Personal protective equipment (PPE) is essential for hazardous workplaces. What do your workers need to keep them safe? Here's a list of items you might need to supply:

1. Head protection

To avoid head injuries from falling objects, knocking heads when working in small spaces and electric shock during electrical work, safety helmets and hard hats should be provided. A set of spares should also be available for any visitors and to replace any damaged helmets.

2. Eye protection

Protecting workers' eyes from airborne dust and debris, when working with chemicals or from sparks when welding, safety goggles are essential. Over glasses should be available for employees who wear spectacles.

3. Hand protection

A variety of gloves made from different substances are available to enable workers to perform tasks without the risk of injury to their hands. They protect from chemical hazards, heat and burns, cuts and scrapes and injury from machinery. They range from thin latex which still allows for delicate work to thick gloves made from heavy materials which would be suitable for work which doesn't require much dexterity.

4. Foot protection

Work boots, steel capped boots, anti-slip footwear and gum boots can all prevent injury to feet from heavy or sharp objects, corrosive or irritating substances, electric shock during electrical work and falls.

5. Hearing protection

Loud noises can damage hearing, especially when exposure is sustained. Protective devices include ear plugs and ear muffs. Ear Muffs is very easy to fit, but they tend to offer less protection than ear plugs as they sit over the ears rather than directly in the ear canal thereby blocking less sound. Ear muffs can also be hot and uncomfortable meaning workers remove them.

6. Face protection

When working with chemicals, molten metal and potential impact hazards, facial protection with a brow guard or visor is advisable.

7. Respiratory protection

Airborne dust and debris is not only a danger to eyes but can damage the lungs when inhaled as well. Airborne solvents and chemical fumes are also hazardous. To prevent respiratory issues, disposable respirators, half and full-face masks and respiratory helmets are available.

Each industry has specific PPE requirements around their environment. Safety Works has done their homework and categorized products by specific “industry solutions” for all-round wearer protection. These industry solutions allow you to purchase an entire head-to-toe PPE outfit to ensure your employees’ safety in the workplace.

• **KT0202 Chemicals**

Tips for working safely around chemicals

You need to protect any employee who is exposed to hazardous chemicals by following the Occupational Safety and Health Administration (OSHA)’s Hazard Communication Standard (HCS). These tips can help you to meet the standard and protect employees.

1 Learn the hazard communication standard

The HCS uses the United Nations’ Globally Harmonized System of Classification and Labeling of Chemicals (GHS). This system puts chemicals into health and physical hazards categories. This helps employees quickly understand a chemical’s dangers.

2 Train employees about chemical hazards

Employers must train employees about any chemical hazards that might be in their work areas before employees start work and whenever there is a new hazard. They must also train employees in a way and in a language they can understand. Employers must tell employees about:

how to spot hazardous chemicals,

the personal protections in place,

who to contact with a problem

what information is on labels and safety data sheets (SDSs), and

how to get access to the sheets.

3 Provide safety data sheets (SDSs)

The sheets should be in a standard 16-section format. They should give details about each hazardous chemical in the workplace. Employees should have easy access to SDSs, either in their work area or electronically.

4 Label all containers of hazardous chemicals

Employers must make sure all containers are clearly labeled with at least a product identifier and general information about a chemical’s hazards. Makers and importers of chemicals have to provide a label showing a signal word, pictogram, and statement for each hazard class and category. Employees must have access to complete information about a chemical's hazards.

5 Create a written hazard communication program

A written hazard communication program will state how you will handle hazard communication in your workplace. It will also list all the hazards in each work area. OSHA recommends using the product identifier to make it easier to track the status of SDSs and labels for hazardous chemicals.

• **KT0203 Cables**

SAFETY TIPS FOR WORKING WITH ELECTRICAL WIRES

Top of Form

Bottom of Form

International Enviroguard

Living in the modern age means that we rely heavily on electricity. Electric power is vital for everything from computers and servers to lights and printers. Job sites rely on electricity to run heavy machinery and power various operational systems. However, while electricity is so valuable, it's also dangerous. When workers are exposed to hazardous electric sources, they can get seriously injured and even die.

Because of the dangers involved, it's imperative to understand how to keep employees safe at all times. So, we're going to look at the top safety tips for working with electrical wires and what you can do to maintain a safe and healthy workplace.

A Primer on Electrical Wire Injuries and Incidents

To help illustrate why electrical wires are so hazardous, let's look at some numbers. The Electrical Safety Foundation International helps monitor and track injuries and deaths caused by electrical hazards on the job.

In 2019, 166 workers died from electrical incidents. That number was the highest in eight years, with a previous high of 174 workers in 2011. The lowest death count in the intervening years was 134 in 2015. The rise and fall of workplace deaths illustrate the need for constant vigilance and protection. When employers and employees get complacent, bad things can happen.

The most dangerous industry for electrical deaths is construction, which accounted for 43 percent of fatalities in 2019. In second place is the utility industry.

Oddly enough, while 2019 was the deadliest year for electrical accidents, it also had a relatively low number of injuries (1,900) compared to previous years. Ironically, 2015 saw the highest injury count with over 2,400 - the most within the same eight-year span.

In 2019, there were over 110,000 structural fires in non-residential buildings. Of those, around eight percent of them were caused by electrical malfunction (8,095 total).

As you can see, electrical hazards can cause significant losses, both in lives and property damage.

What OSHA Says About Electrical Wire Safety

The Occupational Health and Safety Administration is responsible for setting safety guidelines for workers handling electrical wires. There are a few specific codes that address the issue, so let's break them down.

OSHA Electrical Safety Standard 1910.137(b)(2)

Code 1910.137(b)(2) refers to the type of personal protective equipment that employees should wear at all times. Employers are responsible for providing this PPE and training all workers on how to use it properly. Failure to do so can result in steep fines, not to mention injuries and potential deaths on the job.

As a rule, OSHA requires:

Rubber gloves

Face shields

Safety shoes or boots

Insulating sleeves

Flame-resistant clothing

Depending on the type of work being done, employees may need additional PPE for extra protection. For example, if a worker is handling hazardous chemicals, they may need a respirator or breathing apparatus to ensure that they don't inhale toxic fumes. Regardless of the job, employers still have to provide sufficient PPE for all employees.

In addition to PPE, OSHA provides guidelines for insulating protective equipment (IPE). Workers will use IPE to help facilitate their tasks, but IPE is not worn like PPE. Some examples of IPE include

Insulating line hoses and hoods

Insulating barriers

Live-line tools like shotgun sticks or hot sticks

Employers must test both PPE and IPE regularly to ensure that they can protect workers sufficiently. If items are used regularly, OSHA recommends testing gear about once a month. Employers must also provide formal examinations in between onsite testing. Gloves should be examined every six months and insulating sleeves every year.

OSHA Electrical Safety Standard 1926.431

This standard relates to equipment upkeep and maintenance. If employers don't inspect, repair, and upgrade their machinery, that can lead to failure and electrical injury or death. This specific standard refers to the construction industry, but the recommendations work well for all job sites. Some elements of standard 1926.431 include:

Explosion-Proofing- Employers must maintain equipment so that there is little to no risk of an explosion due to electrical malfunction.

Dust Proofing- Dust can get into machinery and cause various problems, both mechanical and electrical. Employers must protect all gear from dust-related incidents that could lead to an explosion or electrical arc.

General Maintenance and Upkeep- Employers and employees must monitor equipment and machinery to watch out for loose screws, gaskets, and other pieces that may interfere with dust and explosion prevention.

Reporting and Repair- If a worker spots any issues with machinery, they have to report to a supervisor immediately. Once a report is filed, the employer must stop using the circuit until the problem is fixed.

OSHA Electrical Safety Standard 1926.416(a)(3)

As we'll discuss in the next section regarding electrical safety precautions, workers need to know where circuits are at all times and how to shut them off. Typically, the best way to avoid electrical injuries or fatalities is to stop the flow of power from the source. This outlines various requirements for employers, such as labelling circuits with easy-to-spot signage, warning employees before they start work in an area with a live circuit, and locating and inspecting circuits regularly.

8 General Safety Tips for Working with Electrical Wires

Before your employees start working with or around electrical wires, they should be trained in proper safety techniques and precautions. Here are some generalized tips that can help prevent a disaster.

1. Make a Plan

The best way to avoid harm is to draft a project plan beforehand. During the planning phase, workers can assess the equipment and environment to spot any potential hazards. Planning can ensure that workers will use the proper PPE and IPE during the job and that they'll know where the correct circuit is for shutting off power.

2. Wear the Right Clothing and Gear

As we mentioned, OSHA requirements say that workers should have rubber gloves, insulating sleeves, and safety glasses on at all times. Fire-resistant clothing can also help prevent injury because the fibers are not very conductive or are treated with a flame-retardant. During the planning stage, employers and employees can determine whether additional PPE is necessary. Workers should also avoid wearing any metal, such as watches or jewellery.

3. Use the Buddy System

Should the worst happen, your workers shouldn't be by themselves on the job. A buddy system helps ensure that someone can always call for help if necessary or perform CPR. Both individuals should be trained in electrical safety and CPR before starting work.

4. Use the Lock Out Tag Out (LOTO) System

There are six steps to the LOTO system, and they can help ensure that all circuits are shut off and de-energized before working. De-energizing a circuit simply means making sure that there is no residual power left in the wires or machinery.

Step One: Inspect the System- Before starting work, employees should be able to assess hazards on the fly, even if they didn't come up during the planning phase.

Step Two: Shut Down the Circuit- Workers should know how to power down the circuit entirely so that there is no low-level residual energy.

Step Three: Isolate the Equipment- Shut off any valves, unplug any cords, and separate the machinery from all electrical sources.

Step Four: Lock and Tag- Any switches or buttons that can turn the equipment on should be locked in the off position. Doing this ensures that no one can accidentally activate the system. Each lock should have a corresponding tag with the worker's name and contact information.

Step Five: Check for Stored Energy- Depending on the equipment, workers should be able to test for any residual electricity within the system. If they detect anything, they should also be able to discharge any stored energy.

Step Six: Verify Everything- Employees should double-check and walk through all previous steps again to ensure that they didn't miss anything.

5. Avoid Working in Wet Areas

Since water is such a potent electrical conductor, it can pose significant safety risks on a job site. Even damp areas can be a problem, so workers must be able to address it. For example, if there is standing water on the ground, employees can either dry it off or cover it with non-conductive material (i.e., a wooden board).

6. Use a Ground Fault Circuit Interrupter (GFCI)

GFCIs are portable devices that workers can plug into an outlet or circuit. If there is a power surge because someone is getting electrocuted, the GFCI will detect it and kill the power automatically. Using these devices can act as a final failsafe just in case something else goes wrong.

7. Stay Away from Overhead Power Lines

OSHA recommends a minimum safe distance of 10 feet from any overhead electrical wires. Many injuries and accidents happen because of overhead lines, so workers should be hyper-aware of them.

8. Inspect Power Cords and Outlets for Damage

Finally, workers should check all electrical wires and elements, including plugs and outlets. Any damaged components should get replaced immediately. For example, if a three-pronged plug is missing the grounding prong, employees should swap it out with a new plug. They should look for signs of burning or charring, as that can indicate exposed wiring and potential electrical sparks.

• KT0204 Hazards (Tripping, electrical, fire, jewellery, etc.)

Electrical Safety

Electricity travels in closed circuits. Shock occurs when the body becomes a part of an electric circuit. Electric shock can cause direct injuries such as electrical burns, arc burns, and thermal contact burns. It can also cause injuries of an indirect or secondary nature in which involuntary muscle reaction from the electric shock can cause bruises, bone fractures, and even death resulting from collisions or falls. Shock occurs when person in contact with ground comes in contact with any of the following:

Both wires of the electric circuit

One wire of the energized circuit and the ground

A metallic part that has become energized by being in contact with an energized wire.

The severity of the shock received when a person becomes a part of an electric circuit is affected by three primary factors:

The amount of current flowing through the body.

The path of the current through the body.

The length of time the body is in the circuit.

Other factors that may affect the severity of shock are the frequency of the current, the phase of the heart cycle when shock occurs, and the general health of the person prior to shock. The effects of an electrical shock can range from a barely perceptible tingle to immediate cardiac arrest. Although there are no absolute limits or even known values that show the exact injury from any given amperage, the table below shows the general relationship between the degree of injury and the amount of amperage for a 60-cycle hand-to-foot path of one second's duration of shock.

EFFECTS OF ELECTRIC CURRENT IN THE BODY	
CURRENT	**EFFECT**
1 Milliampere	Perception level: just a faint tingle.
5 Milliamperes	Slight shock felt. Average individual can let go. However, strong involuntary reactions to shocks in this range can lead to injuries.
6-30 Milliamperes	Painful shock. Muscular control lost.
50-150 Milliamperes	Extreme pain, respiratory arrest, severe muscular contractions. Individual cannot let go. Death is possible.
1,000-4,300 Milliamperes	Ventricular fibrillation. Muscular contraction and nerve damage occur. Death is most likely.
10,000 Milliamperes	Cardiac arrest, severe burns, and probable death.

As this table illustrates, a difference of less than 100 milliamperes exists between a current that is barely perceptible and one that can kill. Muscular contraction caused by stimulation may not allow the victim to free himself/herself from the circuit, and the increased duration of exposure increases the dangers to the shock victim. For example, a current of 100 milliamperes for 3 seconds is equivalent to a current of 900 milliamperes applied for 0.03 seconds in causing fibrillation. The so-called low voltages can be extremely dangerous because, all other factors being equal, the degree of injury is proportional to the length of time the body is in the circuit. Simply put, low voltage does not mean low hazard.

In the event of an accident involving electricity, if the individual is down or unconscious, or not breathing: CALL 911 immediately. If an individual must be physically removed from an electrical source, it is always best to eliminate the power source first (i.e., switch off the circuit breaker). However, if time or circumstance do not allow this option, be sure to use a nonconductive item such as a dry board. Failure to think and react properly could make you an additional victim. If the individual is not breathing and you have been trained in CPR, have someone call 911 and begin CPR IMMEDIATELY!

COMMON ELECTRICAL HAZARDS AND PREVENTIVE STEPS

Many common electrical hazards can be easily identified before a serious problem exists. Read and follow all equipment operating instructions for proper use. Ask yourself, "Do I have the skills, knowledge, tools, and experience to do this work safely?"

Do not attempt electrical repairs unless you are a qualified electrical technician assigned to perform electrical work by your supervisor. Qualified individuals must receive training in safety related work practices and procedures, be able to recognize specific hazards associated with electrical energy, and be trained to understand the relationship between electrical hazards and possible injury. Fixed wiring may only be repaired or modified by Facilities Services.

All electrical devices fabricated for experimental purposes must meet state and University construction and grounding requirements. Extension cords, power strips, and other purchased electrical equipment must be Underwriters Laboratories (UL) listed.

Remove all jewelry before working with electricity. This includes rings, watches, bracelets, and necklaces.

Determine appropriate personal protective equipment (PPE) based on potential hazards present. Before use, inspect safety glasses and gloves for signs of wear and tear, and other damage.

Use insulated tools and testing equipment to work on electrical equipment. Use power tools that are double-insulated or that have Ground Fault Circuit Interrupters protecting the circuit. Do not use aluminum ladders while working with electricity; choose either wood or fiberglass.

Do not work on energized circuits. The accidental or unexpected starting of electrical equipment can cause severe injury or death. Before any inspections or repairs are made, the current must be turned off at the switch box and the switch padlocked or tagged out in the off position. At the same time, the switch or controls of the machine or the other equipment being locked out of service should be securely tagged to show which equipment or circuits are being worked on. Test the equipment to make sure there is no residual energy before attempting to work on the circuit. Employees must follow lock-out/tag-out procedures.

Cords and Power Strips

If you need additional power supply, the best solution is to have additional outlets installed by Facilities Services. Do not use extension cords or power strips ("power taps") as a substitute for permanent wiring.

Extension cords and power strips may be used for experimental or developmental purposes on a temporary basis only. Extension cords can only be used for portable tools or equipment and must be unplugged after use. Do not use extension cords for fixed equipment such as computers, refrigerators/freezers, etc.; use a power strip in these cases. In general, the use of power strips is preferred over use of extension cords.

Power strips must have a built-in overload protection (circuit breaker) and must not be connected to another power strip or extension cord (commonly referred to as daisy chained or piggy-backed). As mentioned above though, extension cords and power strips are not a substitute for permanent wiring.

Ensure any power strips or extension cords are listed by a third-party testing laboratory, such as Underwriters Laboratory (UL). Make sure the extension cord thickness is at least as big as the electrical cord for the tool.

Inspect all electrical and extension cords for wear and tear. Pay particular attention near the plug and where the cord connects to the piece of equipment. If you discover a frayed electrical cord, contact your Building Coordinator for assistance. Do not use equipment having worn or damaged power cords, plugs, switches, receptacles, or cracked casings. Running electrical cords under doors or rugs, through windows, or through holes in walls is a common cause of frayed or damaged cords and plugs.

Do not use 2-prong ungrounded electrical devices. All department-purchased electrical equipment must be 3-prong grounded with very limited exceptions.

Never store flammable liquids near electrical equipment, even temporarily.

Keep work areas clean and dry. Cluttered work areas and benches invite accidents and injuries. Good housekeeping and a well-planned layout of temporary wiring will reduce the dangers of fire, shock, and tripping hazards.

Common signs of an electrical problem include: flickering lights, warm switches or receptacles, burning odors, sparking sounds when cords are moved, loose connections, frayed, cracked, or broken wires. If you notice any of these problems, have a qualified electrician address the issue immediately.

To protect against electrical hazards and to respond to electrical emergencies it is important to identify the electrical panels that serve each room. Access to these panels must be unobstructed; a minimum of 3′ of clearance is required in front of every electrical panel. Each panel must have all the circuit breakers labeled as to what they control. Contact your Building Coordinator for assistance.

When performing laboratory inspections, it is a good idea to verify the location of the power panel and to open the door to ensure any breakers that are missing have breaker caps in its place. If no breaker is present and no breaker cap is covering the hole, contact your Building Coordinator for assistance.

Avoid operating or working with electrical equipment in a wet or damp environment. If you must work in a wet or damp environment, be sure your outlets or circuit breakers are Ground Fault Circuit Interrupter (GFCI) protected. Temporary GFCI plug adapters can also be used, but are not a substitute for GFCI outlets or circuit breakers.

Fuses, circuit breakers, and Ground-Fault Circuit Interrupters are three well-known examples of circuit protection devices

Fuses and circuit breakers are devices that are placed in circuits to automatically break the circuit when the amount of the current flow becomes excessive and therefore unsafe. Fuses are designed to melt when too much current flows through them. Circuit breakers, on the other hand, are designed to open the circuit by electro-mechanical means.

Fuses and circuit breakers are intended primarily for the protection of conductors and equipment. They prevent overheating of wires and components that might otherwise create hazards for operators.

The Ground Fault Circuit Interrupter (GFCI) is designed to shut off electric power within as little as 1/40 of a second, thereby protecting the person, not just the equipment. It works by comparing the amount of current going to an electric device against the amount of current returning from the device along the circuit conductors. A fixed or portable GFCI should be used in high-risk areas such as wet locations and construction sites.

Entrances to rooms and other guarded locations containing exposed live parts must be marked with conspicuous warning signs forbidding unqualified persons to enter. Live parts of electric equipment operating at 50 volts or more must be guarded against accidental contact. Guarding of live parts may be accomplished by:

Location in a room, vault, or similar enclosure accessible only to qualified persons.

Use of permanent, substantial partitions or screens to exclude unqualified persons.

Location on a suitable balcony, gallery, or platform elevated and arranged to exclude unqualified persons, or

Elevation of 8 feet or more above the floor.

SAFE USE OF ELECTROPHORESIS EQUIPMENT

Electrophoresis is a commonly used laboratory technique that uses electrical energy to separate molecules such as proteins or nucleic acids by their size, structure, and electrical charge. Electrophoresis units present several possible hazards including electrical, chemical, and radiological hazards. Each of these hazards need to be addressed before using the units.

Chemical Hazards

Hazardous chemicals commonly used in conjunction with electrophoresis work include:

Ethidium bromide – mutagen, irritant

Acrylamide – carcinogen, neurotoxin, irritant

Phenol – corrosive, toxic

Chloroform – suspect carcinogen, toxic

Always review the Material Safety Data Sheet prior to working with any hazardous material. See the Chemical Hygiene Plan for more information on working with hazardous chemicals.

Electrical Hazards

Typical electrophoresis units operating at 100 volts can provide a lethal shock of 25 milliamps. Take the following precautions when working with electrophoresis equipment:

Ensure all switches and indicators are in proper working condition and that power cords and leads are undamaged and properly insulated.

Label equipment with the warning: "Danger: Electrical Hazard."

Connect equipment to outlets with ground fault circuit interrupters (GFCIs)

Use 3-prong plugs.

If available, use power supplies with safety features that detect issues with the electrical circuit (e.g., noload, overload, sudden load changes, short circuits, etc.)

Turn off main power supply before connecting or disconnecting electrical leads.

With dry gloved hands, connect one lead at a time using one hand only.

Be sure that leads/banana plugs are fully seated.

Switch off all power supplies and unplug the leads before opening the gel chamber lid or reaching inside the gel chamber. Do not rely on safety interlocks.

Laboratory personnel may be exposed to **thermal hazards** when heating agarose solutions. Exercise caution when using a microwave to melt agarose solutions – don't use sealed containers, and beware of superheated liquids that may suddenly and unexpectedly boil. Let hot agarose solutions cool to 50°-60°C before adding ethidium bromide or pouring into trays. Wear insulated gloves and point the flask opening away from you.

Ultraviolet (UV) light boxes and handheld lamps are often used in visualizing ethidium bromide gels and pose potential exposures to UV radiation.

Work Practices:

Read and follow manufacturer's instructions for electrophoresis equipment.

Consult with PI prior to initial use of electrophoresis equipment. Discussion should include special hazards and safety precautions.

Consider using ethidium bromide substitutes.

Personal Protective Equipment

Wear a long-sleeved lab coat, safety goggles, nitrile gloves (latex is not effective), long pants, and closed-toe shoes.

Wear appropriate skin and eye protection when working with UV radiation.

Emergency procedures

Hazardous Waste Management: Dispose of chemicals and gels as hazardous waste. Collect in a non-leaking container labeled with a hazardous waste tag. Request pickup of hazardous waste using the EHS online system.

Non-Hazardous Waste Management: Some gels may be considered non-hazardous and may be treated as such. For example, ethidium bromide <0.4 wt% in non-polyacrylamide gel is considered non-hazardous waste and can be placed into a closed bag, then into trash.

• KT0205 Environmental risks

Environmental Factors That Can Impact Your Health

A number of specific environmental issues can impede human health and wellness. These issues include chemical pollution, air pollution, climate change, disease-causing microbes, lack of access to health care, poor infrastructure, and poor water quality.

1. Chemical Safety

Different chemicals can impact human health in different ways, and often, exposure to dangerous or foreign substances creates health vulnerabilities. The chemical safety field is concerned with minimizing the effects of both natural and synthetic chemicals. More specifically, chemical safety seeks to safeguard human and environmental health from exposure to potential toxins; it focuses on chemicals that exist in the ambient world, as well as synthetic chemicals that are used in industrial processes or are the by-products of manufacturing activity.

Public health officials who work in chemical safety often focus on toxicology, which is the study of substances that have a toxic effect on the human body, whether when ingested or when absorbed through natural surroundings. Another important aspect of public health is chemical risk assessment, which involves scientists and clinicians working to determine a substance's full biological effects.

This is a critical field of public health: According to the World Health Organization (WHO), more than 1.6 million deaths in 2016 were due to exposure to selected chemicals. Some examples of dangerous chemicals in the environment are heavy metals and toxins that find their way into the water supply and harmful pesticides that make their way into the food supply chain.

2. Air Pollution

Studies have shown that air pollution effects on humans are a significant public health concern, not only because of their role in climate change, but also because exposure to air pollution can increase morbidity and mortality.

When environmental scientists talk about air pollution, they're describing any solid or liquid particles, as well as gases, that are suspended in the air and have harmful or poisonous effects. When we think about air pollution, we tend to think in terms of human-caused pollutants, and rightly so: Some of the most dangerous and ubiquitous examples of air pollution include car and truck exhaust, as well as polluting by-products of industrial processes. However, many natural air pollutants can cause health concerns; for example, pollen and mold spores are often linked with asthma and allergies.

According to the WHO, air pollution effects on humans are significant. For example, air pollution causes:

29% of all global deaths from lung disease

24% of all global deaths from stroke

17 % of all global deaths and disease from acute lower respiratory infection

3. Climate Change and Natural Disasters

Another environmental issue with serious ramifications for human health is climate change, along with the increase in natural disasters that has accompanied the shift in Earth's climate. The National Environmental Health Association lists climate change as the single biggest human health threat of the 21st century.

Climate change disrupts the natural world in a number of ways that can impede health and increase vulnerability to disease; these include increases in the planet's temperature and more frequent heavy rains and runoff. The various impacts may result in greater vulnerability to nervous and respiratory diseases, diarrhoea, and more.

Additionally, climate change increases the frequency of natural disasters, often having a ravenous effect on homes and communities and sometimes resulting in loss of life. Wildfires, hurricanes, cyclones, and droughts are just a few examples.

4. Diseases Caused by Microbes

Diseases caused by microbes — also known as microorganisms — present another area of public health concern. Trillions of microbes exist within the human body, and they also live in water, soil, and air. Most of them have no negative health effects, and many microbes perform important biological functions, such as supporting digestive and immune health, according to the National Human Genome Research Institute. Bacteria, viruses, and fungi are types of microbes.

Harmful microbes, which are more commonly called pathogens or germs, can infect humans and cause illness. Eating is one of the primary ways in which humans can contract diseases caused by microbes. One example is food poisoning from E. coli, a type of bacteria that can be found in the environment and in foods, and which can cause respiratory illness, urinary tract infections, and other adverse health effects.

There are also a number of harmful microbes that live in the soil. Humans can come into contact with them by ingesting them (through contaminated food) or through inhaling them (through soil particles in the air). Tetanus and botulism are examples of diseases caused by soil-borne microbes.

5. Lack of Access to Health Care

Another environmental factor that contributes to disease and overall poor health outcomes is living in an area with a lack of access to health care services.

According to Healthy People, "Many people face barriers that prevent or limit access to needed health care services, which may increase the risk of poor health outcomes and health disparities." Some factors that contribute to lack of access to health care are economic instability, unreliable transportation to clinical facilities, and simple lack of education about the importance of preventive care.

Individuals who don't have access to health care services (including pharmaceuticals as well as dental care) are at a higher risk for chronic conditions, which may include asthma, cancer, diabetes, or heart disease.

6. Infrastructure Issues

Infrastructure issues can also have a major impact on community health. Examples include the following:

Poorly maintained roads (increasing risk of car accidents)

Lack of access to clean drinking water

Lack of local health care infrastructure, such as clinics capable of giving vaccinations

Overcoming poor infrastructure requires the right allocation of resources from local, state, and federal governments, as well as a qualified workforce to keep infrastructure properly maintained.

7. Poor Water Quality

Very well Health reports that across the world, more than 780 million people don't have access to clean drinking water; shockingly, about a third of the world's population lacks access to proper sanitation services (e.g., clean bathrooms). The health implications are sobering: Each day, more than 2,200 children die due to diseases caused by poor water quality.

A number of factors can contribute to poor water quality, including industrial waste and pollution, lack of access to proper water treatment and sanitation services, and outdated plumbing infrastructure.

8. Global Environmental Issues

Global environmental issues account for more than 12.6 million deaths each year, according to WHO data. Along with the issues mentioned here, these can include soil pollution, ultraviolet radiation, and biodiversity loss. According to the data, more than 100 illnesses and injuries can be directly linked to environmental health concerns. Often, these issues have the greatest impact on communities that are poor and already have significant health care vulnerabilities.

• **KT0206 Ergonomics and lifting techniques**

Ergonomics

Safe Lifting

Today, forklifts, hoists, dollies and other types of lifting equipment are used to lift heavy objects. However, sometimes it is necessary to load or unload moderate to heavy objects by hand. When that is the case, knowing the proper ways to lift can save you a great deal of pain and misery from a sprained back.

Assess the situation

Before lifting or carrying a heavy object, ask yourself the following questions:

Can you lift this load safely, or is it a two-person lift?

How far will you have to carry the load? * Is the path clear of clutter, cords, slippery areas, overhangs, stairs, curbs or uneven surfaces?

Will you encounter closed doors that need to be opened?

Once the load is lifted, will it block your view?

Can the load be broken down into smaller parts?

Should you wear gloves to get a better grip and protect your hands?

Size up the load

Test the weight by lifting one of the corners. If it is too heavy or an awkward shape, stop.

If there is any doubt, ask for help from fellow workers.

Try to use a mechanical lift or a hand truck.

Try to break the load down into smaller parts.

Use good lifting techniques

Get close to the load. Center yourself over the load and stand with your feet shoulder width apart.

Tighten your stomach muscles. Tight abdominal muscles increase intra-abdominal pressure and help to support the back.

Get a good handhold and pull the load close to you. The farther the load is from your body, the heavier it will feel.

Bend your knees. Bending your knees is the single most important thing you can do when you lift moderate to heavy objects. Squat down like a weightlifter, bend your knees, keep your back in its natural arch, and let your legs do the lifting. Your leg muscles are much more powerful than the smaller muscles in your back.

Do not jerk. Use a smooth motion and lift straight up.

Do not twist or turn your body while lifting. Keep your head up, and look straight ahead. Hold the load close and keep it steady.

Carrying the load

Change direction by turning your feet, not your back. Your nose and your toes should always be pointing in the same direction. Any sudden twisting can result in taking out your back.
Rest if you fatigue. Set the load down and rest for a few minutes.

Setting the load down

Bend your knees. Squat down and let your legs do the work.

Keep your back curves. Remember not to twist your body while setting down a load, and keep your head up.

Keep the load close

Plan your release. Once the load is where you want it, release your grip. Never release your grip until the load is secure.

Using hand trucks and pushcarts

Push rather than pull. It is easier and safer to push than to pull. You can use your body weight to assist when pushing.

Keep close and lock your arms. Stay close to the load, try not to lean over and keep your back in its natural arches.

Use both hands. Carts are easier to push and control using both hands.

Use tie-downs, if necessary, to secure the load.

Forklifts

Use a forklift to lift and transport very heavy objects.

Obtain training and authorization before using a forklift.

Proper Lifting Technique

Follow these tips to avoid compressing the spinal discs or straining your lower back when you are lifting:

Keep a wide base of support. Your feet should be shoulder-width apart, with one foot slightly ahead of the other (karate stance).

Squat down, bending at the hips and knees only. If needed, put one knee to the floor and your other knee in front of you, bent at a right angle (half kneeling).

Keep good posture. Look straight ahead, and keep your back straight, your chest out, and your shoulders back. This helps keep your upper back straight while having a slight arch in your lower back.

Slowly lift by straightening your hips and knees (not your back). Keep your back straight, and don't twist as you lift.

Hold the load as close to your body as possible, at the level of your belly button.

Use your feet to change direction, taking small steps.

Lead with your hips as you change direction. Keep your shoulders in line with your hips as you move.

Set down your load carefully, squatting with the knees and hips only.

Keep in mind:

Do not attempt to lift by bending forward. Bend your hips and knees to squat down to your load, keep it close to your body, and straighten your legs to lift.

Never lift a heavy object above shoulder level.

Avoid turning or twisting your body while lifting or holding a heavy object.

Internal Assessment Criteria and Weight

• IAC0201 Proper techniques for handling computer components for the safety and the longevity of the hardware are identified and described

(Weight 5%)