


LEARNER GUIDE



Sakhisizwe Cc

Preventative Maintenance

Unit Standard 114636

NQF Level 3 Credits 6

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PERSONAL INFORMATION

NAME	
CONTACT ADDRESS	
Code	
Telephone (H)	
Telephone (W)	
Cellular	
Learner Number	
Identity Number	

EMPLOYER	
EMPLOYER CONTACT ADDRESS	
Code	
Supervisor Name	
Supervisor Contact Address	
Code	
Telephone (H)	
Telephone (W)	
Cellular	

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INTRODUCTION

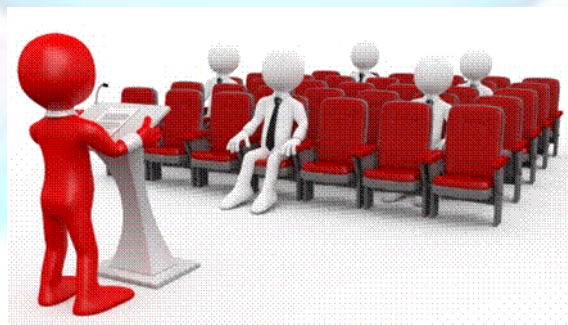
Welcome to the learning programme

Follow along in the guide as the training practitioner takes you through the material. Make notes and sketches that will help you to understand and remember what you have learnt. Take notes and share information with your colleagues. Important and relevant information and skills are transferred by sharing!



This learning programme is divided into sections. Each section is preceded by a description of the required outcomes and assessment criteria as contained in the unit standards specified by the South African Qualifications Authority. These descriptions will define what you have to know and be able to do in order to be awarded the credits attached to this learning programme. These credits are regarded as building blocks towards achieving a National Qualification upon successful assessment and can never be taken away from you!

Programme methodology



The programme methodology includes facilitator presentations, readings, individual activities, group discussions and skill application exercises.

Know what you want to get out of the programme from the beginning and start applying your new skills immediately. Participate as much as possible so that the learning will be interactive and stimulating.

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The following principles were applied in designing the course:

- Because the course is designed to maximise interactive learning, you are encouraged and required to participate fully during the group exercises
- As a learner you will be presented with numerous problems and will be required to fully apply your mind to finding solutions to problems before being presented with the course presenter's solutions to the problems
- Through participation and interaction the learners can learn as much from each other as they do from the course presenter
- Although learners attending the course may have varied degrees of experience in the subject matter, the course is designed to ensure that all delegates complete the course with the same level of understanding
- Because reflection forms an important component of adult learning, some learning resources will be followed by a self-assessment which is designed so that the learner will reflect on the material just completed.

This approach to course construction will ensure that learners first apply their minds to finding solutions to problems before the answers are provided, which will then maximise the learning process which is further strengthened by reflecting on the material covered by means of the self-assessments.


Different role players in delivery process

- Learner
- Facilitator
- Assessor
- Moderator

What Learning Material you should have


This learning material has also been designed to provide the learner with a comprehensive reference guide.

It is important that you take responsibility for your own learning process; this includes taking care of your learner material. You should at all times have the following material with you:

Learner Guide 	<p>This learner guide is your valuable possession:</p> <p>This is your textbook and reference material, which provides you with all the information you will require to meet the exit level outcomes.</p> <p>During contact sessions, your facilitator will use this guide and will facilitate the learning process. During contact sessions a variety of activities will assist you to</p>
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	<p>gain knowledge and skills.</p> <p>Follow along in the guide as the training practitioner takes you through the material. Make notes and sketches that will help you to understand and remember what you have learnt. Take and share information with your colleagues. Important and relevant information and skills are transferred by sharing!</p> <p>This learning programme is divided into sections. Each section is preceded by a description of the required outcomes and assessment criteria as contained in the unit standards specified by the South African Qualifications Authority. These descriptions will define what you have to know and be able to do in order to be awarded the credits attached to this learning programme. These credits are regarded as building blocks towards achieving a National Qualification upon successful assessment and can never be taken away from you!</p>
<p>Formative Assessment</p>  <p>Workbook</p>	<p>The Formative Assessment Workbook supports the Learner Guide and assists you in applying what you have learnt.</p> <p>The formative assessment workbook contains classroom activities that you have to complete in the classroom, during contact sessions either in groups or individually.</p> <p>You are required to complete all activities in the Formative Assessment Workbook.</p> <p>The facilitator will assist, lead and coach you through the process.</p> <p>These activities ensure that you understand the content of the material and that you get an opportunity to test your understanding.</p>

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Different types of activities you can expect

To accommodate your learning preferences, a variety of different types of activities are included in the formative and summative assessments. They will assist you to achieve the outcomes (correct results) and should guide you through the learning process, making learning a positive and pleasant experience.



The table below provides you with more information related to the types of activities.

Types of Activities	Description	Purpose
Knowledge Activities 	You are required to complete these activities on your own.	These activities normally test your understanding and ability to apply the information.
Skills Application Activities 	You need to complete these activities in the workplace	These activities require you to apply the knowledge and skills gained in the workplace
Natural Occurring Evidence 	You need to collect information and samples of documents from the workplace.	These activities ensure you get the opportunity to learn from experts in the industry. Collecting examples demonstrates how to implement knowledge and skills in a practical way

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Learner Administration



Attendance Register

You are required to sign the Attendance Register every day you attend training sessions facilitated by a facilitator.

Programme Evaluation Form

On completion you will be supplied with a "Learning programme Evaluation Form". You are required to evaluate your experience in attending the programme.

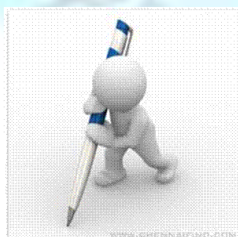
Please complete the form at the end of the programme, as this will assist us in improving our service and programme material. Your assistance is highly appreciated.

Assessments

The only way to establish whether a learner is competent and has accomplished the specific outcomes is through the assessment process. Assessment involves collecting and interpreting evidence about the learners' ability to perform a task.

To qualify and receive credits towards your qualification, a registered Assessor will conduct an evaluation and assessment of your portfolio of evidence and competency.

This programme has been aligned to registered unit standards. You will be assessed against the outcomes as stipulated in the unit standard by completing assessments and by compiling a portfolio of evidence that provides proof of your ability to apply the learning to your work situation.



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How will Assessments commence?

Formative Assessments

The assessment process is easy to follow. You will be guided by the Facilitator. Your responsibility is to complete all the activities in the Formative Assessment Workbook and submit it to your facilitator.

Summative Assessments

You will be required to complete a series of summative assessments. The Summative Assessment Guide will assist you in identifying the evidence required for final assessment purposes. You will be required to complete these activities on your own time, using real life projects in your workplace or business environment in preparing evidence for your Portfolio of Evidence. Your Facilitator will provide more details in this regard.

To qualify and receive credits towards your qualification, a registered Assessor will conduct an evaluation and assessment of your portfolio of evidence and competency.

Learner Support

The responsibility of learning rests with you, so be proactive and ask questions and seek assistance and help from your facilitator, if required.



Please remember that this Skills Programme is based on outcomes based education principles which implies the following:

- You are responsible for your own learning – make sure you manage your study, research and workplace time effectively.
- Learning activities are learner driven – make sure you use the Learner Guide and Formative Assessment Workbook in the manner intended, and are familiar with the workplace requirements.
- The Facilitator is there to reasonably assist you during contact, practical and workplace time for this programme – make sure that you have his/her contact details.

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- You are responsible for the safekeeping of your completed Formative Assessment Workbook and Workplace Guide
- If you need assistance please contact your facilitator who will gladly assist you.
- If you have any special needs please inform the facilitator



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Learner Expectations

Please prepare the following information. You will then be asked to introduce yourself to the instructor as well as your fellow learners



Your name:
The organisation you represent:
Your position in organisation:
What do you hope to achieve by attending this course / what are your course expectations?

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PREVENTATIVE MAINTENANCE

UNIT STANDARD 114636

Unit Standard Title

Demonstrate an understanding of preventative maintenance, environmental and safety issues in a computer environment

NQF Level

3

Credits

6

Purpose

This unit standard is designed to provide credits towards health and safety in the work environment, specifically applicable to the computer industry.

The performance of all elements is to a standard that allows for further learning in this area.

Learning assumed to be in place

The credit value is based on the assumption that people starting to learn towards this unit standard are:

- Competent in Communications Literacy at NQF level 2
- Able to describe basic concepts of Electrostatic Discharge (ESD)
- Able to describe basic concepts of electricity
- Able to identify basic computer components

Unit standard range

This unit standard covers: The health and safety requirements related to the computer environment. More detailed range statements are provided for specific outcomes and assessment criteria as needed.

Specific Outcomes and Assessment Criteria

Specific Outcome 1: Demonstrate an understanding of the use of preventive maintenance measures and procedures.

Assessment Criteria

1. The demonstration identifies the causes of computer hardware maintenance.
2. The demonstration covers preventive measure for the causes of computer hardware maintenance.

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Specific Outcome 2: Demonstrate an understanding of the use of safety measures and procedures.

Assessment Criteria

1. The demonstration explains safety measure for different types of fires and which applies to computer environments.
2. The demonstration covers potential hazards and safety procedures relating to the computer environment.
3. The demonstration cover Electrostatic Discharge (ESD) and precautions for it.

Specific Outcome 3: Explain environmental protection measures and procedures of a computer-working environment.

Assessment Criteria

1. The explanation covers handling of computer components.
2. The explanation covers handling of computer peripheral components.

Unit Standard Essential Embedded Knowledge

The following essential embedded knowledge will be assessed through assessment of the specific outcomes in terms of the stipulated assessment criteria. Candidates are unlikely to achieve all the specific outcomes, to the standards described in the assessment criteria, without knowledge of the listed embedded knowledge. This means that the possession or lack of the knowledge can be inferred directly from the quality of the candidate’s performance against the standards.

- The different hardware components of a computer, and their basic functioning
- Peripherals used in a computer environment.

Critical Cross-field Outcomes (CCFO)

- **Unit Standard CCFO Identifying:** Identify hazards, plan contingencies and identify solutions to hazardous situations.
- **Unit Standard CCFO Collecting:** Gather, organise and interpret health and safety information.
- **Unit Standard CCFO Science:** Use scientific solutions to problems, like rubber maps, grounding wrist strap etc.
- **Unit Standard CCFO Contributing:** Being aware of the potential environmental hazards of computer and computer-related equipment.

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PREVENTIVE MAINTENANCE MEASURES AND PROCEDURES

Outcome

Demonstrate an understanding of the use of preventive maintenance measures and procedures

Assessment criteria

- Identify the causes of computer hardware maintenance problems.
- Identify preventive measures for the causes of computer hardware maintenance.



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Computer Hardware Problems

In this section we will look at the preventative measures to stop computers from over heating, dust build up, Electrical Spikes, and thermal creep.

Overheating

To prevent a computer from over heating, you should make sure that you have a proper fan in your computer.

It is also very important that your computer does not stand in such a way that the ventilation holes are not open. For example, it's not a good idea to throw a blanket or cloth over the computer, because it will then most probably overheat. Air has to be able to move in and out the computer box freely.

The room should preferably be well ventilated as well. If a computer overheats it will switch off automatically. The procedure to follow when a computer overheats and hasn't switched off automatically, would be to switch It off as soon as you realize that it is overheating. Once it is switched off you could remove the cover to allow some extra ventilation.

Dust

To prevent dust from entering your computer it is best to keep the area around your computer clean, but it is virtually impossible to keep dust out of your computer. To get dust that has already accumulated out of your computer, you have to take the cover off and use a machine that works like a vacuum cleaner to blow the dust out carefully.

Don't knock it hard against the compartments inside the computer, you could break something.

Electrical spikes

Every day, destructive electrical spikes and surges caused by lightning or industrial and construction accidents involving utility poles pass through the electrical lines and into your home. Once inside, these high-voltage spikes can cause damage to electronics found in your house, like PC's, garage door openers, microwave ovens and more. Anything you own that has a microchip is susceptible to damage. In the next section we will look at what you can do to prevent this.

Thermal Creep

Thermal creep is mainly found in older computer systems. Thermal creep happens when objects heat up and expand and then cool down and contract. This expansion and contraction leads to objects moving out of place. Chip creep is one form of thermal creep.

Chip creep refers to the problem of chips that, over time, work their way out of the socket. Chip creep occurs due to thermal expansion; the contracting and expanding during system heat up and cool down. While chip creep was most common with older

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memory modules it was a problem with other main chips that were inserted into sockets.

To fix chip creep, users of older systems would often have to remove the case cover and push the loose chip back into the socket. Today's systems are not affected so much by chip creep since chips are mainly soldered into place or are more securely held by various types of retainer clips.

Preventive Measures

To prevent damage to your hardware, you will have to look at ventilation, liquid cleaning compounds and UPS

Ventilation

As we have seen in the previous section, ventilation is very important for your computer. A computer should run at an average temperature of 30-40 degrees Celsius. When your computer does overheat, it will switch off, but if it doesn't your motherboard could melt. So you can see why it is very important to keep your computer as cool as possible.

When you purchase your computer see to it that your computer has a proper CPU fan. This fan and free moving ventilation is the only thing between a healthy and a melted motherboard.

Formative Assessment

- Go to a vendor and make a list of at least the best or top three CPU fans available on the market at the moment. Include the prices and compare your results in terms of prices and brands with your peers.
- Also find out how computer shops blow out the dust in computers. Make a note of the machine they use, what it is called and what it costs.

Liquid Cleaning Compounds

It is not a good idea to clean your computer with water. You should rather use something like spirits or pure alcohol. Something that evaporates fast would be the best to use for cleaning your computer. Do not use a lot at a time, just use a "dab" at a time.

Work carefully with the compartments inside the computer.

The reason for not using water or a lot of liquid at a time is because there is electricity in your computer, and if it is still wet when you switch it on again it will malfunction. This poses the danger of you getting an electrical shock, your computer components could break and you could lose all your data.

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Note Never clean your computer on the inside while it is still switched on. Switch it of and unplug it!

SPS and UPS

In the previous section we looked at Electrical spikes a little bit. To prevent damage to your computer by electrical spikes, you need to get a UPS (uninterrupted power supply)

A UPS also helps you to prevent loss of data when there is a drop in electricity flow (a sag). A sag is a momentary drop in voltage, lasting only a few milliseconds. Usually, you can't even tell one has occurred. Your house lights wont dim or flicker (well, actually they, will but too fast for you to notice.) But your computer will react strangely to this sudden drop in power. Have you ever been on the "up" side of a seesaw and had someone jump off the other end? Your computer will experience he same kind of disorientation when the power drops immediately to a lower voltage. A computer's normal response to this kind of "disorientation" is to reboot itself.

You've probably experienced one of the other two power under-voltage problems: brownouts and blackouts.

A **brownout** occurs when voltage drops below 110 volts for a second or more. Brownouts are typically caused by an immediate increase in power consumption in your area and the lag time it takes for your power provider to respond by increasing production. You might notice when brownouts occur, because the lights in your home will dim, but not go out, then go back to full brightness a second or two later. You might also notice because your computer will reboot or the screen will flicker.

Everyone has experienced a **blackout**. A blackout occurs when the power drops from 110 volts to zero volts in a very short period of time. It is a complete loss of power for anywhere from a few seconds to several minutes. They are typically caused by a power failure somewhere in your area. Sometimes there are backup systems available, but is may take anywhere from a couple of seconds to several minutes to make power available in your area again.

There are two different hardware solutions to power under- and over-voltage: the SPS and the UPS. They each take a different approach to keeping the power at 110V. In both cases you plug the units into the wall, then plug your computer equipment into the SPS or UPS.

Let's look at SPS first. SPS stands for **Standby Power Supply**. It's called that because there is a battery waiting to take overproduction in case of a loss of line voltage. The SPS contains sensors which constantly monitor the line voltage and a battery with a step-up transformer. While conditions are normal, the line voltage charges the internal battery. When the line voltage drops below a preset threshold (also called a cutover threshold - i.e., 105V), the sensors detect that and switch the power from the wall to the internal battery. When the power comes back above the threshold, the sensors detect the restoration of power and switch the power source back to the line voltage.

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The main problem with SPS's is that they take a few milliseconds to switch to the battery. During those few milliseconds, there is NO voltage to the computer. This lack of voltage can cause reboots or crashes (rather like a brownout). An SPS is great against blackouts, but it does little for brownouts and sags.

The better choice for over or under voltage problems would be the Uninterruptible Power Supply or UPS. The UPS works similarly to an SPS, but with one important difference. The computer equipment is always running off the battery. While the line voltage is normal, the battery gets charged. When power fluctuates, only the charging circuit is affected. The battery continues to provide uninterrupted power to the equipment. Because the equipment is constantly operating off the battery, the UPS also acts as a kind of line conditioner.

There is one main problem with UPS's, however – the quality of power they provide. Batteries provide DC power, and computer power supplies run on AC power. Inside the UPS is a power inverter that converts the DC into AC. However, it isn't perfect. AC power produces 60Hz sine waveform, whereas the inverter produces a square wave.

A computer's power supply will accept these square waveforms, but it doesn't like them. Even though this problem exists, UPS manufacturers are using more sensitive inverters that can more closely approximate the sine wave. So a UPS should be used with every piece of computer equipment where data loss would be a problem. (in other words, almost every piece of computer equipment).



This is what a UPS looks like.

Formative Assessment

- Explain the difference between a UPS and an SPS.
- What are the advantages of a UPS?
- What are the disadvantages of a UPS?

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- What are the advantages of an SPS?
- What are the disadvantages of an SPS?
- Go to a vendor and find out what an SPS costs and what a UPS costs.
- How many PC's can be connected to an SPS?
- How many PC's can be connected to a UPS?
- Which one would you recommend to a client? Motivate your answer.



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Different Types Of Fires

In this section we will take a look at the types of fires there are, and the methods you should use to extinguish them. In the table below you can see exactly what you should use for which type of fire.

Type A fire

would be your typical house fire, or even in a normal admin office.

Type B fire

would be a fire caused by either a liquid form like turpentine, oil, petrol and other solvents like spirits.

Type C fire

Is caused by gas and is more dangerous because you can't control where the gas is going. It is typically the type of gas like EasiGas that we use for a gas stove and is **VERY** flammable. You would definitely need Fire Brigade assistance for this type of fire to stop the flow of gas as soon as possible.

Type D fire

would be some metal like Magnesium 300 degrees. It is not advisable to throw anything on a fire like this. Rather get the Fire Brigade to help you, and tell them what type of fire it is when you call for help so they know what equipment to bring to contain and extinguish the fire.

Another example of a metal fire is phosphor. Phosphor explodes when it is exposed to oxygen and water.

Type E fire

is most likely the type of fire you will find with computers. Or rather hope you never do. If a computer is on fire, there won't be much to save, but it still needs to be extinguished. These fires most commonly occur because of a short in the electricity circuit.

Do not touch any part of the computer, especially metal parts that could relay the electricity to you and shock you, or touch any of the electrical wires.

DO NOT throw water on it either. Water also relays electricity and will make the fire worse. If you do not have a carbon dioxide or dry chemical extinguisher, either in the office or at home where the fire as occurred, get the fire brigade to come and extinguish the fire.

If the electricity has not shorted and the mains switched off by itself, switch the electricity off at the main switch board, whilst wearing rubber gloves and shoes with rubber soles.

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FIRE TYPES AND EXTINGUISHERS		
Class	Category	Extinguisher
A	Carbonaceous, wood, paper, linen etc	Water type extinguisher
B	Liquid, oil, petrol, solvents etc	Foam type extinguisher
C	Flammable gases	Fire brigade assistance
D	Flammable metals	Fire brigade assistance or dry powder extinguisher (different dry powder extinguishers are available for different metals)
E	Electrical	Carbon dioxide or dry chemical extinguisher

Formative Assessment

Contact the fire brigade and find out what the standard procedure is that you should follow in the case of a fire in an office that has at least 15 computers in it. Summarise your findings. Share your results with your peers.

Potential Hazards And Safety Procedures

A computer power supply runs on 230volts. This is a lot of electricity and you should be careful around it. When handling a power supply you should always ensure that the plug at the wall is turned off and removed.

It is very hard to actually repair a **power supply** because access to the inside of the power supply is limited and you need to be a skilled electrician to be able to fix it. If you try to do it yourself, you might run the risk of not doing it correctly and run the risk of burning out your computer and injuring yourself as well. It is therefore better to just replace a broken power supply.

A **screen** also has a lot of electricity running through it, and should also be handled with extreme care when it is opened. Make sure that the whole computer is switched off and plugged out, since a lot of screens run their power supply through the computer itself.

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Electrostatic Discharge (ESD) And Precautions

ESD

ESD stands for **electrostatic discharge**. ESD happens when two objects of dissimilar (different) charge come in contact with one another. The two objects exchange electrons in order to standardise the electrostatic charge between the two objects. This charge can, and often does, damage electronic components.

The likelihood that a component will be damaged increases with the increasing use of Complementary Metal Oxide Semiconductors (**CMOS**) chips, because these chips contain a thin metal oxide layer that is hypersensitive to ESD.

The previous generation's Transistor-Transistor Logic (TTL) chips are actually more robust than the newer CMOS chips since they don't contain this metal oxide layer. Since most of today's ICs are CMOS chips, there is more of a concern with ESD.

When you shuffle your feet across the floor and shock your friend on the ear, you are discharging static electricity into the ear of your friend. The lowest static voltage transfer that you can feel is around 3000 volts (it doesn't electrocute you because there is extremely little current). A static transfer that you can see is at least 10,000 volts. You can easily generate around 20,000 volts simply by dragging your smooth-soled shoes across a shag carpet in the winter. (Actually it doesn't have to be winter to run this danger. It can occur in any room with very low humidity. It's just that heated rooms in the winter are generally of low humidity)

It would make sense that these thousands of volts would damage computer components. However, a component can be damaged with as little as 80 volts! That means, if your body has a small charge built up in it, you could damage a component without even realizing it.

Anti-Static Wrist Strap

An ESD strap works by attaching one end to an earth ground (typically the ground pin on an extension cord) and the other end is wrapped around your wrist. This strap grounds your body and keeps it at a zero charge.

Tip An ESD strap is a specially designed device to bleed electrical charges away safely. It uses a 1-megaohm resistor to bleed the charge away slowly. A simple wire wrapped around your wrist will not work correctly, and could electrocute you!

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Warning There is only one situation where you should not wear an ESD strap. If you wear one while working on the inside of a monitor, you increase the chance of getting a lethal shock.



ESD Static Mats

It is possible for a device to be



damaged by simply laying it on a bench top. For this reason, you should have an ESD mat in addition to an ESD strap. This mat drains excess charge away from any item coming in contact with it. ESD mats are also sold as mouse/keyboard pads to prevent ESD charges from interfering with the operation of the computer. ESD charges can cause a computer to hang, reboot or generally cause problems.



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If an ESD stap or mat is not available, it is possible to discharge excess static voltage by touching any metal case of the power supply. However, the power supply **must be plugged into a properly grounded outlet** for this to work as intended. Because it's plugged in, extra caution should be taken so that you don't get electrocuted. Also, continous contact should be maintained to continuously drain excess charge away. As you can see, it would be easier to have an anti-static wrist strap.

Formative Assessment

- Do reseach on why it would be important to wear goggles while you are working on a computer. Write a report on it and share it with your peers.
- Explain what an anti-static wrist strap is.
- Why should you wear an anti-static wrist strap?
- Why is it important to use an ESD mat when working with electronic equipment?
- Should you weat an ESD wrist strap when working on the monitor of a computer? Motivate your answer.



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ENVIRONMENTAL PROTECTION MEASURES

Outcome

Explain environmental protection measures and procedures of a computer-working environment.

Assessment criteria

- Explain the handling of computer components
- Explain the handling of computer peripheral components



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Handling Computer Components

There are some components in a computer that needs to be handled with care, for instance the CPU battery. If you do not take the battery out carefully, you run a definite risk of breaking the casing and then the battery will never fit properly again.

The battery is an important part of the PC because when the computer is switched of, the battery runs the computer BIOS, which is responsible for the firmware of your computer. **Firmware** is software that is preinstalled on the computer. One of the functions of firmware is to ensure that all the components on the motherboard works properly, so you can see how important such a little battery is.

The handling of screens would vary depending on the type of screen. If you are working with an LCD screen it is NOT advisable to open the screen. An LCD screen contains millions of liquid crystals, therefore the name Liquid Crystal Display. If you open the screen the wrong way, the crystals will fall out and your screen is then rendered useless. However, if you do decide to open the screen yourself, you should also make very sure that there is absolutely no electricity connected to either the computer or laptop.

Before you attempt to perform any one of the above mentioned, it would be a really great idea to read the manufacturer instruction manual, that will most probably tell you to rather hand the product in at a authorised dealer who knows exactly how the product works.

Formative Assessment

- Get an old motherboard in the classroom, and take turns to carefully remove and replace the CPU battery.
- What is the purpose of firmware?
- What is the purpose of the CPU battery?
- Why should you not open an LCD screen?

Handling Computer Peripheral Components

Printer toner cartridges.

- It is never be a good idea to let a toner cartridge lie in the sun. the sun in our country is very harsh and will damage most things, including your skin, furniture, computer equipment, photographic equipment, music CD's, food and just about everything you can think of.
- Printer toner cartridges should also not be shaken or set alight.



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Just as with ink cartridges, always buy the exact model recommended from the manufacturer. The reason for that is just as with ink cartridges, the toner cartridge has been designed specifically for a particular model.

Additionally, never refill toner cartridges, for the same reasons we don't recommend refilling ink cartridges. The quality is poor and, besides the fact that you're just refilling the toner means you're not replacing the photosensitive drum (which is usually inside the cartridge) and if it not replaced could lead to you having to replace the entire drum.

Chemical Solvents And Cans

Chemical solvents such as spirits or alcohol used to clean PC's should always be handled with care. Do not smoke or light a match near them or use them near an open flame as they are highly flammable and can cause a huge fire in a matter of seconds.

Some of these solvents are also strong and can damage the skin on your hands. If you are going to work with any of these for a period of time, wear gloves.

Use chemical solvents in a properly ventilated area, as the fumes given off by these products can affect your body.

When you have taken the amount you need of the solvent, immediately close the container and put it in a safe place. Do not leave it open, as it can fall over, spill and create all sorts of hazards such as damage to equipment, fire, etc. Do not EVER leave any kind of chemical solvent in a place where small children can get hold of it. Small children are inclined to put everything in their mouths and some of these solvents will burn the inside of a human's body. Believe me, you do not want to see a small child dying in agony just because you left a hazardous substance in a place where they can find it.



ALWAYS read the manufacturer's instructions on the product. These instructions are there for a purpose: so that you do not cause damage to yourself or the environment.

Cans containing cleaning material and other chemical compounds such as paint, should also be handled with care.

Do not puncture the can, as the contents are put into the can under pressure. When you puncture the can, it will explode in your face.

Also do not use a can near a fire or an open flame, do not light a match or a lighter near a can. The contents are flammable and can start a big fire.

Do not spray the contents of a can on someone else, often the contents of the can are damaging to the eyes, nose, throat and even skin of people.

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Formative Assessment

- Find a toner cartridge manufacturer instruction manual, read through it and summarise the recommended directions for use. Remember to include reasons for not using cheaper options in your summary.
- Read the instructions on a bottle of spirits. Summarise the instructions in your own words, making sure that you indicate how the product should be used and how it should not be used. Also give an explanation of why the product should not be used in certain ways.



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