

BA SANGAM COLLEGE
YEAR 11
APPLIED TECHNOLOGY
WORKSHEET 5

Subject: Applied Technology	Year/Level: 11	
Week: 5	Lesson 1	Date:
Topic: Machines and Engine (Portable Electric Belt Sander)		

LESSON PREPARATION:

- Prepared lesson notes
- prepared follow up work

PREVIOUS LEARNING/PRIOR ASSOCIATED LEARNING:

Based on the machine learnt in this lesson, students have not yet seen or work with a portable electric sander but the process and operation of the machine is very relevant and similar to the portable power planer machine.

LEARNING OBJECTIVES:

At the end of the lesson, students should be able to:

Cognitive Domain:

- 1) Know and understand the characteristic and properties of a portable electric sander

Psychomotor Domain:

- 1) Operate the learn power tool.
- 2) Apply all the safety measures when operating the electric belt sander.

Affective Domain:

- 1) Appreciate the application of the power tools when using it.

TEACHING RESOURCES (MATERIAL AND VISUAL AIDS)

- Lesson notes

FOLLOW UP WORK:

- Students Activity

LESSON NOTES:

Portable Electric Belt Sander:

Most sanders have some means of collecting the wood dust. In some machines a dust bag is fitted to the machine, while in other a flexible hose is provided which may be connected to an ordinary domestic vacuum cleaner or similar unit.

The portable electric belt sander is a light easily used tool weighing only between 4.5 and 6.8 kg depending on the type and model. Its size is usually named for the width of the belt; for example a 75mm sander has an endless belt 75mm wide. This is the usual size, although they are made in sizes from 50mm to larger than 100mm.



Safe Operation Use of the Portable Electric Belt Sander:

To use the portable Electric Belt sander *CORRECTLY* and *SAFELY* you MUST:

- Do not switch the machine on or off while it is resting on the work.
- Allow the machine to gain full speed before lowering it carefully on to the work. Lower the sanders so that the back part of the belt touches first, then quickly bring it to the horizontal position.
- Move the sander backwards and forwards and from side to side without too much pressure. It should go a little over the edges of the work.
- If the surface to be sanded is rough, the machine may be used across the grain in a diagonal direction. Final standing is carried out with the grain.
- Keep the power cable clear of the work or it may be overrun on the backward stroke of the sander, causing it to be caught up the wrapped around the rollers.
- Keep the spare belts in a dry, warm place.

Orbital Finishing Sander:

The orbital finishing sander is a small electric, hand-sanding machine for fine finishing work. It is driven by a small electric motor which supplies power to a base plate which moves with the flat orbital (circular) motion. The orbital movement is usually about 8mm in diameter and it makes 4000 to 5000 of these a minute depending on the make of the tool.



STUDENTS ACTIVITY:

- i. Explain the process in which this machine is used for.

- ii. Describe three sanding safety operation one need to carried out on when working with a portable electric belt sander.

Reference:

Year 11 Applied Technology Textbook, MEHA.

INDUSTRIAL ARTS DEPARTMENT LESSON PLAN

Subject: Applied Technology	Year/Level: 11	
Week: 5	Lesson 2	Date:
Topic: Machine and Engine (Portable Electric Drill)		

LESSON PREPARATION:

- Prepared lesson notes
- prepared follow up work

PREVIOUS LEARNING/PRIOR ASSOCIATED LEARNING:

Students have learned in the previous lesson the different types of portable power tools with how they work and their safety measures. Students have also grasp some fundamental knowledge on the uses of drills as they have covered it in year 9 basic technology based on hand tools.

LEARNING OBJECTIVES:

At the end of the lesson, students should be able to:

Cognitive Domain:

- 1) Know and understand the different parts of portable electric drill.

Psychomotor Domain:

- 1) Operate an electric portable drill.
- 2) Apply all safety measures when operating a portable electric drill.

Affective Domain:

- 1) Demonstrate hands-on skills on a given work piece and enjoy operating the machine.

TEACHING RESOURCES (MATERIAL AND VISUAL AIDS)

- Lesson notes

FOLLOW UP WORK:

- Students Activity

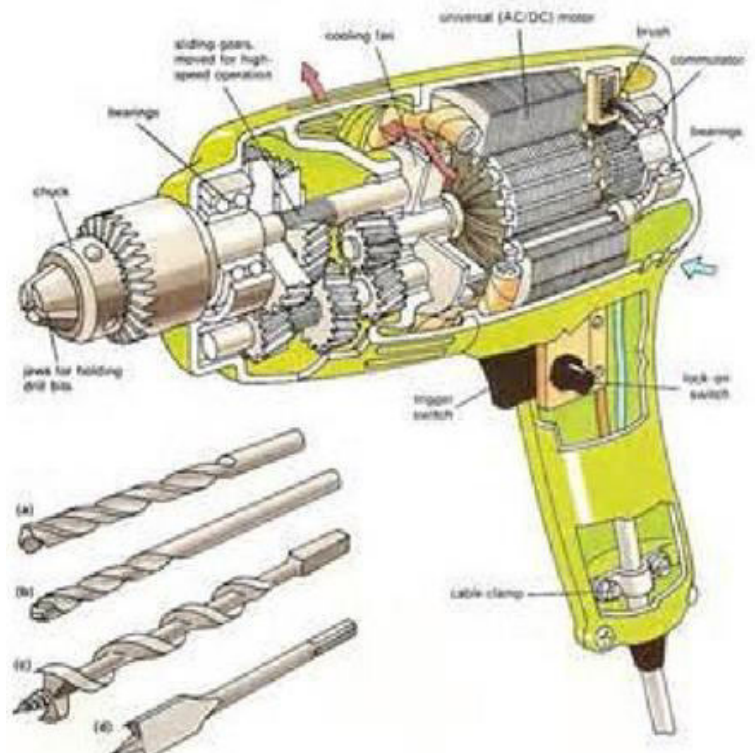
LESSON NOTES:

Portable Electric Drill:

- The portable electric drill is the most commonly used electric tool, 6mm drill being the most popular.

Drill Size:

- The size of the drill refers to the maximum diameter of bit or accessory which can be held in the chuck.
- Thus the 6 mm drill will take any bit or accessory which has a 6 mm shank.
- This means that holes larger than 6 mm can be as long as the shank is not larger than 6 mm in diameter.
- However, it is wise not to bore hole much larger than this size because of the possibility of overloading the motor.



Chuck:

There are three common types of chucks: those tightened by hand like an ordinary hand drill, those tightened by an Allen key and those tightened by a geared key. The geared key is the most satisfactory type as it provides a quick, effective means of holding the bit firmly in the chuck. The key is usually fastened to the cable by a light chain to prevent loss.



Safe Operation and Use of the portable Electric

Drill:

To use the portable Electric drill *CORRECTLY* and *SAFELY* you MUST:

- Do not use switch lock when hand drilling.
- Make sure the job is secure and over a waste block if drilling right through.
- Use a drill stand if possible-drilling pressure can be control more easily than with free hand drilling.
- Make sure the drill or bit is secure in the chuck- remove chuck key.
- Allow the motor to attain full speed before commencing to drill.
- Back the drill or bit out of the hole frequently to remove chips.
- Remove pressure as the tool commences to through the wood or metal.
- Make sure the drill or bits are sharp and are properly sharpened.

STUDENTS ACTIVITY:

1. Give some of the reasons of the breakage of drilling bits.

2. Why do we use eye goggles in drilling?

3. What is the main purpose of the chuck?

4. There are three common types of chucks. Name these three types of chucks.

Reference:

Year 11 Applied Technology Textbook, MEHA

INDUSTRIAL ARTS DEPARTMENT LESSON PLAN

Subject: Applied Technology	Year/Level: 11	
Week: 5	Lesson 3	Date:
Topic: Machines and Engine (Grinders)		

LESSON PREPARATION:

- Prepared lesson notes
- prepared follow up work

PREVIOUS LEARNING/PRIOR ASSOCIATED LEARNING:

Based on the previous lesson, students have learned the different types of portable machines where they have discovered some new things as application wise. Students have fundamental knowledge on the different aspects a machine cater especially for the grinder.

LEARNING OBJECTIVES:

At the end of the lesson, students should be able to:

Cognitive Domain:

- 1) List down all the safety precaution when operating and using the jig saw.

Psychomotor Domain:

- 1) Use the jig saw on a given work piece.
- 2) Apply all the safety precaution when operating the jig saw.

Affective Domain:

- 1) Appreciate the application of the jig saw when given a work piece.

TEACHING RESOURCES (MATERIAL AND VISUAL AIDS)

- Lesson notes

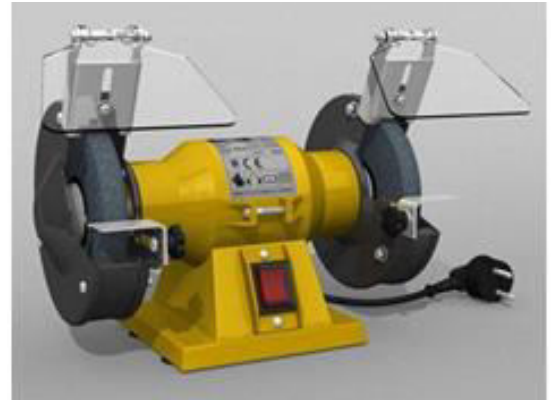
FOLLOW UP WORK:

- Students Activity

LESSON NOTES:

Grinders:

- A grinding machine, often shortened to grinder, is any of various power tools or machine tools used for grinding, which is a type of machining using an abrasive wheel as the cutting tool.
- Each grain of abrasive on the wheel's surface cuts a small chip from the work piece via shear deformation.
- Grinding is used to finish work pieces that must show high surface quality (e.g., low surface roughness) and high accuracy of shape and dimension.
- As the accuracy in dimensions in grinding is on the order of 0.000025 mm, in most applications it tends to be a finishing operation and removes comparatively little metal, about 0.25 to 0.50 mm depth.



Angle Grinder:

- An angle grinder, also known as a side grinder or disc grinder, is a handheld power tool used for cutting, grinding and polishing.
- Angle grinders typically have an adjustable guard and a side-handle for two-handed operation.
- There are many different kinds of discs that are used for various materials and tasks, such as cut-off discs (diamond blade), abrasive grinding discs, grinding stones, sanding discs, wire brush wheels and polishing pads.
- The angle grinder has large bearings to counter side forces generated during cutting, unlike a power drill, where the force is axial.



Safety:

- Angle grinders are widely used in metalworking and construction, as well as in emergency rescues.
- They are commonly found in workshops, service garages and auto body repair shops angle grinders produce sparks when cutting ferrous metals.
- They also produce shards cutting other materials. The blades themselves may also break. This is a great hazard to the face and eyes especially, as well as other parts of the body, and as such, a full face shield must be worn and other protective clothing.
- Angle Grinders should never be used without their guard or handle attached; they are there as a necessary precaution for safety.
- All work should be securely clamped or held firmly in a vice.

STUDENTS ACTIVITY:

1. Explain the process that this machine is used for.

2. Name another portable power tool that plays the same role as grinder does.

3. Why do we use face shield when grinding?

Reference:

Year 11 Applied Technology Textbook, MEHA.

Subject: Applied Technology	Year/Level: 11	
Week: 5	Lesson 4	Date:
Topic: Machines and Engine (Buffer)		

LESSON PREPARATION:

- Prepared lesson notes
- prepared follow up work

PREVIOUS LEARNING/PRIOR ASSOCIATED LEARNING:

Students have fundamental knowledge on this topic as some of the machine covered in the previous lesson is very similar to this machine (Buffer)

LEARNING OBJECTIVES:

At the end of the lesson, students should be able to:

Cognitive Domain:

- 1 Know the name of the machine with the uses of the machine.

Psychomotor Domain:

- 1 Operate the machine.
- 2 Apply all the safety measures when operating the machine.

Affective Domain:

- 1) Appreciate the application of the machine.

TEACHING RESOURCES (MATERIAL AND VISUAL AIDS)

- Lesson notes

FOLLOW UP WORK:

- Students Activity

LESSON NOTES:

Buffer:

Buffing and polishing using wheels and 'compounds' is somewhat like using wet and dry sanding paper, only much faster. Instead of using 'elbow grease' you will be using the power and speed of an electric motor.

The edge, or face, of the wheel is the 'sanding block', which carries a thin layer of 'compound' which is the sandpaper. Varying types of wheel are available, and the different grades of compound are scaled similar to sandpaper. The compounds are made from a wax substance which has the different abrasive powders added to it. When this hard block is applied to the edge of a spinning buffing wheel, the heat from the friction melts the wax, and both wax and abrasive are applied in a thin slick to the face of the wheel.



Safety:

Basic safety rules should be followed when using the polishing/buffing machine.

1. Always wear goggles - small pieces of mop and polish will fly out of the machine whilst it is being used. Goggles will prevent damage to eyes.
2. Always wear an apron or overall. These will hold back loose clothing. For example, a tie could easily be caught by the rotating mop, this would pull the machine operator into the polisher. This would result in a very dangerous and possibly fatal accident.
3. Always apply the work to the lower portion of the mop, never the top.
4. Never allow the top edge of the work to be caught by the mop.
5. Always be ready to use the foot stop (emergency stop button). Have your foot ready to press it if necessary.
6. Although the buffing machine has two mops that rotate at the same time. The machine can only be operated by one person.

STUDENTS ACTIVITY:

1. Explain the process carried out when using this machine (Buffer).

2. Why do we use eye goggles when operating this machine (Buffer)?

3. How many mop is available in a buffing machine?

Reference:

Year 11 Applied Technology Textbook, MEHA.

Subject: Applied Technology	Year/Level: 11	
Week: 5	Lesson 5	Date:
Topic: Carpentry and Joinery (Grain)		

LESSON PREPARATION:

- Prepared lesson notes
- prepared follow up work

PREVIOUS LEARNING/PRIOR ASSOCIATED LEARNING:

Students have thorough knowledge on this topic as they have learn the basics from year 9 and year 10 syllabi on the topic materials when dealing with timber.

LEARNING OBJECTIVES:

At the end of the lesson, students should be able to:

- Identify the different types of grain.
- Demonstrate hands-on skills when working along the grain or across the gain.
- Know the type of tool and machine that is used for the grain.
- Measure the length of the timber, width of the timber and thickness of the timber.

TEACHING RESOURCES (MATERIAL AND VISUAL AIDS)

- Lesson notes

FOLLOW UP WORK:

- Students Activity

LESSON NOTES:

CARPENTRY AND JOINERY

Grain:

- The grain refers to the direction of the wood fibres and cells in the timber piece.
- It is caused by the development of these in the growing tree and affected by subsequent milling.

With the Grain

- refers to the direction of planing, when the fibres are pushed down by the cutting iron, to give a smooth surface.

Against the Grain

- refers to planing when the plane is pushed in the opposite direction and the fibres are pushed up giving a rough surface.

Across the Grain

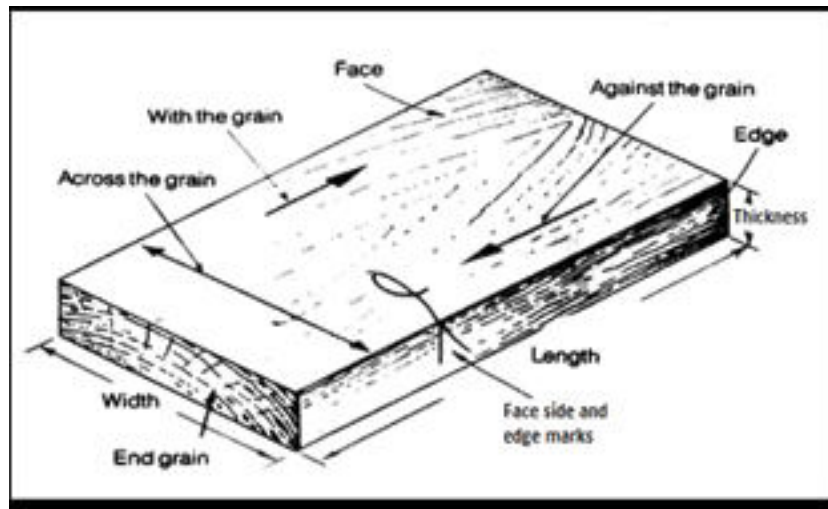
- refers to working or setting out done across the fibres, i.e., at right angles to the length.

End Grain

- The end grain is porous surface of the timber exposed after cutting across the fibres.

Working End Grain

- due to the direction of the fibres, end grain planing will cause splitting unless care is taken.
- On wide boards, the ends should be planed from the corners so that the cutting iron moves only slightly past the centre.
- On narrow boards a chamfer cut on the corner away from the operator allows the cut to be carried through and prevents the back corner from splitting.
- Scrap timber firmly cramped against the back edge of the board also allows planing across the end grain.
- This method should be used where a chamfer cannot be cut.



- The technique of skewing the plane slightly when working end grain gives a slicing action and allows the plane to be pushed more easily and gives a better finish.
- End grain may also be finished on the shooting board or by disc sanding.

Length of Timber

- The length of timber is measured along the grain on the face of the piece.

Width of Timber

- The width of timber is measured across the grain on the face of the piece.

Thickness of Timber

- The thickness of timber is measured across the grain on the edge of the piece.

STUDENTS ACTIVITY:

1. What do you understand by the term grain?

2. Define the following terms:

- a. With the grain

- b. Against the grain

- c. Across the grain

- d. End Grain

Reference:

Year 11 Applied Technology Textbook, MEHA.