and digital deployment or both
5
Gather requirements
Interviews
Checklists and templates
Workshops and use cases
2

Self – Check-3	Written Test

Name: _____ Date: _____

Instruction: Answer all the questions listed below, if you have some clarifications-feel free to ask your teacher.

1. What are the features and characteristics of a good document? 10 points

_____

_____

_____

_____

_____

_____

_____

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