

MAINTENANCE GRADE 8: TERM 1

1. INTRODUCTION TO MAINTENANCE

Maintenance as a subject covers the skills and knowledge required to perform elementary repair and maintenance work at a basic level, focusing on the household and small construction environments. Maintenance skills are used by handymen to prevent equipment from breaking down and materials from deteriorating. Minor problems are solved before they become more serious ones. Handymen keep records of repairs undertaken as well as the dates when equipment was last repaired, inspected or serviced. This helps them to establish an inspection and repair schedule.

Regular maintenance is essential to keep workshop, equipment, machines and the environment safe and reliable. It helps to eliminate workplace hazards, which can lead to dangerous situations, accidents and health problems. It protects learners and educators from injuries and teaches them how to work safely.

Educators are responsible for reviewing learners' actions and making sure that safe rules are clearly provided and taught. Safety programs create a safe and productive work environment, which will create an environment where safety improvements are considered, encouraged and implemented. More importantly, safety enhances the brand value, goodwill and love for a workshop by learners, which also impacts on experience and value to the broader society.



ACTIVITY 1

Explain the term maintenance and its role.

Activity 2:

Provision of pictures for work in progress suggesting different types of work done in maintenance as a career.

Example: Learners engage with the picture explaining nature of work:



Fig 1



Fig 2

2. HEALTH AND SAFETY (OHS ACT 85 of 1993)

What is OHS Act

It is the abbreviation for The Occupational Health and Safety Act, which provides for a Safe and healthy work environment.

purpose

- To provide for the health and safety of persons at work and for the health and safety of persons in connection with the use of plant and machinery.
- the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work.
- to establish an advisory council for occupational health and safety and to provide for matters connected therewith.

The main focus in occupational health and safety is on three different objectives:


- The maintenance and promotion of worker's health and working capacity.

- The improvement of working environment and work to become conducive to safety and health.
- The development of work organisations and working cultures in a direction which supports health and safety at work and in doing so also promotes a positive social climate and smooth operation and may enhance productivity of the undertakings.

WHAT IS AN ACCIDENT ???











“An accident is an unplanned & uncontrolled event which causes or is likely to cause an injury”.

- It is some thing which unexpected , un-predictable or intended or not desired.
- An accidents may cause a result of some unsafe activity, act, working condition etc ,.....



Safety signs

An international standard (ISO) for safety signs aims to improve understanding and proper application of safety signs designed to reduce accidents and injury in the workplace.

Shape	Meaning	Color	Examples
 Circle with diagonal bar	Prohibition	RED (contrast: white)	No smoking 
 Circle	Mandatory Action	BLUE (contrast: white)	Wear Eye protection 
 Equilateral Triangle	Warning	YELLOW (contrast: black)	Danger Flammable material 
 Square / Rectangle	Information about safe condition	GREEN (contrast: white)	Escape Route – Left 
 Square / Rectangle	Fire Safety	RED (contrast: white)	Fire Extinguisher 



Personal safety equipment. (PPE)

Protective clothing/ gear and equipment will protect you against health and safety risks when you perform dangerous tasks. Hard hat, goggles, shields, masks, shoes, gloves as well as other protective gear are designed to ensure your health and safety.



Protective gear	Purpose for wearing
Safety boots	<ul style="list-style-type: none"> You must wear sturdy, non-slip boots on a building site and a factory or workshop. When mixing concrete or mortar by hand you are require to wear gumboots.
Safety glasses	<ul style="list-style-type: none"> When operating grinders, drills, electric saws, or any other portable equipment you must always wear protective safety glasses.
Ear protection	<ul style="list-style-type: none"> When the noise levels are too high, protect your hearing by wearing protective gear such as earplugs or earmuffs
Head protection	<ul style="list-style-type: none"> Hard hat is compulsory on any building site and will protect your head from falling objects. It also prevents injury should you bump your head against hard object. Wear it all time when you enter a building site.
Overall Safety gloves Safety apron Face shield Ear protection	Provide a protective barrier between the hazardous substances and the skin.

Safety rules and procedures in a workshop.

It serves as a general guide as to how learners should conduct themselves, for preparing their conduct and safety in a workshop. It must promote the responsibility, knowledge and skills. Learners must reflect positive discipline and have constructive learning.

- Must at all times wear their overalls.

- Their overalls will always be in good condition.
- They will respect and observe the workshop safety.
- They will not disturb or disrupt their fellow pupils from doing their work.
- They should not be lazy or sleep in the workshop.
- Learner will always strive to perform his best.
- They will not waste or damage equipment through negligence.
- They will not use foul language or horseplay in the workshop.
- They will bring weapons or drugs into the workshop.
- They will always obey and carry out instructions given by the workshop teacher.

Workshop demarcations

OSHA Floor Marking

Occupational Safety and Health Administration (OSHA) floor marking guidelines are covered in detail under standard number 1910.22. These guidelines help facilities determine how and where they need to use floor markings to improve safety. These standards cover things such as cleaning requirements for shop floors, standards for aisles and passageways, and much more.

Facility owners, managers, and safety professionals need to be sure they are always following the OSHA floor marking standards. This will help improve the overall safety of a facility and will also ensure there are no violations of the regulations, which could result in fines.



The colours are as follows:

- **Yellow Floor Markings** - Yellow is recommended for marking off aisles and pathways within a facility. Yellow is also used in other areas where people need to use caution.
- **White Floor Markings** - White is a general-purpose color for floor markings and can be used for a wide range of different things. Most commonly it is used to identify storage locations
- **Red Floor Markings** - Red floor markings should be reserved for marking fire fighting equipment such as fire extinguishers.
- **Orange Floor Markings** - Orange is normally used for organizing things within a facility that need inspection
- **Green Floor Markings** - Green is normally used to mark off safety equipment. If there is a first aid kit on a wall, green floor marking tape may be used in that area to draw people's attention to it.
- **Red & White Floor Marking** - A red and white-stripped floor marking tape is used to let people know that the area must be kept clear for emergency access. This tape could be placed around fire hydrants, near emergency vehicle zones, and other similar areas.
- **Bright Orange or Orange/Red Floor Markings** - These colors are typically used to mark biological hazards in the area.

Procedures In The Event Of Accident Involving Injury

- Seek Medical Attention. First aid should be given by someone who has had appropriate training. Names of people qualified to administer first aid is on the front of the first aid kits
- In the case of minor injuries that cannot be satisfactorily treated by first aid, or if there is any doubt, the injured person shall be sent or taken to the hospital emergency center, or the doctor of their choice
- The supervisor must ensure that the Form 6 & Form 7 have been completed and submitted to the Department Safety Officer and Queen's Occupational Health & Safety Department as soon as possible

GENERAL SAFETY RULES REGARDING TOOLS AND EQUIPMENT

Always use the right tool for the job at hand. This is the first step towards the safe use of hand tools. Using the wrong tool for the job is definitely a step in the wrong direction and a sure way to injure yourself.

Most accidents and injuries in the workplace are associated with equipment and tool which are not handled with care. Here are a few precautions to consider when it comes to handling tools safely:

Basic Safety Rules for Hand Tools

- Always wear eye protection.
- Wear the right safety equipment for the job.
- Use tools that are the right size & right type for your job.
- Follow the correct procedure for using every tool.
- Keep your cutting tools sharp and in good condition.
- Don't work with oily or greasy hands.
- Handle sharp-edged and pointed tools with care.
- Always carry pointed tools by your side with the points and heavy ends down.
- Secure all small work & short work with a vise or clamp.
- Never carry tools in your pockets.
- Don't use tools which are loose or cracked.
- Keep your punches & chisels in good condition. Mushroomed heads can chip & cause injuries.
- Don't use a file without a handle.
- Don't pry or hammer with a file. It may shatter.
- Don't use screwdrivers as chisels or pry bars.
- Don't try to increase your leverage by using a "cheater" with a wrench. Wrenches are designed at the right strength for their size and length.
- After using a tool — clean it and return it to its proper storage place.
- If anything breaks or malfunctions — report it to your supervisor at once.
- Use the right type of tool for the job.
- Never place tools and materials where they hang on the edge of a bench.
- Don't use tools for things they weren't meant for.
- Store tools and materials vertically, with the points and heavy end down.
- Cut away from yourself when you use chisels and other edged tools.
- Don't force screws; make sure that the correct screw for the job is being used.

Basic safety rules for electric power tools:

- Make sure lighting is good; if the area is artificially lit, ensure that the lights do not cause a stroboscopic effect.
- Power tools should only be handled by one person at a time.
- There should be sufficient space around the machinery
- Never touch or attempt to adjust moving parts.
- Report any damaged or malfunctioning machinery.
- Follow the operating instructions and warning label on the tool itself.
- Keep floors dry and clean to avoid slipping while working with or around dangerous tools.
- Keep cords from presenting a tripping hazard.
- Never carry a power tool by its cord.
- Use tools that are double-insulated or have a three-pronged cord and are plugged into a grounded receptacle.
- All the hazardous, moving parts should be covered with guards.
- Do not use electric tools in wet conditions unless they are approved for that use.
- Use a ground fault circuit interrupter (GFCI) or an assured grounding program.
- Use appropriate PPE.

Health and safety aspects associated with storage of materials

Storing flammable liquids

- Sufficient precautionary measures must be taken
- Flammable liquids must be secured using non-flammable material
- Fumes must be effectively circulated or extracted through the ventilation system
- Fumes should not be allowed to contaminate or pollute any other work area.
- The building or fume cupboard must be constructed using fireproof material

Storing hazardous materials

- Room must be well ventilated
- Door should have a threshold in case of a spill
- Materials that may cause a spark must not be stored here.
- Liquids that may interact chemically should not be stored in a close proximity
- Containers should always be sealed or properly closed.
- Never store other flammable materials here.,

Machinery

- The equipment must be suitable for the job.

- Machinery must be fitted with the necessary safety devices, which must be in working order.
- All machinery must have proper instructions regarding how to operate it.
- All machine operators must be trained.
- Personal protective gear must be provided for all workers.
- Maintenance must be carried out on machinery regularly
- Access to the construction site must be controlled.
- If large construction machinery is used, warning lights should be on and visible
- Operating controls must be easy to reach and properly fitted.
- Moving parts should be safeguarded to avoid injuries
- Fire extinguishers must be available; in the event of fire.



Activity 1

1. Identify the safety signs illustrated below.



2. Protective clothing/ gear and equipment will protect you against health and safety risks when you perform dangerous tasks.

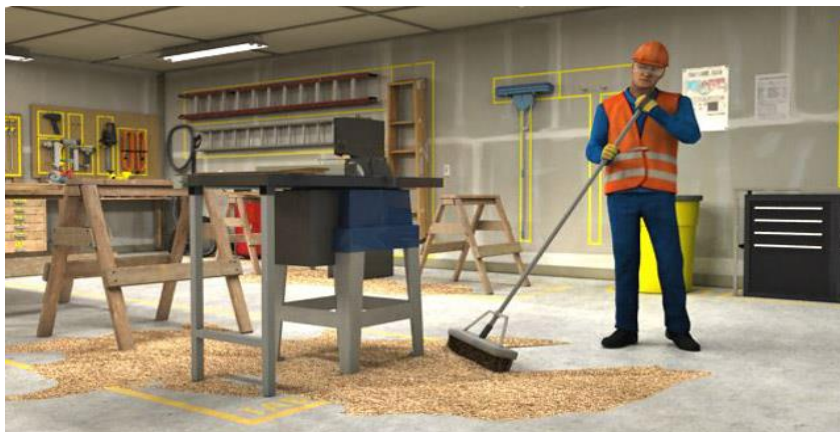


2.1 identify all the protective equipment depicted on the above picture.

2.2 explain when and where you would wear the protective gears listed in 1.1.

HOUSEKEEPING

Good housekeeping in the industry therefore means an orderly arrangement of tools, equipment, operations, storage facilities and materials. It is a matter of life and death. Factories/ workshops that neglect housekeeping which is the basis for safety campaign in the workshops that neglect disaster, in human and financial terms is everything and in its place at all times. It is desirable because :



What can be done to achieve Good housekeeping ?

1. Teach the learners the importance of housekeeping.

2. Provide receptacles for waste.
3. Provide facilities for proper storage and shacking.
4. Put up notice for the guidance of the learners.
5. Introduce colour coding and make somebody responsible for keeping the rules.

Advantages of Housekeeping

- It serves time trying to find the tool.
- Tools are packed safely.
- No falling of stock.
- Fires are prevented.
- Fire are prevented.
- Injuries are avoided.

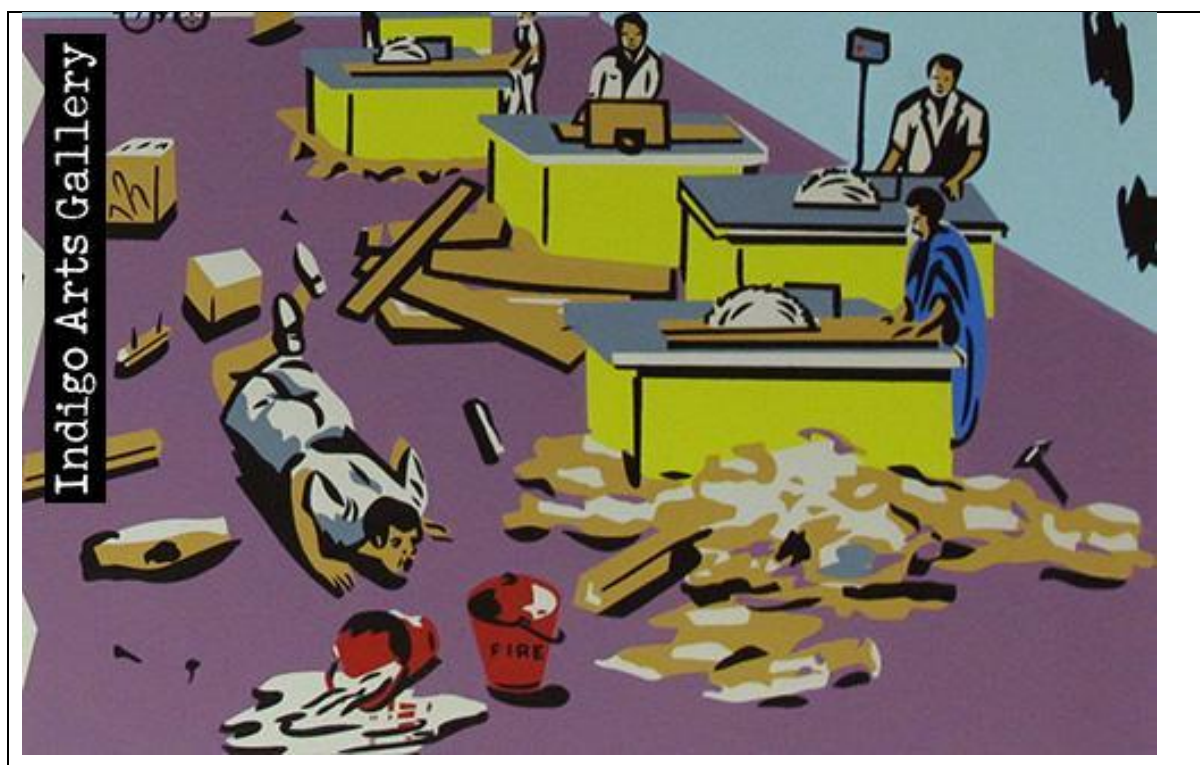
Disadvantages of poor housekeeping

- Workers tripping over loose objects on the floor.
- Articles dropping from the above.
- Workers slipping on greasy, wet or dirty floors.
- Staff running against projecting.
- Hands or other parts of the body cut on nails.
- Fires.



Activity 2

1. In your own words. Describe good house keeping
- 2 list TWO advantages of good housekeeping and disadvantages of poor housekeeping.
3. Study the pictures and identify the good and bad practices related to housekeeping.



Practical Activity 1

Safety sign Poster

You will need

A3 paper
Prestik
Crayons
Pencil

Instructions

Learners work individually.
learner must select a safety sign
Learner must draw the selected sign.
Learner must explain where the sign is used.
Paste the sign in the classroom.

Use the safety signs below to complete the activity.



Practical activity 2

PPE identification

You will need:

- Available PPE at school

The educator will bring the available safety gear at school. Each learner will identify the safety gear presented by the educator and also give a reason for wearing each protective gear. Identification and reason will credit the learner 2 full marks.

4. FIRST AID

First aid is the first and immediate assistance given to any person suffering from either a minor or serious illness or injury, with care provided to preserve life, prevent the condition from worsening, or to promote recovery.

First aid is the emergency help or assistance given to the victim suffering illness or injury, with care provided to preserve life before getting to the doctor and or hospital.




Figure 3 below shows a first aid kit, which is always ready to be used for any minor cuts and burns that may occur in the workshop. The educator will assist and take the necessary steps to safely treat the learner's injury. All injuries must be reported immediately no matter how small the injury. It is important to wear surgical gloves when treating any cuts and signs of bleeding, to prevent the spread of viruses and diseases such as HIV/ Aids. Any cut and signs of bleeding extra care needs to be taken and wearing of surgical gloves is very important. This is the prevention of HIV and AIDS.





FIRST AID KIT CONTENT





A basic first aid kit consists of the following: socket, tweezers, pliers, plasters, cement, sterile gloves, glue, eye patches, oil, antiseptic, petrol, bandage, gauze swabs, scissors, safety pins, bolts and nuts and roller bandages.




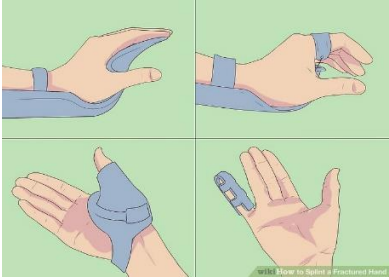


Fig 3

Name	Illustration	Uses
First aid kit		<ul style="list-style-type: none"> • Used for minor cuts and skin injuries.
Tweezers		<ul style="list-style-type: none"> • To remove debris such as glass, dirt, or splinters from a wound. • To remove stingers left behind by bees.
Pliers		<ul style="list-style-type: none"> • Cutting wire strings, twisting and or fastening.

Scissors		<ul style="list-style-type: none"> • Cutting gauze and some adhesive bandages to an appropriate length. • Cutting clothing to exposed an injury.
Plasters		<ul style="list-style-type: none"> • Is a small medical dressing used to cover small injuries.
Sterile gloves		<ul style="list-style-type: none"> • Gloves must be worn as a single-use item for: each invasive procedure, contact with sterile areas and non-intact skin.
Gauze pad		<ul style="list-style-type: none"> • Used to absorb blood. • To apply ointments or to clean wounds.
Bandage		

		<ul style="list-style-type: none"> • Used to hold the dressing and splints in place. • Used to reduce swelling or provide support to a sprained area like an ankle.
Safety pins		<ul style="list-style-type: none"> • Used to fix bandages. • Used to fasten pieces of fabric or clothing together.
Bolts and nuts		<ul style="list-style-type: none"> • Mainly used to hold and tighten splints in position.
Adhesive tape		<ul style="list-style-type: none"> • To Hold a bandage or other kind of dressing onto a wound.
Eye patches (cloth patch)		<ul style="list-style-type: none"> • To cover a lost or injured eye.

		<ul style="list-style-type: none"> • For Healing use in children for the treatment of clear vision (amblyopia).
Cotton wool (balls and rolls)		<ul style="list-style-type: none"> • Used for cleaning wounds, padding and protection.
Cleaning agents (alcohol wipes or ethyl alcohol)		<ul style="list-style-type: none"> • Antiseptic for cleaning wounds. • Sterile water for eye wash. • Antiseptic hand cleanser for a higher level of sanitation, both pump bottle and wall mounted dispensers. • Disinfectant cleaners.
Splint		<ul style="list-style-type: none"> • Used to stabilize a broken bone while the injured person is taken to the hospital for more advanced treatment.



ACTIVITY 3:

Demonstrate and explain all aspect of safety relating to treating an open cut.

5. WORKSHOP CODE OF CONDUCT

Serves as a general guide as to how learners should conduct themselves, for preparing their conduct and safety in a workshop. It must promote the responsibility, knowledge and skills. Learners must reflect positive discipline and have constructive learning.

- Must at all times wear their overalls.
- Their overalls will always be in good condition.
- They will respect and observe the workshop safety.
- They will not disturb or disrupt their fellow pupils from doing their work.
- They should not be lazy or sleep in the workshop.
- Learner will always strive to perform his best.
- They will not waste or damage equipment through negligence.
- They will not use foul language or horseplay in the workshop.
- They will not bring weapons or drugs into the workshop.
- They will always obey and carry out instructions given by the teacher.



ACTIVITY 4

WORKSHEET FOR CODE OF CONDUCT

1. I will always wear my..... (Overall, Suite, Pants).
2. My overall will always be in..... (White, Good, Dirty) condition.
3. I will respect and observe the..... (School, Workshop, Shop) rules.
4. I will alwaysand carry out instructions given by the workshop teacher.
(Obey, Destruct, Damage)
5. I will not disturb or disrupt my fellow pupils from doing their..... (Hair, work, money).
6. I will Strive to perform my best. (Sometimes, Always, Never)
7. I will not waste or (Damage, Sell, Buy) machinery through negligence.
8. I will not use foul or horseplay in the workshop. (Nose, Mouth, Language)
9. I will not bring weapons or into the workshop. (Guns, Drugs, Girl)
10. I will not be lazy orin the workshop. (Sleep, Work, Dance) (10)

6. GRAPHICS/ COMMUNICATION SKILLS

Introduction

Engineering graphics and designs is a combination of lines, symbols and signs used to create technical drawings that are needed to clearly communicate a message to a builder, engineer or producer. It is a communication tool.

Purpose of engineering graphics and design

Designers use drawings when developing ideas. Clear, complete and accurate drawings help to prevent expensive and/ dangerous mistakes e.g. when a builder discovers that a mistake was made in a building and has to demolish the building. This has financial implications and time is wasted.

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The language of graphics includes:

- Being able to visualise a drawing
- Knowledge and understanding of drawing principles and practices
- The design process


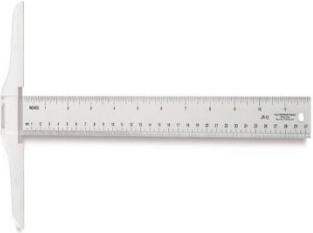
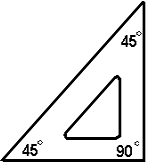
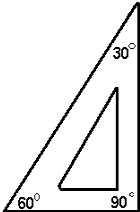
Engineering Graphics and Designs prepares a person for the following career opportunities/ choices or paths:


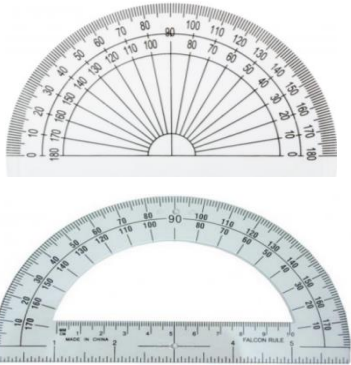


- Civil Engineering
- Mechanical Engineering
- Electrical Engineering
- Maritime studies
- Mining engineering
- Medical Technician
- Industrial designer
- Interior Designer
- City Planner
- Teacher
- Jewellery designer



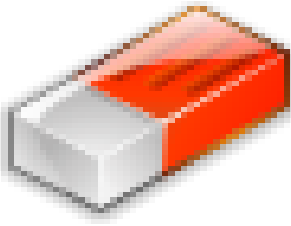
- Architecture etc.

General drawing principles

Drawing Instruments

NAME	USE	CARE
 <p>Drawing Board</p>	Any kind of drawing, writing or sketching on a piece of paper.	Clean your board using a house hold degreaser or low odour white spirit.
 <p>T- Square</p>	To draw horizontal lines and as guide when drawing vertical lines.	Wipe with clean cloth 45 preferable yellow duster.
 <p>45° Set square</p>	To draw parallel lines, perpendicular, standard measure angle (45° and 90°).	Wipe with clean cloth preferable yellow duster.
 <p>30°/ 60° Set square</p>	To draw parallel lines, perpendicular, standard measure angle (30°, 60° and 90°).	Wipe with clean cloth preferable yellow duster.

 <p>Scale rule</p>	<p>It used to measure the length, width and height.</p>	<p>Wipe with clean cloth preferable yellow duster.</p>
 <p>Protractor</p>	<p>To measure the angles.</p>	<p>Wipe with clean cloth preferable yellow duster</p>
 <p>Compass set</p>	<p>Draw the circles and arcs.</p>	<p>The lead on the compass must be kept sharp.</p>
	<p>Lettering, drawing straight and curved lines.</p> <p>Pencils comes in different grades (H, B, F and HB).</p>	<p>Keep it sharpened at all times.</p>

 <p>Pencil</p>		
 <p>Pair of dividers</p>	<p>It is used to transfer the measured distances on maps and drawing</p>	<p>Always insure that the points remains sharp for accuracy</p>
 <p>Eraser</p>	<p>It is used to clean the dirt off the drawing. It is also used for making changes for correcting errors in drawing.</p>	<p>Use cotton cloth or soapy water to clean it. It must be totally dry before use.</p>

Dimensioning

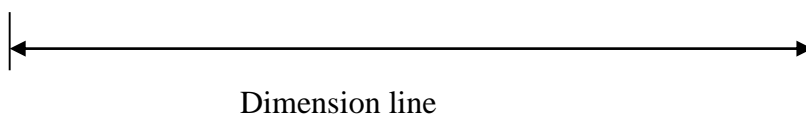
Dimensioning is a process of measuring the length, width or thickness.

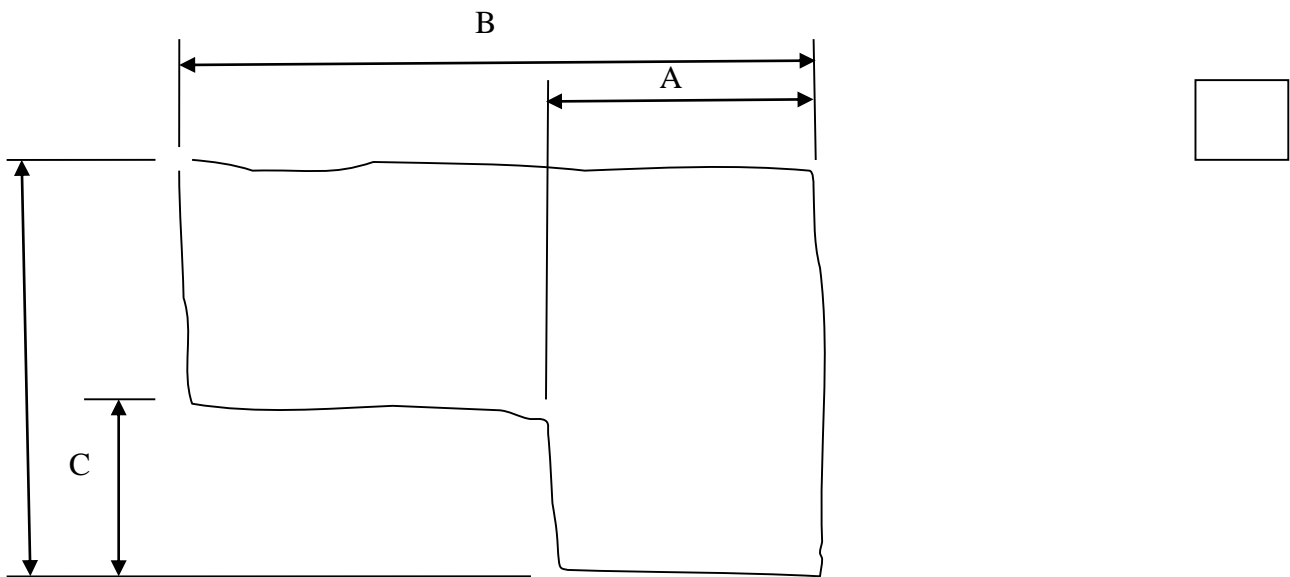
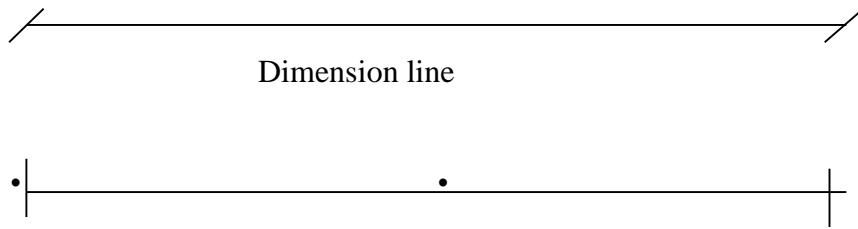
The purpose of dimensioning is to provide a clear and complete description of an object.

Dimensions should follow the following guidelines:

- All measurement must be strictly done in millimetres (mm)
- The given values should be accurate
- Dimensions must be placed in correct positions
- Correct dimension lines must be used
- Extension/ projection lines must not touch the object (or the drawing)

Examples of dimension lines





SCALE

The scale refers to the proportion or ratio between the dimensions adopted for the drawings and the corresponding dimensions of the object. The following scales will be used in this regard:

Scale 1:1 is a full scale. It implies that the drawing of an object is drawn the same or equal to the actual object.

Scale 1:2 is a reduced scale. It implies that the drawing is smaller than the actual object. Below is an example of reducing scales

1: 5

1: 10

1: 50

1: 100

Scale 2:1 is an enlarging scale. It implies that the drawing is bigger than the actual object.

Below is some example of enlarging scales.

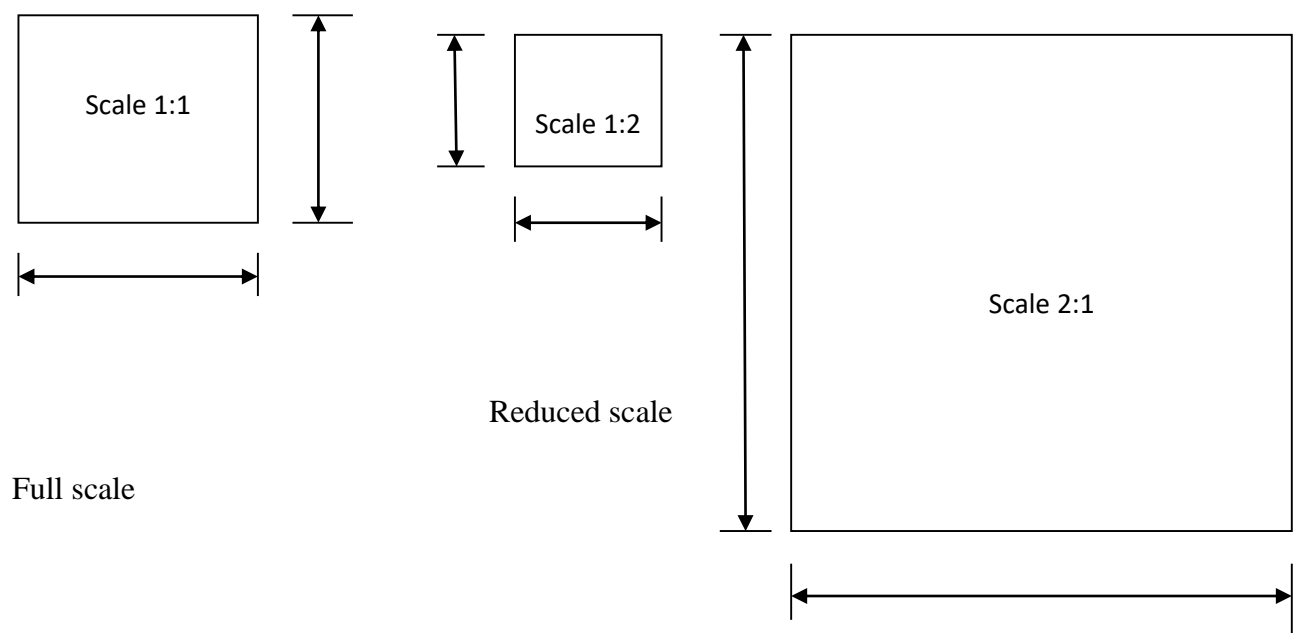
5:1

10:1

50:1









100:1

Application of scale



Enlarged scale

Line work

Line type	Description	General application
A 	Continuous line dark.	Visible outlines and edges.
B 	Continuous line light.	Dimension lines. Extension lines. Hatching lines. Leader lines.
C 	Continuous line very light.	Construction lines. Projection lines. Guidelines for printing.
D 	Dashed line light.	Hidden lines.
E 	Chain line light.	Centre lines. Pitch lines and circles. Lines indicating symmetry.
F 	Chain line light – dark ends.	Cutting planes.
G 	Short break line light.	Irregular boundaries.
H 	Long break line light.	Limits of views and sections, if the line is not an axis.

Lettering

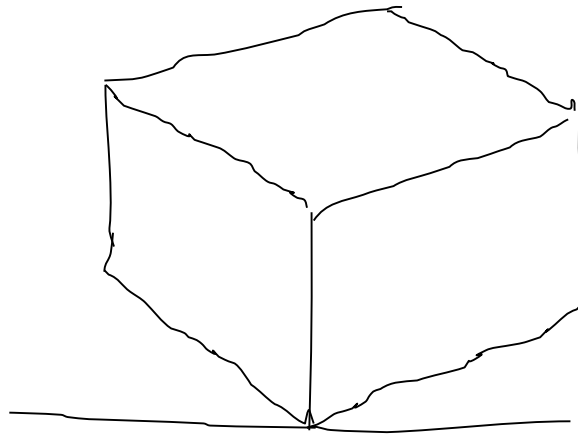
FREEHAND LETTERING

ABCDEFGHIJKLMNOPQRSTUVWXYZ &

1234567890

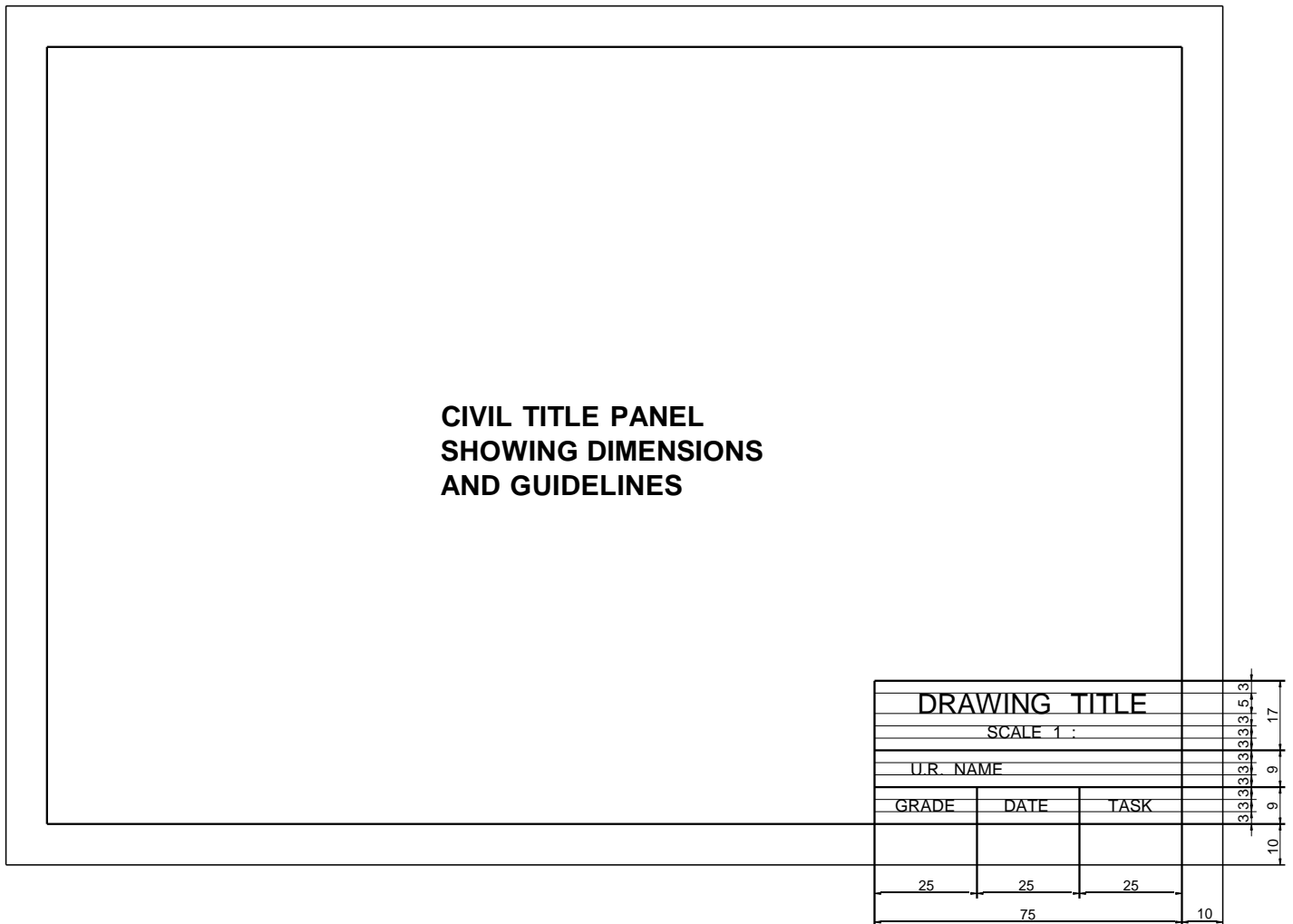
Freehand drawing

Freehand drawings or sketches refer to drawings that are done without mechanical help, such as guiding or measuring instruments. These sketches are drawn using a pencil and an eraser only.



Free hand sketch

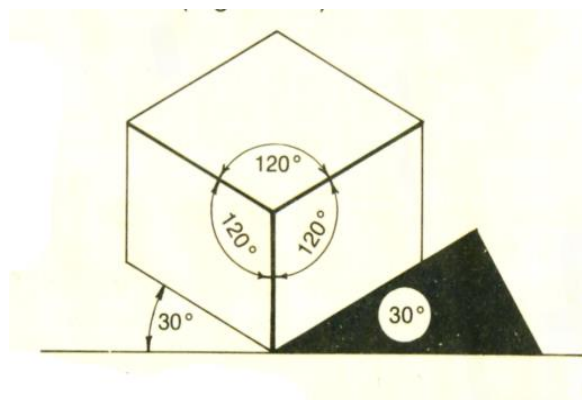
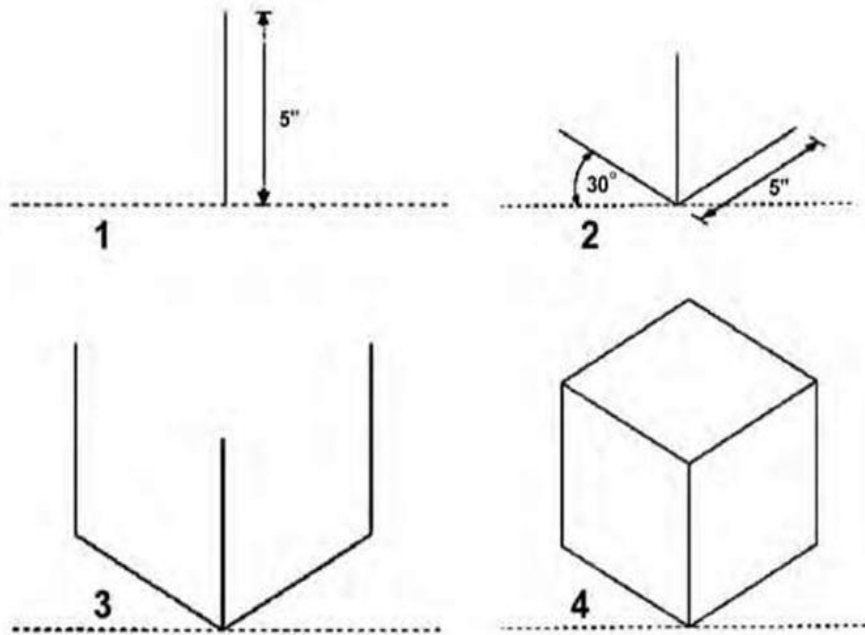
Setting up a drawing sheet



Isometric drawing

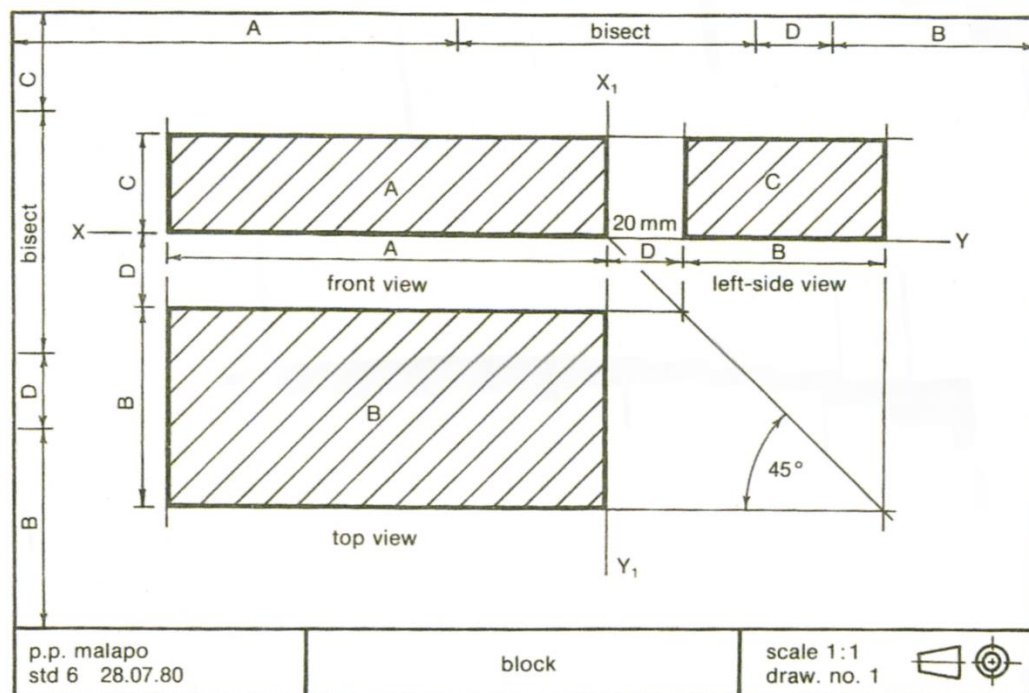
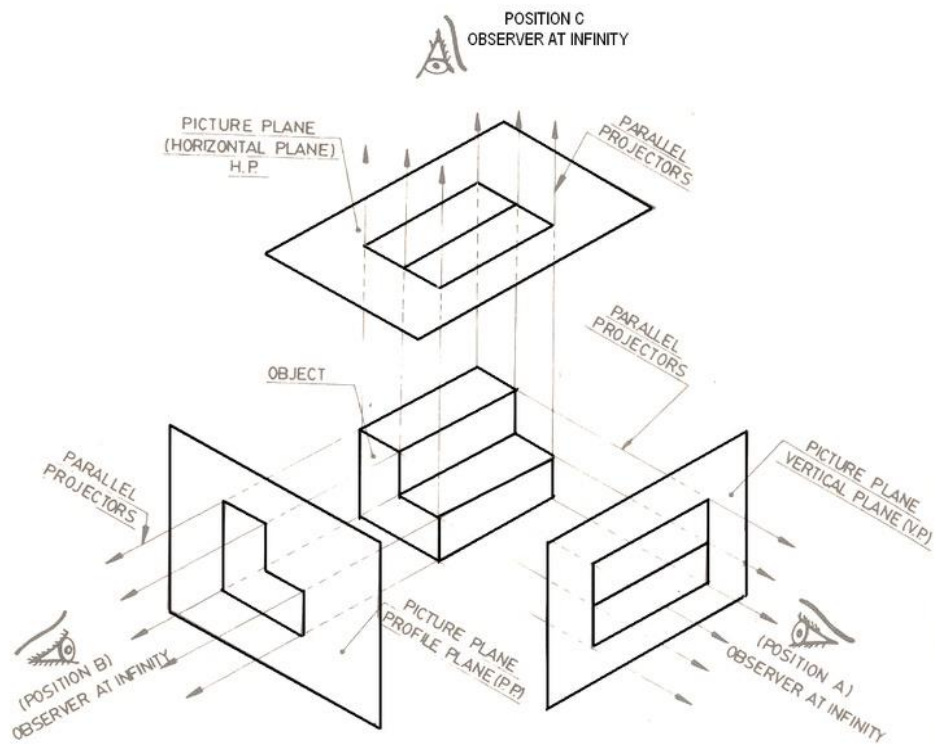
An isometric drawing shows three faces of an object at the same time. The following steps will show how to do isometric drawings:

1. Draw the vertical line on the horizontal line at 90° .
2. Draw the lines outward to the angle of 30° .
3. Mark on the line the width, height and the length of the block..
4. Complete the front side of the box.



Orthographic drawing (first angle projection)

When drawings are represented according to their visible sides.



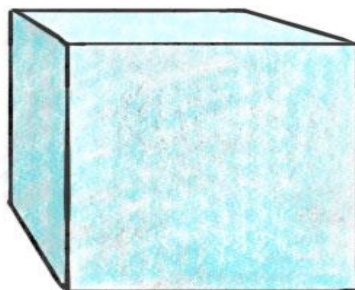
Single point perspective drawing

Single point perspective drawing makes an object look more real. The objects look like they converge at a certain point when a spectator is standing at a stationary point. The objects become smaller along and the lines called vanishing lines. The vanishing lines meet at a point in the distance and this point is called the vanishing point.



- Single point perspective uses one vanishing point.

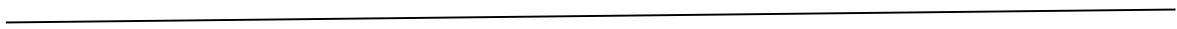
Example of a single vanishing point perspective cube



There are the six steps taken to arrive at perspective line drawing of the cube

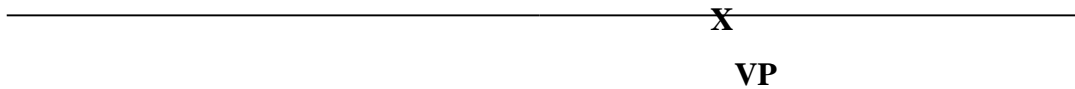
Step 1

Draw a horizon line. The horizon line is a horizontal line that represents the eye level of the scene



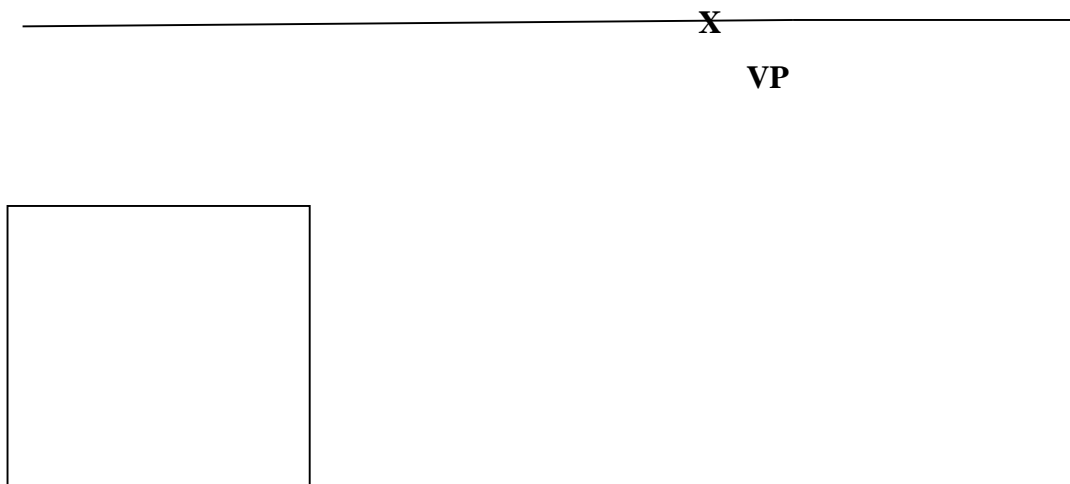
Step 2

Place a vanishing point on the horizon line.



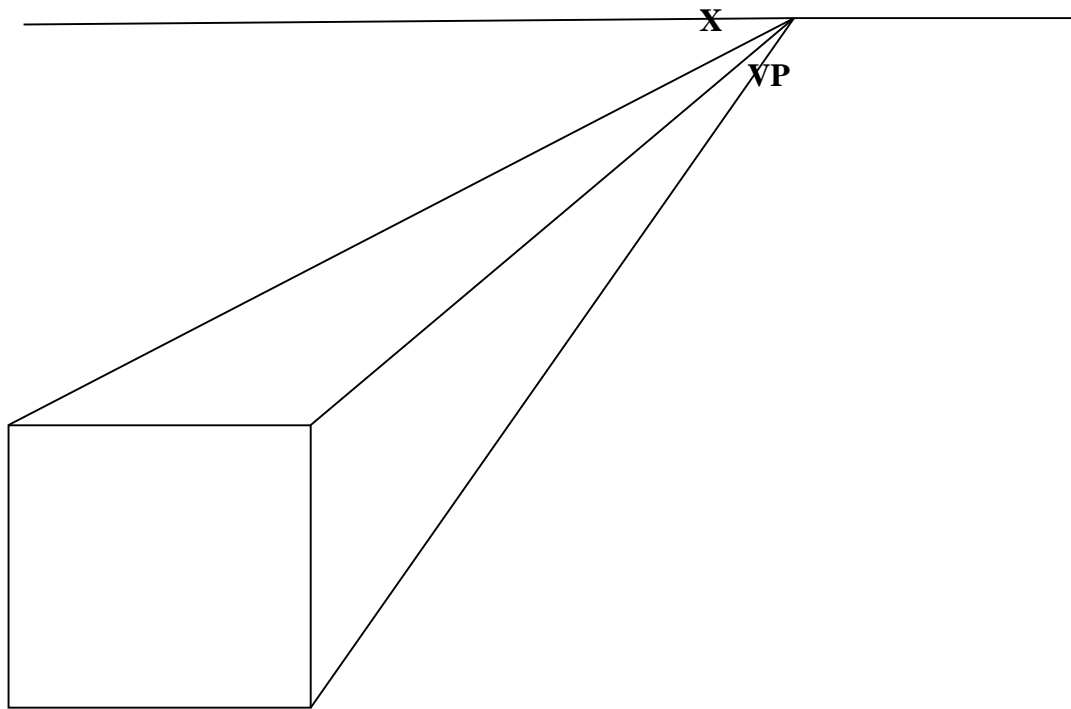
Step 3

Draw the front view of the cube



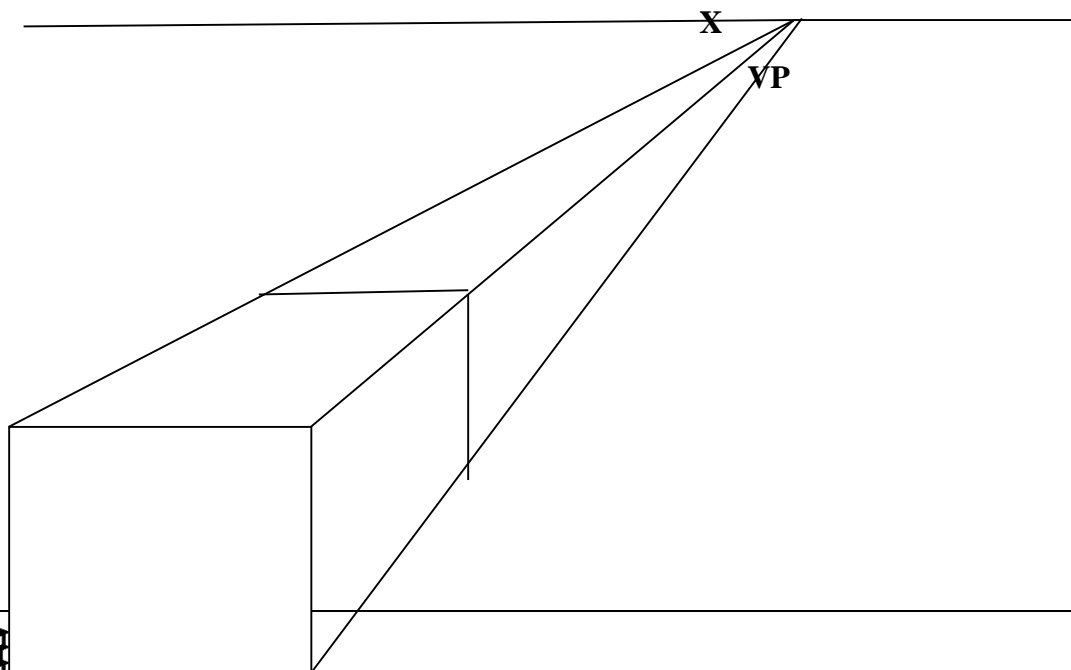
Step 4

Using feint lines (construction lines) connect the appropriate corners to the vanishing point.



Step 5

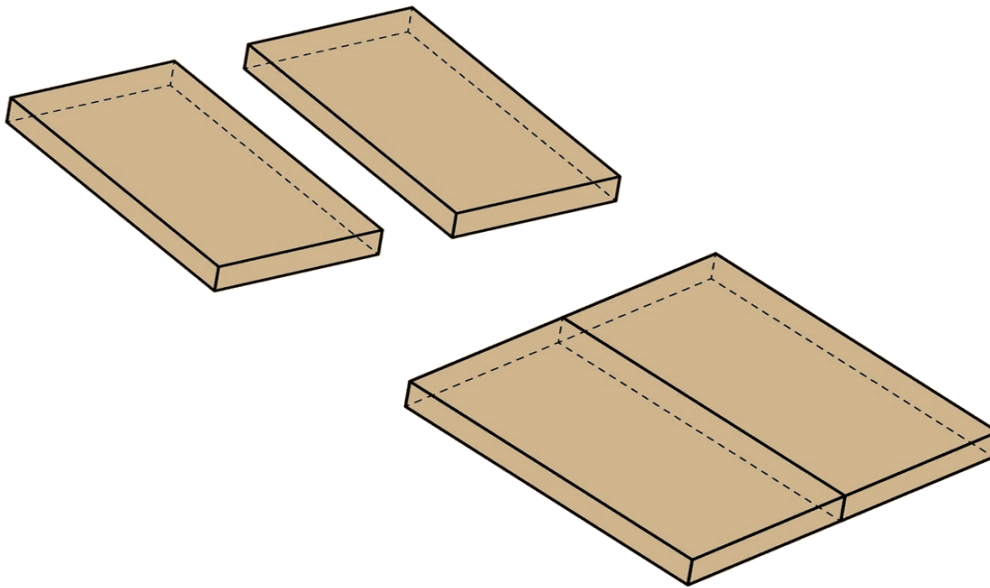
Draw a horizontal line parallel to the front edge. Draw a vertical line parallel the side line and darken.



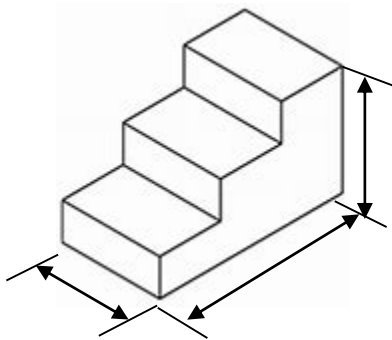
SELF ASSESSMENT

1. In an A4 sheet set up a drawing sheet with general name and title.

2. Using free hand redraw the following woodworking joint (Butt joint)



3. In first angle orthographic projection draw the front view, top view and the side view of the following object



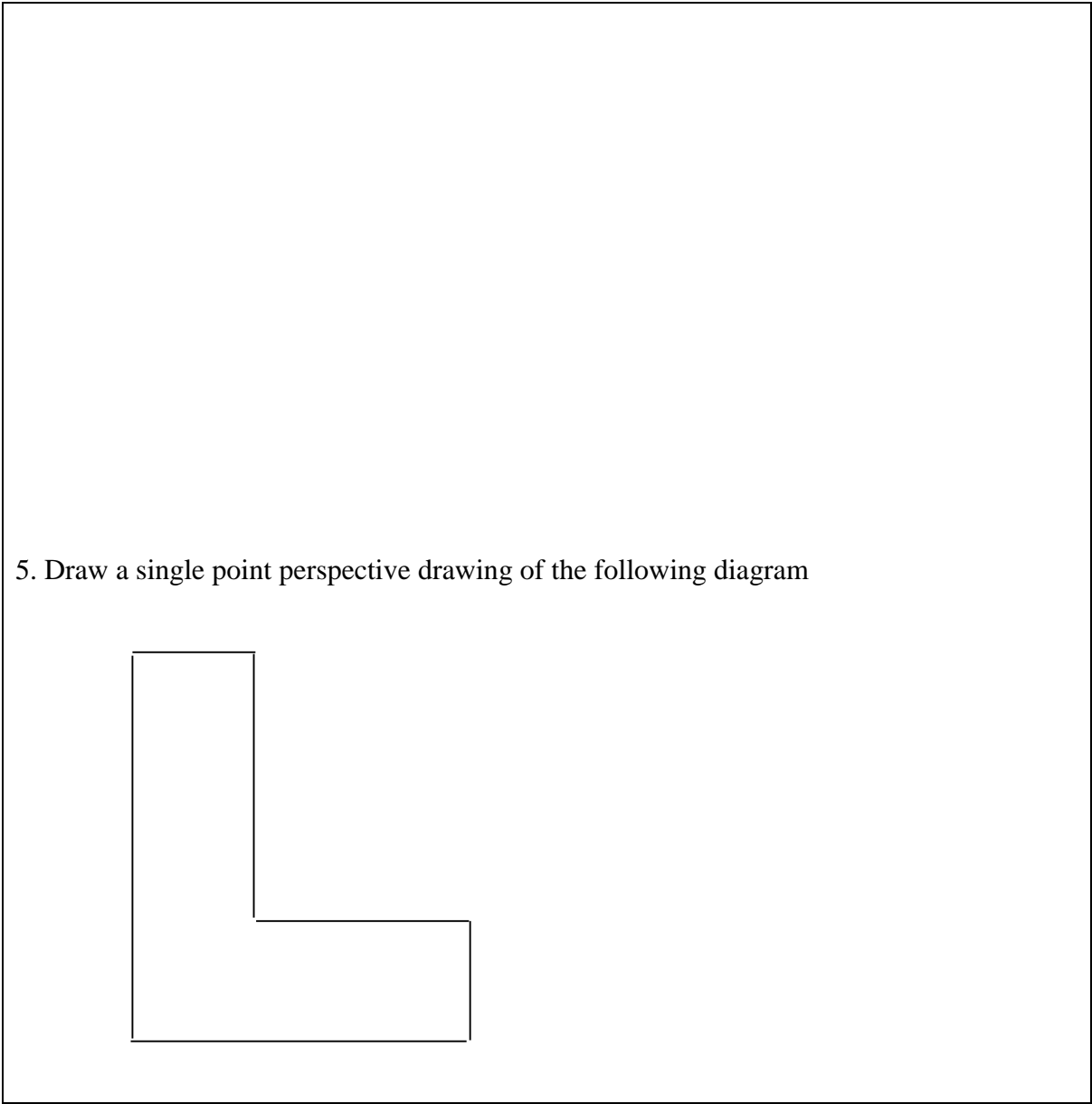
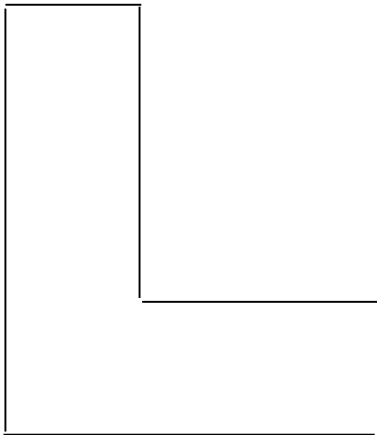
Dimensions: Length = 60

Width= 30

Height=45

4. Using the correct drawing instruments copy the object in figure 3 above

5. Draw a single point perspective drawing of the following diagram



TOOLS AND

EQUIPMENT

7. TOOLS AND EQUIPMENT

GENERAL SAFETY RULES REGARDING TOOLS AND EQUIPMENT

Always use the right tool for the job at hand. This is the first step towards the safe use of hand tools. Using the wrong tool for the job is definitely a step in the wrong direction and a sure way to injure yourself.

Most accidents and injuries in the workplace are associated with equipment and tool which are not handled with care. Here are a few precautions to consider when it comes to handling tools safely:

Basic Safety Rules for Hand Tools

- Always wear eye protection.
- Wear the right safety equipment for the job.
- Use tools that are the right size and right type for your job.
- Follow the correct procedure for using every tool.
- Keep your cutting tools sharp and in good condition.
- Don't work with wet, oily or greasy hands.
- Handle sharp-edged and pointed tools with care.
- Always carry pointed tools by your side with the points and heavy ends down.
- Secure all small work and short work with a vise or clamp.
- Never carry tools in your pockets.
- Don't use tools which are faulty or cracked.
- Keep your punches and chisels in good condition. Mushroomed heads can chip and cause injuries.
- Don't use a file without a handle.
- Don't pry or hammer with a file. It may shatter.
- Don't use screwdrivers as chisels or pry bars.
- Don't try to increase your leverage by using a "cheater" with a wrench. Wrenches are designed at the right strength for their size and length.
- After using a tool clean it and return it to its proper storage place.
- If anything breaks or malfunctions report it to your supervisor at once.
- Never place tools and materials where they hang over the edge of a bench.
- Don't use tools for things they were not meant for.
- Store tools and materials vertically, with the points and heavy ends pointing downwards.
- Cut away from yourself when you use chisels and other edged tools.
- Don't force screws; make sure that the correct screw for the job is being used.

Basic safety rules for electric power tools:

- Make sure lighting is good; if the area is artificially lit, not too much light or too little ensure that the lights do not cause a stroboscopic effect.

- Power tools should only be handled by one person at a time.
- There should be sufficient space around the machinery
- Never touch or attempt to adjust moving parts.
- Report any damaged or malfunctioning machinery.
- Follow the operating instructions and warning labels on the tool itself.
- Keep floors dry and clean to avoid slipping while working with or around potentially dangerous tools.
- Keep cords from presenting a tripping hazard.
- Never carry a power tool by its cord.
- Use tools that are double-insulated or have a three-pronged cord and are plugged into a grounded receptacle.
- All electrical power tools should have a double-action safety switch.
- All the hazardous, moving parts should be covered with guards or shield.
- Do not use electric tools in wet conditions unless they are approved for that use.
- Use a ground fault circuit interrupter (GFCI) or an assured grounding program.
- Use appropriate PPE.



ACTIVITY 1

1. Most accidents and injuries in the workplace are caused by unsafe handling of tools and equipment

1.1 Which precautions would you take against injuring yourself when using sharp tools?

1.2 How would you carry sharp tools in the workshop?

1.3 What would you do if a machine is faulty?

2. Why is it necessary to clean tools after using them?

3. List FIVE general safety precautions regarding hand tools.

4. In your own words, explain why electric power tools should not be used in wet conditions.

5. List FIVE general safety precautions regarding electrical power tools.

Entrepreneurship

What is Entrepreneurship?

Entrepreneurship is the act of creating a business or businesses while building and scaling it to generate a profit.

The meaning of entrepreneurship involves an entrepreneur who takes action to make a change in the world. Whether startup entrepreneurs solve a problem that many struggle with each day, bring people together in a way no one has before, or build something revolutionary that advances society, they all have one thing in common: **action**

Importance of Entrepreneurship

What is entrepreneurship really about? And why's it so important?

An entrepreneur is the person who sees a problem in the world and immediately focuses on creating the solution. They're the leaders that strike out on their own to improve society.

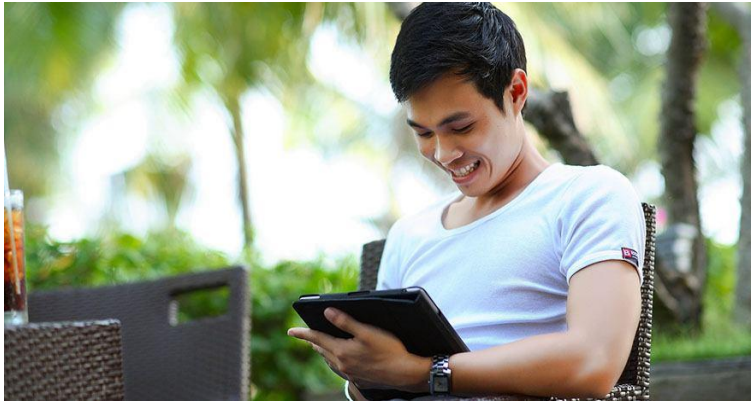
Whether they're creating jobs or a new product, they constantly take action to ensure world progress. In the process of understanding what is entrepreneurship, let's look at why entrepreneurs are important in society.

- **Entrepreneurs create jobs:** Without entrepreneurs, jobs wouldn't exist. Entrepreneurs take on the risk to employ themselves. Their ambition to continue their business' growth eventually leads to the creation of new jobs. As their business continues to grow, even more jobs are created. Thus, lowering unemployment rates while helping people feed their families.
- **Entrepreneurs create change:** Entrepreneurs dream big so naturally some of their ideas will make worldwide change. They might create a new product that solves a burning problem or take on the challenge to explore something never explored before. Many believe in improving the world with their products, ideas or businesses.
- **Entrepreneurship is the incubator of innovation.** Innovation creates disequilibria in the present state of order. It goes beyond discovery and does implementation and commercialization, of innovations. "Leapfrog" innovation, research, and development are being contributed by entrepreneurship.

Thus, entrepreneurship nurses innovation that provides new ventures, products, technology, market, quality of good, etc. to the economy that increases Gross Domestic Products and standard of living of the people.

Entrepreneurs give to society: While some have this notion of the rich being evil and greedy, they often do more for the greater good than the average person. They make more money and thus pay more in taxes which helps fund social services. Entrepreneurs are some of the biggest donors to charities and non-profits for various causes.

Why Do People Become Entrepreneurs



Every entrepreneur has their own ‘why’ that drove them to dive into being their own boss. Whether entrepreneurs need more freedom or to make the world a better place, they all take control of their life by living life on their own terms. Here are a few of the reasons why people become entrepreneurs:

- **To change the world:** Many entrepreneurs strive to make the world better. Whether entrepreneurs believe in space exploration, eliminating poverty or creating a practical but game-changing product, they ultimately build a brand in service of others. Some entrepreneurs use their business as a way to raise capital quickly to funnel into their noble causes. To social entrepreneurs, building an empire is about creating a better world for everyone.
- **They don’t want a boss:** Entrepreneurs often struggle with having a boss. They often feel suffocated, restricted and held back. Some entrepreneurs may feel that they have a more effective way of doing things. Others may dislike the lack of creative freedom. Ultimately, they become attracted to entrepreneurship to succeed on their own terms. Being the boss can be more fulfilling than having one.
- **They want flexible hours:** Entrepreneurship is often popular around those who need flexible hours. Many people with disabilities often enjoy entrepreneurship as it allows them to work when they’re able to. Parents with young children might also prefer entrepreneurship as it allows them to raise young children at home or pick them up from school without having to feel guilty about it.
- **They’re risk-takers:** Calculated risk taking and entrepreneurship go hand in hand. Entrepreneurs don’t apply to jobs, they create them. With that comes risk. Whether it’s the financial risk of starting your first brand or the risk from not knowing what to expect, business is risky. Entrepreneurs are often taking risks by trying things the average person won’t, to do things the average person can’t.

- **They can't get a job:** Many stumble into entrepreneurship when they can't get a job. Getting fired, a lack of experience or a criminal record can prevent the average person from getting a job when they're desperate. Instead of being defeated by their situation, they create new opportunities for themselves.
- **They don't fit into the corporate environment:** Entrepreneurs don't often thrive in corporate environments. It's often very restricting for their growth. They may dislike the lack of control they have in their role or the office politics. In general, you can spot an entrepreneur in a corporate environment as they're usually trying to gain more control in their role and learning their co-workers responsibilities to better understand how everything fits together.
- **They're curious:** Entrepreneurs love finding out the answer to the question, 'what will happen if...' They're experimental. Entrepreneurs love learning. They regularly read business books to advance their knowledge.
- **They're ambitious:** Those who love reaching difficult goals and milestones are made to be entrepreneurs. There's no limit to how much an entrepreneur can make and so they can always work to achieve higher levels of greatness. Since there's no limit to what they can achieve, entrepreneurs constantly find themselves growing and achieving more than they ever imagined.

Types of entrepreneurship

I want to be clear that there's a difference between types of entrepreneurship and the types of entrepreneurs.

There are four major types of entrepreneurship which are:

- **Small business entrepreneurship.** Believe it or not, this is the bread and butter of entrepreneurship. It makes up 99% of all companies and employs more than half of the non-government workforce. These are the people you see in your community like plumbers, carpenters, grocers, pharmacy owners etc. and either don't have the skill or motivation to expand their business. As a result, they're usually barely profitable.
- **Scalable start up entrepreneurship.** This is the type of entrepreneurship you hear about in the news and also where Silicon Valley investment tends to flow. Their mission from day one is to find a business model that's scalable. Not all of them are successful in that regard which is why investors have to bet big and often to make up for the losers.
- **Large company entrepreneurship.** This entrepreneurship from within huge conglomerates that already have established customer bases and market share. Why would they need entrepreneurship? Over time, consumer tastes change and products are no longer in vogue. If the large company doesn't innovate then they die a slow death.
- **Social entrepreneurship.** This is relatively new. Though they're still out for profit and sustainable business, they create products and services that solve social problems. For example, TOMS Shoes and their One For One campaign.

Factors affecting entrepreneurship

Entrepreneurship is essential for the development of any economy. Countries which have flourished attribute their rise to the growth of entrepreneurship. Therefore, governments and people all over the world want to encourage this concept. **Below are the factors which**

contribute to the growth of entrepreneurship and therefore to the growth of the economy of any given area.

Political Factors

Political factors play a huge role in the development of entrepreneurship in a given geographical area. This is because politicians decide the type of market that is in place. The market could be capitalistic, communist or some countries have adopted a mixed economy. Each of these three markets has very different implications for the way in which entrepreneurs are required to function. Capitalism requires breakthrough innovation whereas communism requires entrepreneurs to be well connected with the political class. Therefore, it has been observed that the more capitalistic any country is, the more entrepreneurship flourishes in the region.

Legal Factors

Entrepreneurs are dependent upon law for a wide variety of factors. The strength and fairness of the legal system of a nation affect the quality of entrepreneurship to a large extent. This is because entrepreneurs require a wide variety of legal services to function. For instance, entrepreneurs would require the courts to enforce the contracts that were entered to between parties. In many countries such contracts are not enforceable and therefore the resultant risk prohibits the development of entrepreneurship. Then again, the entrepreneurs are dependent on the courts for the protection of their property rights. Also, many advanced countries have noticed that the provision of declaring bankruptcy has been positively associated with the development of entrepreneurship. Entrepreneurs do fail a few times before they find the right innovation that leads to their success. The United States is amongst the countries with the highest rate of entrepreneurial development and it is also known to have one of the most advanced bankruptcy laws! Even business legends like Henry Ford had declared bankruptcy in their early days.

Taxation

The government can also influence a high degree of control on the market through provisions of taxation. Some amount of taxation is necessary for the government to maintain the legal and administrative systems in place for the entire economy. However, a lot of times governments resort to excessive taxation. They usually adopt the policy of beggaring the rich

and giving it off to the poor. This goes against the basic tenets of entrepreneurship which believes in survival of the fittest. Therefore, countries where tax regimes are restrictive find an outflow of entrepreneurs. In short, entrepreneurs want to set up shop in places where there is minimal interference from the government.

Availability of Capital

The degree to which the capital markets of a nation are developed also play a huge role in the development of entrepreneurship in a given region. Entrepreneurs require capital to start risky ventures and also require instant capital to scale up the business quickly if the idea is found to be successful. Therefore, countries which have a well developed system of providing capital at every stage i.e. seed capital, venture capital, private equity and well developed stock and bond markets experience a higher degree of economic growth led by entrepreneurship.

Labour Markets

Labor is an important factor of production for almost any kind of product or service. The fortunes of the entrepreneurs are therefore dependent on the availability of skilled labor at reasonable prices. However, in many countries labor has become unionized. They demand higher wages from the entrepreneurs and prohibit other workers from working at a lower price. This creates an upward surge in the costs required to produce and as such has a negative effect on entrepreneurship.

With the advent of globalization, entrepreneurs have witnessed the freedom to move their operations to countries where labor markets are more favorable to them. This is the reason why countries like China, India and Bangladesh have witnessed a huge rise in entrepreneurial activity in their countries.

Raw Materials

Just like labor, raw material consisting of natural resources is also an essential product required for any industry. In some countries this raw material is available through the market by paying a fair price. However, in some countries seller cartels gain complete control over these natural resources. They sell the raw materials at inflated prices and therefore usurp most of the profit that the entrepreneur can obtain. Therefore, countries where the supply of raw material faces such issues witness depletion in the number of entrepreneurial ventures over time.

Creation of a business plan

Every business needs to have a written business plan. Whether it's to provide direction or attract investors, a business plan is vital for the success for your organization. But, how do you write a business plan.

A business plan include:

- Executive summary -- a snapshot of your business
- Company description -- describes what you do
- Market analysis - research on your industry, market and competitors
- Organization and management -- your business and management structure
- Service or product -- the products or services you're offering
- Marketing and sales -- how you'll market your business and your sales strategy
- Funding request -- how much money you'll need for next 3 to 5 years
- Financial projections -- supply information like balance sheets
- Appendix -- an optional section that includes résumés and permits

However, getting started may be difficult to do. So, here are seven steps for writing a perfect business plan.

1. Research, research, research.

“Research and analyze your product, your market and your objective expertise. To write the perfect plan, you must know your company, your product, your competition and the market intimately.

In other words, it's your responsibility to know everything you can about your business and the industry that you're entering. Read everything you can about your industry and talk to your audience.

2. Determine the purpose of your plan.

A business plan, as defined by Entrepreneur, is a “written document describing the nature of the business, the sales and marketing strategy, and the financial background, and containing a

projected profit and loss statement.” However, your business plan can serve several different purposes.

As Entrepreneur notes, it’s “also a road map that provides directions so a business can plan its future and helps it avoid bumps in the road.” That’s important to keep in mind if you’re self-funding or bootstrapping your business. But, if you want to attract investors, your plan will have a different purpose and you’ll have to write a plan that targets them so it will have to be as clear and concise as possible. When you define your plan, make sure you have defined these goals personally as well.

3. Create a company profile.

Your company profile includes the history of your organization, what products or services you offer, your target market and audience, your resources, how you’re going to solve a problem and what makes your business unique. When I crafted my company profile, I put this on our About page.

Company profiles are often found on the company’s official website and are used to attract possible customers and talent. However, your profile can be used to describe your company in your business plan. It’s not only an essential component of your business plan; it’s also one of the first written parts of the plan.

Having your profile in place makes this step a whole lot easier to compose.

4. Document all aspects of your business.

Investors want to make sure that your business is going to make them money. Because of this expectation, investors want to know everything about your business. To help with this process, document everything from your expenses, cash flow and industry projections. Also, don’t forget seemingly minor details like your location strategy and licensing agreements

5. Have a strategic marketing plan in place.

A great business plan will always include a strategic and aggressive marketing plan. This typically includes achieving marketing objectives such as:

- Introducing new products
- Extending or regaining market for existing products
- Entering new territories for the company
- Boosting sales in a particular product, market or price range. Where will this business come from? Be specific.
- Cross-selling (or bundling) one product with another
- Entering into long-term contracts with desirable clients
- Raising prices without cutting into sales figures
- Refining a product
- Having a content marketing strategy
- Enhancing manufacturing/product delivery

“Each marketing objective should have several goals (subsets of objectives) and tactics for achieving those goals,” states Entrepreneur.

“In the objectives section of your marketing plan, you focus on the ‘what’ and the ‘why’ of the marketing tasks for the year ahead. In the implementation section, you focus on the practical, sweat-and-calluses areas of who, where, when and how. This is life in the marketing trenches.”

Of course, achieving marketing objectives will have costs. “Your marketing plan needs to have a section in which you allocate budgets for each activity planned,” Entrepreneur says. It would be beneficial for you to create separate budgets for internal hours (staff time) and external costs (out-of-pocket expenses).

6. Make it adaptable based on your audience.

“The potential readers of a business plan are a varied bunch, ranging from bankers and venture capitalists to employees,” states Entrepreneur. “Although this is a diverse group, it is a finite one. And each type of reader does have certain typical interests. If you know these interests up-front, you can be sure to take them into account when preparing a plan for that particular audience.”

For example, bankers will be more interested in balance sheets and cash-flow statements, while venture capitalists will be looking at the basic business concept and your management

team. The manager on your team, however, will be using the plan to “remind themselves of objectives.”

Because of this, make sure that your plan can be modified depending on the audience reading your plan. However, keep these alterations limited from one plan to another. This means that when sharing financial projections, you should keep that data the same across the board.

7. Explain why you care.

Whether you’re sharing your plan with an investor, customer or team member, your plan needs to show that you’re passionate and dedicated, and you actually care about your business and the plan. You could discuss the mistakes that you’ve learned, list the problems that you’re hoping to solve, describe your values, and establish what makes you stand out from the competition.

When I started my payments company, I set out to conquer the world. I wanted to change the way payments were made and make it easier for anyone, anywhere in the world to pay anyone with few to no fees. I explained why I wanted to build this. My passion shows through everything I do.

By explaining why you care about your business you create an emotional connection with others so that they’ll support your organization going forward.



ACTIVITY 2

1. Define the term ‘entrepreneur’.
2. What are the THREE important aspects of entrepreneurship.
3. Name FOUR major types of entrepreneurship.
4. What are the factors that affect entrepreneurship?

