

INDUSTRIAL ARTS: CARPENTRY (PREPARING STAKEOUT BUILDING LINES) Learner's Material

This instructional material was collaboratively developed and reviewed by educators from public and private schools, colleges, and/or universities. We encourage teachers and other education stakeholders to email their feedback, comments, and recommendations to the Department of Education at action@deped.gov.ph.

We value your feedback and recommendations.

**Department of Education
Republic of the Philippines**

Technology & Livelihood Education – Grade 9
Industrial Arts: Carpentry - (Preparing Stakeout Building Lines)
Learner’s Material
First Edition, 2014

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Content Standard	Performance Standard
The learner demonstrates understanding in staking out building lines.	The learner independently prepares materials and stake out building lines in carpentry based on construction standards.

PREPARING STAKEOUT BUILDING LINES

I. INTRODUCTION

Welcome to the Learners Module in “**Carpentry NC II TLE Grade 9**” This module contains training materials and activities for you to complete.

The unit of competency “**Prepare Stake-out Building Lines**” contains the knowledge, skills and attitudes required for a Carpentry NC II TLE Grade 9 course.

You are required to go through a series of learning activities in order to complete each of the learning outcomes of this module. In each learning outcome there are **Information Sheets and Activity Sheets**. Follow these activities on your own and answer the **Self-Check** at the end of each learning activity.

PREPARE TOOLS, EQUIPMENT AND MATERIALS FOR STAKEOUT BUILDING LINES

- Identify tools and materials for stakeout building lines
- Prepare tools, materials and necessary permit for stakeout building lines.
- Select appropriate Personal Protective Equipment (PPE)

PRE/DIAGNOSTIC ASSESSMENT

Directions: Match column A with column B. Write your answers on your notebook.

A

1. Falling objects
2. Objects that could puncture the skin
3. Objects that could roll over the worker’s feet
4. Radiation
5. Toxic chemicals
6. Excessive noise

B

- A. Safety shoes
- B. Hard hat
- C. Goggles
- D. Respirators
- E. Gloves
- F. Ear muff

- | | |
|---|--------------------|
| 7. A requirement in constructing a building | G. Plumb bob |
| 8. It is used to check the verticalness | H. Steel square |
| 9. It is used to check squareness | I. Claw hammer |
| 10. It is used to drive and pull out nails | J. Building permit |

INFORMATION SHEET 1.1

TYPES AND USES OF PERSONAL PROTECTIVE EQUIPMENT (PPE)

The use of protective clothing and equipment is not the only solution for preventing accident.

It is most important to understand that the primary protection against accidents is to identify possible hazards and take the necessary safety measures to eliminate the hazard.

When necessary, workers should be provided with protective clothing and other personal protective equipment.



Types of Personal Protective Equipment (PPE)

1. **Eye and face protection** Goggles and face protection must be worn to protect workers from flying particles, liquid chemicals, acids, chemical gases or vapors. Workers must also be protected from radiation during welding, touching, soldering, brazing and other operations that emit light.
2. **Head protection** Hard hats must be worn where there is danger of falling objects. Specialized hard hats are required to reduce electrical shock hazards.
3. **Foot protection** Safety shoes with impact protection are required in work areas where heavy objects or tool could be accidentally dropped on the feet.

Safety shoes with puncture protection are required when working around nails, wires, tacks, scrap metal and other objects that could pierce the feet.

4. **Hand protection** Gloves are required to protect workers from cuts, scrapes, punctures, burns, chemical absorption or extreme temperature
5. **Hearing protection** Appropriate ear muffs or ear plugs should be worn to lessen the noise in the workplace.
6. **Respirators:** Appropriate respirators must be worn as a last resort if it is not possible to ventilate the work area properly.

SELF-CHECK 1.1

TYPES AND USES OF PERSONAL PROTECTIVE EQUIPMENT (PPE)

Directions: Match column A with column B. Write your answers on your notebooks

A

1. Falling objects
2. Objects that could roll over the worker's feet
3. Heat
4. Radiation
5. Toxic chemicals
6. Excessive noise

B

- a. Safety shoes
- b. Hard hats
- c. Goggles
- d. Respirator
- e. Gloves
- f. Ear muff

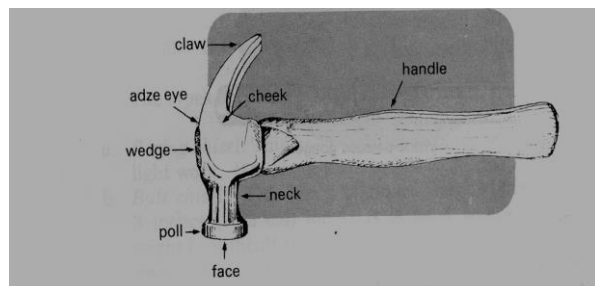
INFORMATION SHEET 1.2

TOOLS AND MATERIALS USED FOR STAKING-OUT BUILDING LINES

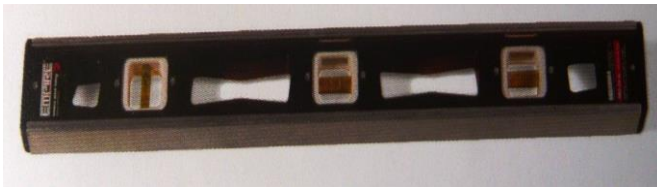
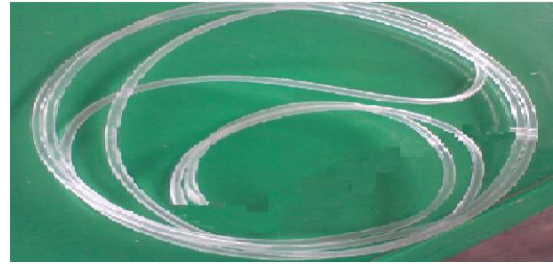
It is very important to know the names and proper use of each of the various tools we need in our works. In addition, application on their proper care and maintenance will give the following advantages: efficiency of the work, quality speed, accomplishment, and accuracy.

Tools and Materials

1. **Claw hammer** is used for driving and pulling out nails.

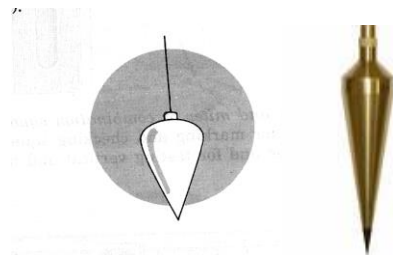


2. **Water hose level** is used to determine the horizontal levelness of batter boards, and parts of the building such as beam, floorings and others.



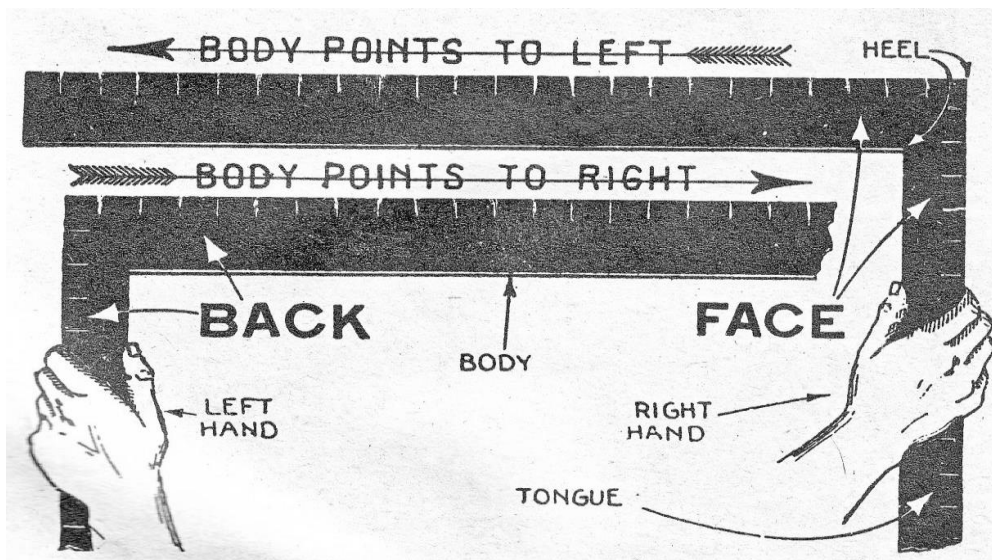
3. **Bar Level or Spirit Level** is a tool used to test the horizontal levelness of the surfaces of material. It is framed in aluminum or wood.

4. **Plumb bob** is a cone shaped metal suspended on a string and is used to check the verticalness of post or column and other.

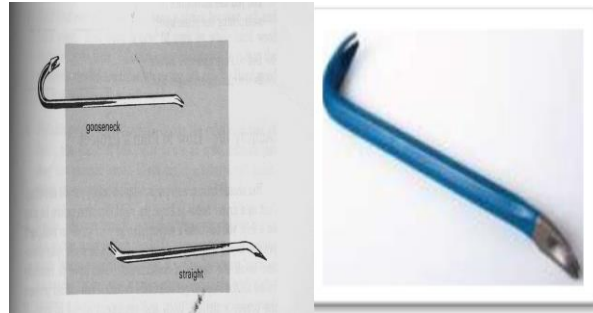


5. **Nylon string** is used to indicate the sides of the building.

6. **Steel square** is L-shaped with one arm forming a perfect right angle to the other. It is used to check the squareness of the corner of a particular object.

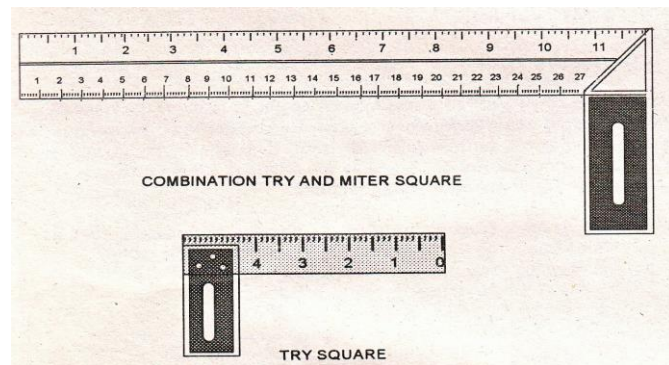


7. **Ripping/Wrecking bar** is used to pull out long nails. This may be straight or gooseneck. It has a nail slot for pulling out spikes and wedging apart nailed boards.

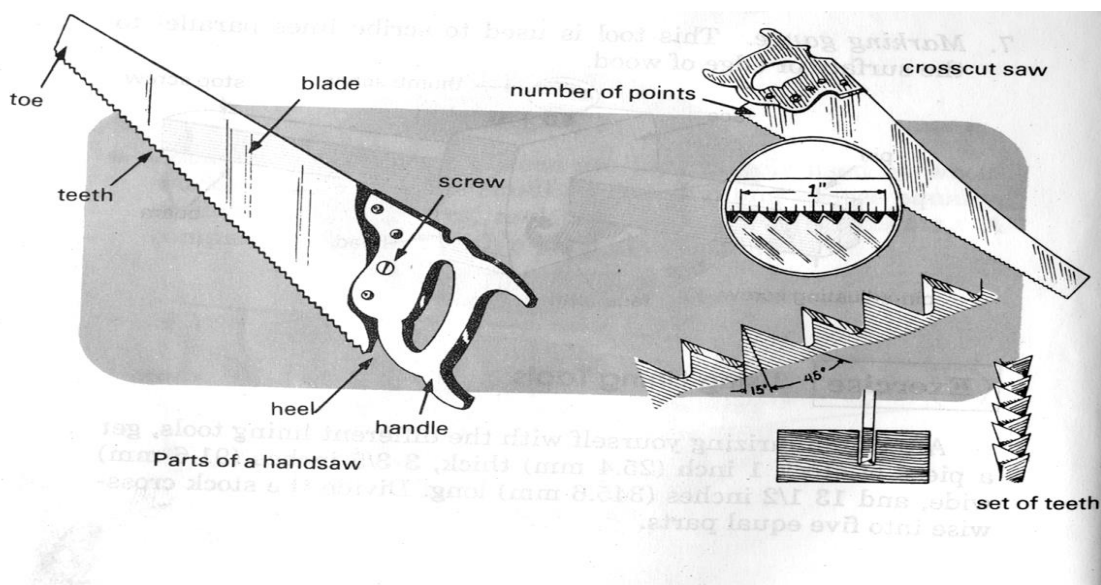


8. **Pull-push rule** is used for laying out measurements. This is a flexible strip of metal provided with the scale of the English and Metric Systems of measurements. It is rolled in a case.

9. **Try square** looks like the steel square and is used to check the flatness and squareness of a small piece of stock or lumber.



10. **Cross cut saw** is used for cutting lumber across the grain of wood.



11. **Bolo** is used to cut pegs for stake-out.



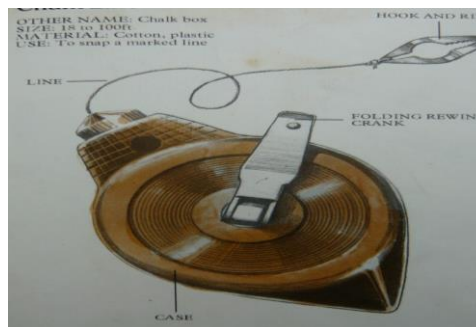
12. **Sledge hammer** is used to drive pegs for stake-out



13. **Lumber** is a milled or processed piece of wood ready for use.



14. **Chalk line** is used to mark straight line on a long piece of stock or lumber.



SELF-CHECK 1.2

TOOLS AND MATERIALS USED FOR STAKING-OUT BUILDING LINES.

Directions: Identify the tool/material being defined. Write your answers in your notebook.

1. It is used to drive pegs for stake-out.
2. A cone-shaped metal suspended on a string used to check the verticalness of post or column and other.
3. A tool rolled in a case and is used to layout measurements.

4. It is bigger than try square and used to check squareness of a wider or bigger object.
5. It is used to drive and pull out nails.
6. It is used to check the horizontal levelness of the surface material.
7. It is used to cut pieces of lumber across the grain.
8. It is used to indicate the sides of a building.
9. It is used to cut pegs for stake-out.
10. It is used to mark straight line on a long piece of stock or lumber.

INFORMATION SHEET 1.3

CONSTRUCTION COMPANY RULES AND REGULATIONS

To avoid problems and unnecessary expenses, make sure that all necessary permits are secured from local authorities concerned before conducting activities in the construction site.

1. A type of authorization must be granted by a government or other regulatory body before the construction of a new or existing building can legally occur.
2. Relocate the boundaries of the construction, especially lots without existing reference point or adjoining structures. This job is to be given to a geodetic engineer.
3. Clear all sites of any existing structures, trees and elements that will obstruct the construction activities. Cutting of trees requires permit from the Department of Environment and Natural Resources (DENR).
4. Allocate space for warehousing, workers' quarter and construction office which are usually requirements in the construction embodied in the specification contract.
5. Apply and secure temporary electric power connections and water supply.
6. The site of the construction must be securely fenced to protect the construction activities from onlookers and passersby and to also protect the materials from pilferage both from the outside and the inside.
7. Determine the building set back from the road line. Install the stake on the ground at a reasonable spacing that will fit into the length of the batter board available.

Types of permit that are necessary to secure before constructing a building.

1. Building permit
2. Electrical permit
3. Sanitary and plumbing permit
4. Zoning clearance
5. Fencing permit
6. Permit to cut trees
7. Water installation permit

8. Excavation and ground preparation permit
9. Enclosure permit
10. Mechanical permit
11. Scaffolding permit
12. Sidewalk construction permit

SELF-CHECK 1.3

CONSTRUCTION COMPANY RULES AND REGULATIONS

Direction: TRUE or FALSE. Write the word TRUE if the statement is correct and write the word FALSE if the statement is wrong.

1. The Department of Environment and Natural Resources issues a permit to cut trees.
2. The person who has the authority to relocate the boundaries of the construction when there is no existing reference point is the geodetic engineer.
3. Determining the building set back from the road line is not necessary.
4. The site of the construction must be securely fenced to protect the construction activities.
5. Allocating a space for warehousing, workers' quarter and construction office is not usually required in the construction.

STAKE OUT AND SET BATTER BOARDS

- Set out stakes from pre-determined building lines
- Measure, lay-out and cut batter board according to specification
- Set stakes at 0.75 – 1.00 meter away from the pre-determined building lines
- Secure batter boards with tolerance for dimensions at +/- 5mm, and levelness of +/- 3mm.
- Use PPE according to job requirements

PRE/DIAGNOSTIC ASSESSMENT 2

Directions: Multiple choice: Choose the letter of the correct answer.

1. A horizontal board placed when laying out a building.

a. Facia board	b. Batter board	c. Panel board	d. None
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2. What is the distance between the stakes in laying out a building?

a. 2 feet	b. 3 feet	c. 4 feet	d. 5 feet
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3. When constructing a different height of foundation, how do you set the height of the batter board?
 - a. according to the height of shortest foundation
 - b. according to the average height of the foundation.
 - c. according to the height of the tallest foundation.
 - d. both A and C

4. The term used to mark stake for the batter board?
 - a. grade stake
 - b. level stake
 - c. stake
 - d. All of these

5. Where do you start leveling for the batter boards?
 - a. center stake
 - b. Between the corner and center stake
 - c. corner stake
 - d. Both A and C

INFORMATION SHEET 2.1

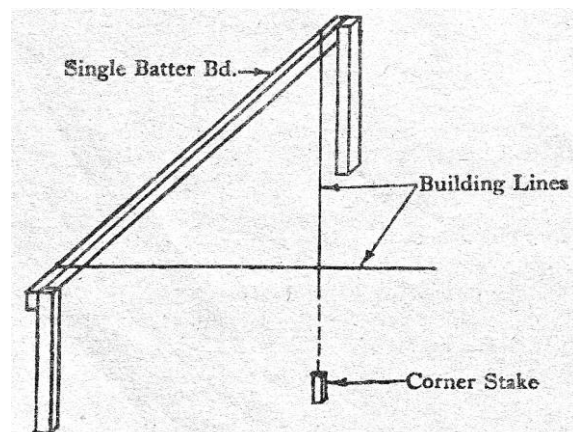
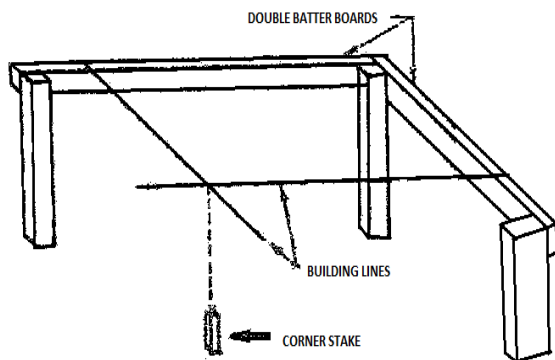
TYPES OF BATTER BOARD

Batter boards are the horizontal boards placed at the corner and at the sides of the projected building when final layout takes place. The reference for the foundation is marked on these boards.

● Two Types of Batter Boards

1. Batter boards for foundation posts may be either joined by continuous pieces surrounding the site of foundation or by individual piece for each foundation.

2. Batter boards for the foundation walls are either single or double batter boards which are placed at corner.



The batter boards should be set as high as the desired height of the foundation. In constructing with different heights of foundation, the tallest foundation is set as the height of batter boards.

SELF-CHECK 2.1

TYPES OF BATTER BOARDS

Answer Briefly: Write your answers in your notebook.

1. What do you call the horizontal boards that are placed when laying out a building?
2. The term is used to mark a stake for the batter board?
- 3-4. What are the two types of batter boards?
5. When constructing a different height of foundation, how do you set the height of the batter board?

ACTIVITY SHEET 2.1

PROCEDURE IN SETTING BATTER BOARD

Procedure:

1. Determine the height of the foundation at any of the four corners of the proposed building. Set the stakes at 0.75 to 1 m away from the pre-determined building lines, preferably where the grade stake is.



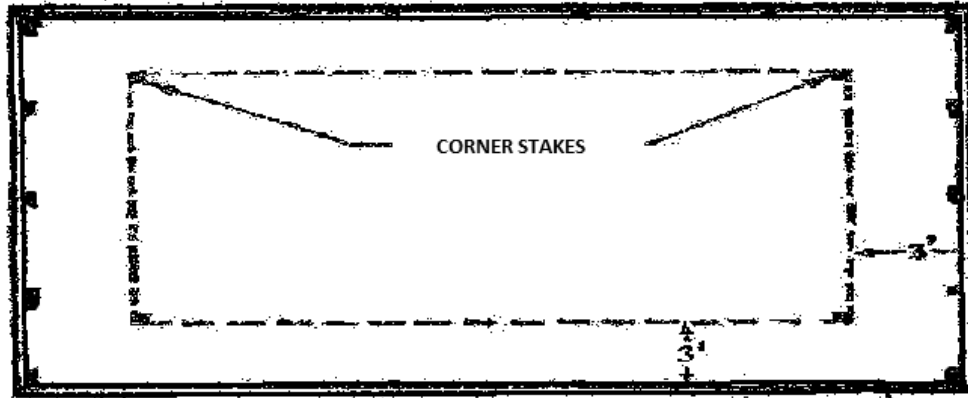
Fig.1 Determining the height of the foundation.

2. In this corner, drive a stake as high as the desired height of the foundation.



Fig.2 Putting up the stake for foundation

3. Drive in set of posts for the batter boards 3 feet away from the corners and along the sides. Drive in the posts firmly. Align these posts with a string.



BATTER BOARDS AND ITS POST

Fig.3 Set of post for the batter boards and the distance of the string on it.

4. Move the height of the foundation from the stakes to the corner post of the batter board. This is done by stretching a string, leveled with spirit level or level bar from the stake to the post.

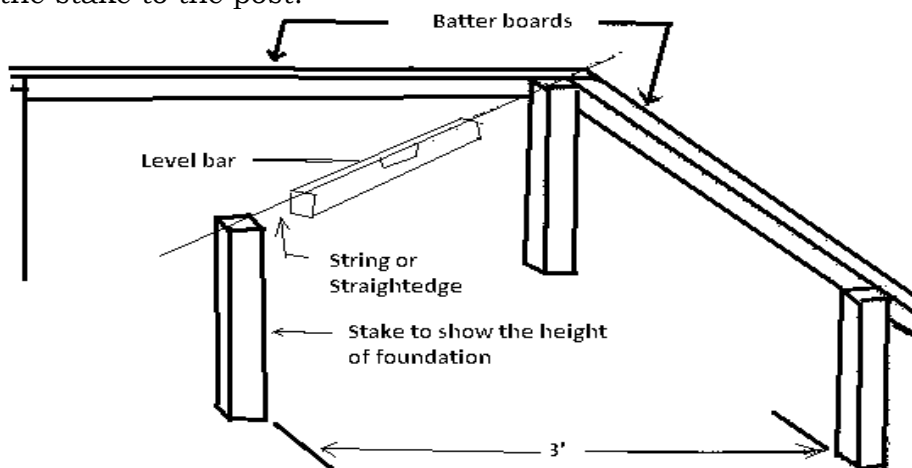


Fig.4 Transferring the height of the foundation from the stake to the corner post.

5. From the mark of this post, stretch out a string going around the corners of the building and passing at the side of the batter board posts.
6. Level this string with a spirit level or level bar. Stretch the string tight. Start leveling from the corner stake where the height of the foundation is established. Recheck the levelness.

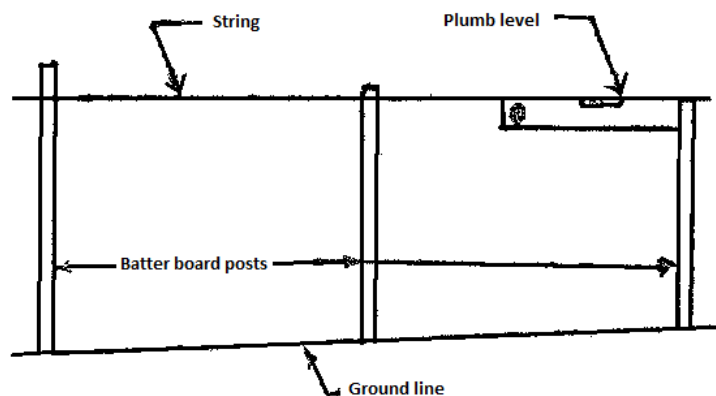


Fig.5-6 Transferring the height of the foundation from the corner post to all batter board post around the building layout.

7. Mark batter board posts along the line just leveled. These marks are places for the top of the batter boards.
8. Nail the batter boards in place, the straight side up and at the marks of the posts.



Fig. 7 A Batter board

Assessment Criteria:

1. Batter boards are set away from the building line excavation.
2. Batter boards are properly secured with tolerance for dimension at $\pm 5\text{mm}$, and levelness of $\pm 3\text{mm}$.
3. Unexpected situations are responded to in line with company rules and regulations.
4. Housekeeping is performed according to safety regulation.

Rubrics in Assessing the Performance/Output

Operation: Procedure in setting batter boards

Criteria	Percentage	5	4	3	2	1	Average
1. Proper handling of tools and equipment.	20%						
2. Accuracy of measurement.	25%						
3. Skills and Knowledge on work.	25%						
4. Safety	15%						
5. Work ethics	15%						
Total	100%						

Criteria	5	4	3	2	1
Proper handling of tools and equipment.	All tools were properly used.	1-2 tools were improperly used.	3-4 tools were improperly used	Almost all of the tools were improperly used	No attempt to work or incomplete work performance.
Accuracy of measurement.	100% of batter boards are properly set with tolerance for dimension of $\pm 5\text{mm}$, and levelness of $\pm 3\text{mm}$.	75% of batter boards are properly set with tolerance for dimension of $\pm 5\text{mm}$, and levelness of $\pm 3\text{mm}$.	50% of batter boards are properly set with tolerance for dimension of $\pm 5\text{mm}$, and levelness of $\pm 3\text{mm}$.	25% of batter boards are properly set with tolerance for dimension of $\pm 5\text{mm}$, and levelness of $\pm 3\text{mm}$.	No attempt to work or incomplete work performance.

Skills and Knowledge on work.	Learners perform the procedure completely and independently.	Learners perform the procedure completely with only 1 help from the teacher.	Learners perform the procedure completely with 2 help from the teacher.	Learners attempted to work but were not able to finish the job.	No attempt to work.
Safety	Learners used complete PPE according to job requirements.	Learners did not use 1 of the required PPE.	Learners did not use 2 of the required PPE.	Learners did not use 3 of the required PPE.	All of the required PPE were not used during work.
Work ethics	Learners finished the job completely without destruction/damage.	Learners finished the job completely with 1-3 destruction/damage.	Learners finished the job completely with 4-6 destruction/damage.	Learners finished the job completely with 7-9 destruction/damage.	Learners attempted to do the job but not completely finished.

SUMMATIVE ASSESSMENT

Multiple choice: Choose the letter of the correct answer.

- A type of authorization that must be granted by a government or other regulatory body before the construction of a new or existing building can legally occur.
 - Fencing permit
 - Building permit
 - Construction materials
 - Tools and equipment needed
- A personal protective equipment worn to lessen the noise in the workplace.
 - Hearing protection
 - Respirators
 - Foot protection
 - Eyes and face protection
- These must be worn as a last resort if it is not possible to ventilate the work area properly.
 - Hearing protection
 - Respirators
 - Foot protection
 - Eyes and face protection
- A tool used to test the horizontal levelness of the surfaces of material.
 - Plumb bob
 - Nylon String
 - Spirit level or level bar
 - Steel square
- This is used to indicate the sides of the building.
 - Plumb bob
 - Nylon String
 - Spirit level or level bar
 - Steel square

Identification: Answer the following statement.

- What do you call the horizontal boards placed at the corners and at the sides of the projected building when final layout takes place?
- It is a flexible strip of metal provided with the scale and used for laying out measurement.
- This protection is worn to protect the worker from radiation.
- What do you call to marked stake for the batter board?
- Where do you start leveling for the batter boards?

Fill in the blanks: Supply the blanks with the correct word or group of words to complete the sentence.

PROCEDURE IN SETTING BATTER BOARD

- A. Determine the _____ 11 _____ at any of the four corners of the proposed building, Set the stakes at 0.75 to 1m away from the pre-determined building lines, preferably where the grade stake is.
- B. On one of the corners, drive a _____ 12 _____ as a high as the desired height of the foundation.
- C. Drive in set of posts for the _____ 13 _____ 3 feet away from the corners and along the sides. Drive in the posts firmly. Align these posts with a _____ 14 _____.
- D. Move the height of the foundation from the stakes to the _____ 15 _____ of the batter board. This is done by stretching a string, leveled with spirit level or level bar from the stake to the post.
- E. From the mark of this post, _____ 16 _____ a string going around the corners of the building and passing at the side of the batter board posts.
- F. Level this string with a _____ 17 _____. Stretch the string tight. Start _____ 18 _____ from the corner stake where the height of the foundation is established. Re-check the levelness.
- G. _____ 19 _____ batter board posts along the line just leveled. These marks _____ are places for the top of the batter boards.
- H. _____ 20 _____ the batter boards in place, the straight side up _____ and _____ at the marks of the posts.

Performance Test: Execute the Procedure in Setting Batter Boards.

Note: Students are grouped with a minimum of 2 and a maximum of 5 persons in each group.

Assessment Criteria:

1. Batter boards are set away from the building line excavation.
2. Batter boards are properly secured with tolerance for dimension at $\pm 5\text{mm}$, and levelness of $\pm 3\text{mm}$.
3. Unexpected situations are responded to in line with company rules and regulations.
4. Housekeeping is performed according to safety regulations.

Rubrics in Assessing the Performance/Output

Operation: Procedure in Setting Batter Boards

Criteria	Percentage	10	8	6	4	2	Average
1. Proper handling of tools and equipment.	20%						
2. Accuracy of measurement.	25%						
3. Skills and Knowledge on work.	25%						
4. Safety	15%						
5. Work ethics	15%						
Total	100%						

Criteria	5	4	3	2	1
Proper handling of tools and equipment.	All tools are properly handled and used.	1-2 tools are improperly handled and not properly used.	3-4 tools are improperly handled and not properly used.	Most of the tools are improperly handled and not properly used.	No attempt to work or Incomplete work performance
Accuracy of measurement.	100% of batter boards are properly set with tolerance for dimension of $\pm 5\text{mm}$, and levelness of $\pm 3\text{mm}$.	75% of batter boards are properly set with tolerance for dimension of $\pm 5\text{mm}$, and levelness of $\pm 3\text{mm}$.	50% of batter boards are properly set with tolerance for dimension of $\pm 5\text{mm}$, and levelness of $\pm 3\text{mm}$.	25% of batter boards are properly set with tolerance for dimension of $\pm 5\text{mm}$, and levelness of $\pm 3\text{mm}$.	No attempt to work or Incomplete work performance
Skills and Knowledge on work.	Learners perform the procedure completely and independently.	Learners perform the procedure completely with minimal help from the teacher.	Learners perform the procedure completely with more help from the teacher.	Learners will attempt to work but they will not finish the job.	Learners did not attempt to do the job.
Safety	Learners will use complete PPE according to job requirements.	1 of the required PPE is not used during work.	2 of the required PPE are not used during work.	3 of the required PPE are not used during work.	All of the required PPE are not used during work.
Work ethics	Learners finished the job completely without destruction/damage.	Learners finished the job completely with 1-3 destruction/damage.	Learners finished the job completely with 4-6 destruction/damage.	Learners finished the job completely with 7-9 destruction/damage.	Learners attempted to do the job but not completely finished.