Skilled Trades 1201
Teacher Guide

Acknowledgements

The development of this Teacher Resource Guide for Skilled Trades 1201 involved the support of various groups and individuals. First, I would like to thank Mr. Eldred Barnes, Director, Division of Program Development, Dept. of Education, for his support throughout this process. Secondly, I would like to thank Mr. John Barron, Program Development Specialist for Technology Education/Career Education, for his valuable guidance throughout the development of this guide. Finally, I would like to extend a special thanks to the Skilled Trades Working Group whose insight and constructive feedback helped ensure that Skilled Trades 1201 will provide students with the foundation knowledge and skills needed for future related study at the secondary and post-secondary level.

Sincerely

Mr. Gonzo Bennett
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Foreword

This teacher guide was written with the intention of being a tool to be used by teachers in their preparation and delivery of instruction for Skilled Trades 1201. The Skilled Trades 1201 course involves a substantial quantity of "life size" construction and this can be difficult in some smaller technology labs. This guide will give teachers a modular method of delivering this curriculum that allows the course to be taught using minimum space and still allows for effective delivery of the curriculum outcomes without sacrificing the "real life" experiences this course demands. It includes a modular schedule and an assortment of technical drawings and assignments that should allow teachers to effectively teach Skilled Trades 1201.

Program Overview and Rationale

Background

Skilled Trades 1201 is grounded in the Foundation for the Atlantic Canada Technology Education Curriculum. The teacher is directed to the Foundation document for specific information that forms the basis for this course. The Foundation is referenced at appropriate points in this document. As well, the Specific Curriculum Outcomes that form the basis of the course are each referenced to the Key Stage Curriculum Outcomes in the Foundation.

Skilled Trades 1201 has been developed to give students a sense of the prescribed skilled trades and the Red Seal skilled trades. It provides a more detailed depth of treatment for six of the trades by referencing them to standard practices in residential construction.

Rationale

Skilled Trades 1201 is grounded in the Foundation for the Atlantic Canada Technology Education Program. The foundation articulates technology as the human constructed world that consists of knowledge, processes and products, and Technology Education as a program to enable K-12 students to make sense of their technological environment.

Knowledge of needs and wants drives humans to modify their environment to meet those needs and wants. Knowledge of the resources needed to meet the needs and wants enables them to succeed. Use of resources requires knowledge of a wide range of technological processes ranging from the broadest level technological problem solving and designs to the most minute detail of how to use a tool.

Technological processes include processing of materials by separating, shaping, combining and finishing them; management of projects; encoding information with assorted text, image and video tools, and following safety protocols.

Technological products are ‘visible’ aspects of technology. They range from clothes and food to microbes and spaceships. The most visible part of the built world includes buildings, roadways, vehicles, and all those appliances large and small that we take for granted.

Much of this highly visible built environment is built and maintained by people working in the skilled trades. This course introduces students to the world of the skilled trades and lets them experience how skilled tradespersons interact with and employ a wide variety of technological knowledge, processes and products in their daily work.

General Curriculum Outcomes (GCOs)

Technology Education curriculum in the Atlantic Provinces is defined in terms of five General Curriculum Outcomes (GCOs). These define the intent and focus of the Technology Education Program and apply from Kindergarten to Grade 12.

They are:

GCO 1: Technological Problem Solving. Students will be expected to design, develop, evaluate, and articulate technological solutions.

GCO 2: Technological Systems. Students will be expected to evaluate and manage technological systems.

GCO 3: History and Evolution of Technology. Students will be expected to demonstrate an understanding of the history and evolution of technology, and of its social and cultural implications.

GCO 4: Technology and Careers. Students will be expected to demonstrate an understanding of current and evolving careers and of the influence of technology on the nature of work.

GCO 5: Technological Responsibility. Students will be expected to demonstrate an understanding of the consequences of their technological choices.

Key Stage Curriculum Outcomes (KSCOs)

The Key Stage Curriculum Outcomes for Technology Education are listed in the Outcomes section of the Foundation for the Atlantic Canada Technology Education Curriculum (2001) document. Key Stage Curriculum Outcomes (KSCOs) expand the intent of the GCOs and summarize what is expected of students during each of the four Key Stages. The Skilled Trades 1201 document adheres to the KSCOs at the Key Stage 4 level (Grades 10-12).

The Key Stage 4 Curriculum Outcomes listed are organized according to each of the five General Curriculum Outcomes (GCOs) for the Atlantic Canada Technology Education Curriculum.

GCO 1:

Technological Problem Solving

Students will be expected to design, develop, evaluate, and articulate technological solutions.

By the end of grade 12, students will have achieved the outcomes for entry to grade 9 and will also be expected to

[1.401] articulate problems that may be solved through technological means
assess diverse needs and opportunities
construct detailed design briefs that include design criteria and a work schedule

[1.402] conduct design studies to identify a technological solution to a problem
investigate related solutions
document a range of options to solve this problem
determine and justify the best option
determine resource requirements and availability
develop detailed action plans, including technical drawings and sequences of action

[1.403] develop (prototype, fabricate, make) technological solutions to problems
match resources and technical processes for specific tasks
construct and test models and prototypes as needed
construct the solution with adherence to the design criteria
document activities, decisions, and milestones

[1.404] critically evaluate technological solutions and report their findings
develop detailed evaluations of both their own and others' technological solutions, with reference to independently developed criteria
employ a continuous assessment methodology with the purpose of continuous improvement of the design
document and report their changes, the rationale for change, and conclusions.

[1.405] communicate ideas and information about technological solutions through
appropriate technical means accurately present technical information by using a representative sample of analog and digital tools, including, for example, two- and three-dimensional, computer-assisted drafting and modelling tools
create accurately scaled models and prototypes

GCO 2:

Technological Systems

Students will be expected to operate and manage technological systems.

By the end of grade 12, students will have achieved the outcomes for entry-grade 9 and will also be expected to

- [2.401] operate, monitor, and adjust technological systems of increasing complexity
- [2.402] manage technological systems of increasing complexity
- [2.403] modify programming logic and control systems to optimize the behaviour of systems
- [2.404] deconstruct complex technological systems into their simpler systems and components
- [2.405] troubleshoot and maintain systems

GCO 3:

History and Evolution of Technology

Students will be expected to demonstrate an understanding of the history and evolution of technology, and of its social and cultural implications.

By the end of grade 12, students will have achieved the outcomes for entry-grade 9 and will also be expected to

- [3.401] evaluate technological systems in the context of convergence where one system has multiple functions, or divergence where multiple systems have the same function
- [3.402] evaluate the symbiotic roles of technology and science in modern society
- [3.403] analyze the symbiotic relationship between technology and education, including factors that influence standards for technological literacy and capability, and ways that the community responds
- [3.404] critically evaluate the effects of accelerating rates of technological change on self and society
- [3.405] account for effects of cultural diversity on technological solutions
  critically examine the effects of cultural diversity on market forces and technological products, and vice versa
  incorporate knowledge of cultural diversity into development of technological solutions

GCO4:

Technology and Careers

Students will be expected to demonstrate an understanding of current and evolving careers and of the influence of technology on the nature of work.

By the end of grade 12, students will have achieved the outcomes for entry-grade 9 and will also be expected to

- [4.401] assess and evaluate employability profiles for a variety of workplaces and careers and determine the level of technological literacy and capability they would need to achieve for job entry
- [4.402] employ design and invention as tools to create entrepreneurial activity
- [4.403] envision their short- and longer-term future and develop a plan for acquiring the technological literacy/capability required to achieve their vision

GCO 5:

Technological Responsibility

Students will be expected to demonstrate an understanding of the consequences of their technological choices.

By the end of grade 12, students will have achieved the outcomes for entry-grade 9 and will also be expected to

- [5.401] demonstrate responsible leadership in employing legal and ethical rules and principles
- [5.402] demonstrate responsible leadership in employing health and safety rules and standards
- [5.403] demonstrate responsible leadership in taking proper measures to manage current and future technological risk

Specific Curriculum Outcomes (SCOs)

The Skilled Trades 1201 is an introduction to the designated trades in this province and the inter-provincial Red Seal trades. It looks briefly at the structure of the trades, including the formal schooling aspect of cross-trade courses, and trade specific courses. Some time is spent with technical drawings, one of the key cross-trade capabilities. A significant part of the course focuses on 6 construction related trades, those being

- Carpentry
- Residential Electrician
- Plumber
- Lather
- Painter-Decorator
- Sheet-metal Worker

Students examine each trade and develop rudimentary knowledge and skill. A construction project that spans all 6 trades serves to emulate some aspects of on-the-job experiences.

The course has 3 units

Unit 1 Apprenticeship and the Skilled Trades
Unit 2 Skills Common to all Trades
Unit 3 Skill-building in Selected Trades

Program Components

Timeline for Skilled Trades 1201

Skilled Trades 1201 is a 110 hour two credit course. A suggested breakdown of time for the course follows:

Unit 1 Apprenticeship and the Skilled Trades (6 hours)

Topic 1 Apprenticeship Program (1hour)
Topic 2 The Skilled Trades (1 hour)
Topic 3 Courses Common to all Skilled Trades (2 hours)
Topic 4 Focus on 6 Skilled Trades (2 hours)

Unit 2 Skills Common to all Trades (24 hours)

Topic 1 Technology and the Workplace (3 hours)
Topic 2 Reading Blueprints and Drawings (18 hours)
Topic 3 Working in the Technology Lab (3 hours)

Unit 3 Skill-building in Selected Trades (78 hours)

Topic 1 Carpentry: Floor Construction (7 hours)
Topic 2 Carpentry: Wall Framing (7 hours)
Topic 3 Carpentry: Roof Trusses (7 hours)
Topic 4 Construction Electrician: Circuits (7 hours)
Topic 5 Construction Electrician: Residential Wiring (7 hours)
Topic 6 Plumber: Toilet Installation (7 hours)
Topic 7 Plumber: Sink Installation (7 hours)
Topic 8 Lather (7 hours)
Topic 9 Painter-Decorator (7 hours)
Topic 10 Masonry: Ceramic Wall Tile Installation (7 hours)
Topic 11 Masonry: Ceramic Floor Tile Installation (7 hours)

For the purposes of this teacher guide we will be concentrating on Unit 3. In order to deliver this curriculum using a modular approach the 13 topics will be covered through the delivery of 6 trades, which will be broken down into 11 modules with the following breakdown:

Carpentry (21 hours)

Module 1: Floor Construction (7 hours)
Module 2: Wall Framing (7 hours)
Module 3: Roof Framing (7 hours)

Electrician (14 hours)

Module 4: Construction Electrician-Circuits (7 hours)
Module 5: Construction Electrician-Residential Wiring (7 hours)

Plumber (14 hours)

Module 6: Sink Installation (7 hours)
Module 7: Toilet Installation (7 hours)

Lather (7 hours)

Module 8: Drywall and Plastering (7 hours)

Painter/Decorator (7 hours)

Module 9: Painting (7 hours)

Masonry/Ceramic Tile (14 hours)

Module 10: Ceramic Wall Tile Installation (7 hours)
Module 11: Ceramic Floor Tile Installation (7 hours)

Each module for this course is designed to be a self-supporting module with no prerequisite knowledge from other modules necessary for successful completion. The structure is designed for a class size of 22 students with students working in pairs for the entire 77-hour duration. It is felt that groups of two are the most effective group size for this course. Each module will be given an allocation of 7 hours (classes) with a breakdown of 2 hours for theory, 4 hours for fabrication, and 1 hour for teardown and reflection. At the end of each 7-hour module groups will rotate to the next scheduled module. Below is a sample schedule that can be modified by inserting student names so the rotation can be easily tracked.

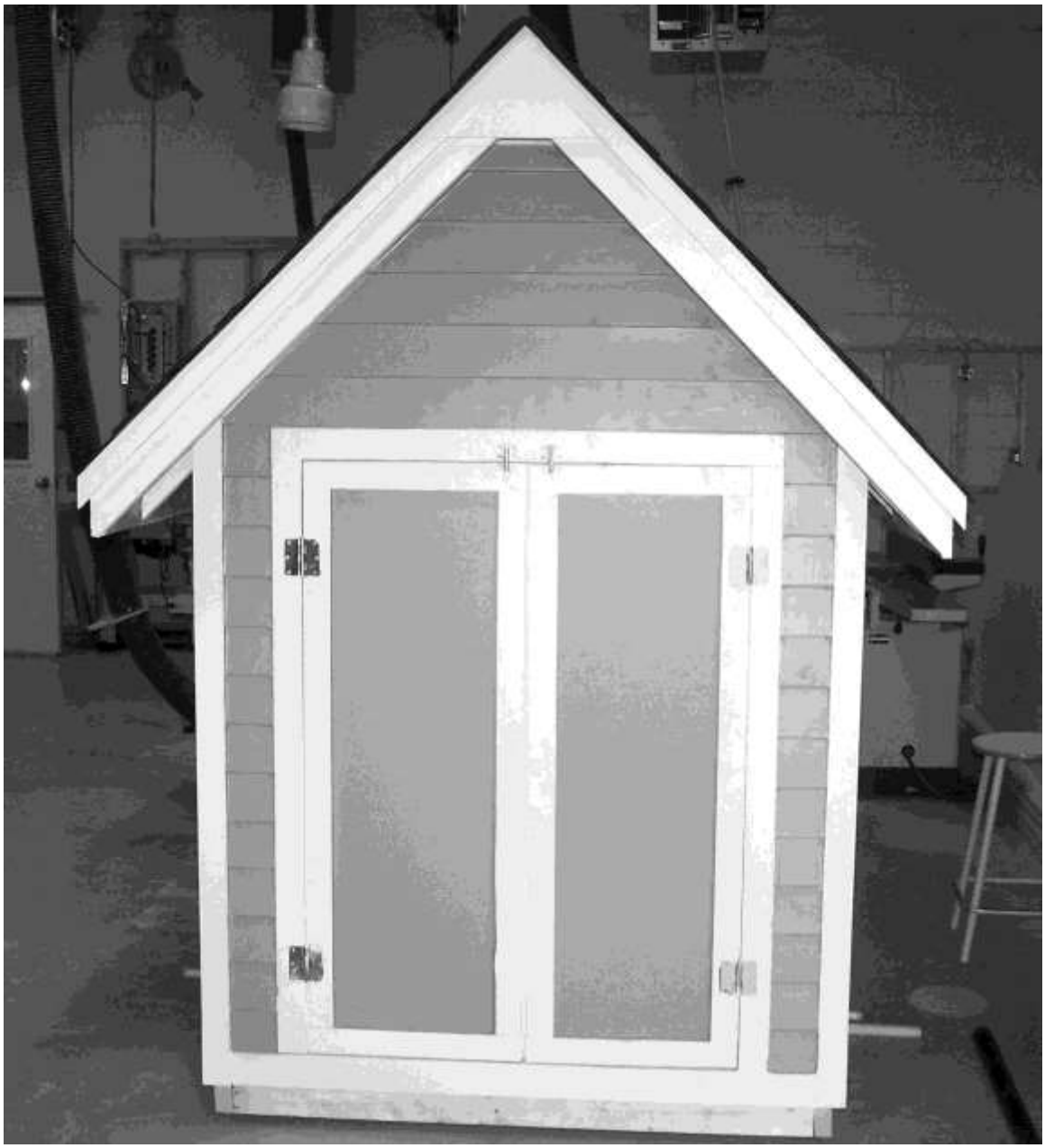
It should be noted that the wall diagrams for the electrical, lather and ceramic tile modules can be built individually as shown or they can be combined to minimize space. This would be especially useful if they were multiple sections of the Skilled Trades course being offered concurrently.

Sample Schedule for 11 groups of two students										
Carpentry 21 hours			Electrical 14 hours		Plumbing 14 hours		Lather 7 hours	Painter 7 hours	Masonry 14 hours	
Floor (7)	Wall (7)	Truss (7)	Circuits (7)	Residential Wiring (7)	Sink (7)	Toilet (7)	Lather (7)	Paint (7)	Ceramic Tile: Walls (7)	Ceramic Tile: Floors (7)
1	2	**3**	4	**5**	6	**7**	8	**9**	10	11
11	1	2	3	4	5	6	7	8	9	10
10	11	1	2	3	4	5	6	7	8	9
9	10	11	1	2	3	4	5	6	7	8
8	9	10	11	1	2	3	4	5	6	7
7	8	9	10	11	1	2	3	4	5	6
6	7	8	9	10	11	1	2	3	4	5
5	6	7	8	9	10	11	1	2	3	4
4	5	6	7	8	9	10	11	1	2	3
3	4	5	6	7	8	9	10	11	1	2
2	3	4	5	6	7	8	9	10	11	1

Introductory Notes

The first three modules deal with carpentry. Completing three separate modules, which will result in the completion of a shed, specifically a snow blower shed, covers this topic. It must be noted here that the first rotation of students will build a floor, walls, and trusses. However, each successive rotation will continue to work on the shed until it is complete. Essentially this means that even though the students complete the theoretical section for floors, walls, or trusses they may in fact be working on installing siding, doors, trim work, or even shingling. It is expected that at the completion of all 11 modules you will have built two sheds. This may vary depending on the size of the shed you choose to build.

The snow blower shed that is referenced in this document is shown below. It can be modified to suit your fabrication lab and other conditions you are faced with.



Module 1

Carpentry: Floor Construction

Module 1

Floor Construction

Module Overview

This module will introduce students to the principles of floor construction. Students will learn floor construction terminology, measuring practices, floor construction techniques, proper building techniques and proper building practices. They will draw on knowledge gained in Unit 2 in relation to reading blueprints and technical drawings. They will have to interpret a technical drawing, develop a work plan, select proper materials, layout and cut their materials, and then assemble their materials to create a finished floor. They will employ the safe cutting and construction practices covered in the earlier safety section and will emulate safe building and workplace guidelines. Students will learn the value of teamwork and the importance of planning ahead to achieve proper results. The work plan and pricing activity will give them real life experience with building projects.

Specific Curriculum Outcomes and Suggested Timelines

Module 1 addresses 6 specific curriculum outcomes (SCOs) from the Carpentry: Floor Construction section in the Skilled Trades 1201 curriculum guide. The time allocated in each module is recommended but can be adjusted if the teachers sees fit. However, it should be noted that the entire module is only allocated 7 hours and this needs to be adhered to.

Topic 1: Theory of Floor Construction (2 hours)

- 3.2.2 Identify various types of floor framing systems and describe the advantages & disadvantages of various materials [1.401][1.402] [2.401][3.401]
- 3.2.3 Define live and dead loads and state the important load considerations for floor framing [1.401][1.402] [2.401][3.401]
- 3.2.4 Identify the various types of floor sheathing and the advantages and disadvantages of each [1.401][1.402] [2.401][3.401]
- 3.2.5 Create a work plan for the structural component of the floor construction project [1.402][1.405][4.402][4.403]

Topic 2: Floor Fabrication (4 hours)

- 3.2.1 Review and demonstrate safe practices for use of standard hand, portable power, and stationary power tools for floor construction [2.401][2.402][2.405][3.401][5.402]
- 3.2.6 Construct and sheath a floor frame based on the technical drawings supplied by the instructor [1.403][1.404][1.405][2.401][2.402][2.405] [4.402][5.401][5.402][5.403]

Topic 3: Reflection (1 hour)

- 2.3.2 Develop strategies for managing individual and team activities [4.401][5.401][5.402][5.403]
- 2.3.3 Maintain a work log (portfolio) for personal and professional assessment [1.405]

Topic 1: Theory of Floor Construction

Suggested Duration: 2 hours
Suggested Format: Computer Lab

Following the completion of this activity, students will be able to:

- 3.2.2 Identify various types of floor framing systems and describe the advantages & disadvantages of various materials [1.401][1.402] [2.401][3.401]
- 3.2.3 Define live and dead loads and state the important load considerations for floor framing [1.401][1.402] [2.401][3.401]
- 3.2.4 Identify the various types of floor sheathing and the advantages and disadvantages of each [1.401][1.402] [2.401][3.401]
- 3.2.5 Create a work plan for the structural component of the floor construction project [1.402][1.405][4.402][4.403]

Teacher Required Resources

Skilled Trades 1201 Teacher's Resource Guide

Student Required Resources

Skilled Trades 1201 Student Reference Textbooks
Student Materials Pack

Teacher Preparation

1. Review the theory of floor construction and the new tools, materials, and building techniques used in today's construction industry. This review can be done by referring to the resources listed below.

   Wagner and Smith. 2003. Modern Carpentry. Tinley Park, Illinois. The Goodheart-Willcox Company, Inc.

   Feirer and Feirer. 2004. Carpentry and Building Construction, Sixth Edition. New York, New York. Glencoe/Mcgraw-Hill.

2. Prepare copies of assignment sheets located in resource guide at the end of this unit. Appropriate assignments are #ASG-M1-T1-1, #ASG-M1-T1-2, and

#ASG-M1-T1-3. These can either be copied and passed out in paper format or placed in a folder electronically on a shared resource for students to access.

Introduction

- State the purpose of this activity and the expected learning outcomes.
- State how this activity relates to the other activities in this module.
- Summarize what will be covered in this lesson and the related student activity.

Presentation

Discuss with students the importance of the theoretical aspect of training for any trade. Students have to be made aware of the vast knowledge base needed to become a qualified carpenter. This knowledge base is partially gained through theoretical learning and class work. Students need to be informed of the value (grade) placed on the completion of the theoretical portion of the module. It is important that students are aware of the fact that the theoretical portion is compulsory and must be completed before the practical portion of the activity can be engaged. Students will be given 2 hours to complete these activities and if they feel that they are at risk of not finishing then they should supplement class time with homework or after school work arranged with the teacher. Of utmost importance is the necessity that students be aware of the absolute limit of 7 hours as it impacts every other group and every other module. There can be **no extension** to the time allocated for the module.

Assessment and Evaluation

The teacher will formally evaluate the completed assignments as completed by each individual in each group. Teachers can choose whether to make the group responsible for one copy of all assigned work **or** a separate copy of all assignments from each individual in the group. These theoretical assignments will be valued at 30% of the module.

Learning Resources

Feirer and Feirer. 2004. Carpentry and Building Construction, Sixth Edition. New York, New York. Glencoe/Mcgraw-Hill.

Wagner and Smith. 2003. Modern Carpentry. Tinley Park, Illinois. The Goodheart-Willcox Company, Inc.

Student Materials Pack

The Student Material Pack for Topic 1 includes the following attached documents:

1. Assignment #ASG-M1-T1-1, “Theory of Floor Construction”.
2. Assignment #ASG-M1-T1-2, “Labeling and Defining Floor Components”
3. Assignment #ASG-M1-T1-3, “Materials Pricing Activity”

Theory of Floor Construction
Assignment #ASG-M1-T1-1

Answer the following questions using the textbook "Modern Carpentry". Answers may be submitted on paper or can be presented in the form of a PowerPoint presentation

1. What are floor joists? What are they most commonly made of in residential construction? Why are manufactured joists gaining in popularity?

2. Why is it important for all "crowns" in floor joist to be all turned up?

3. List and describe two types of bridging and the advantages of each.

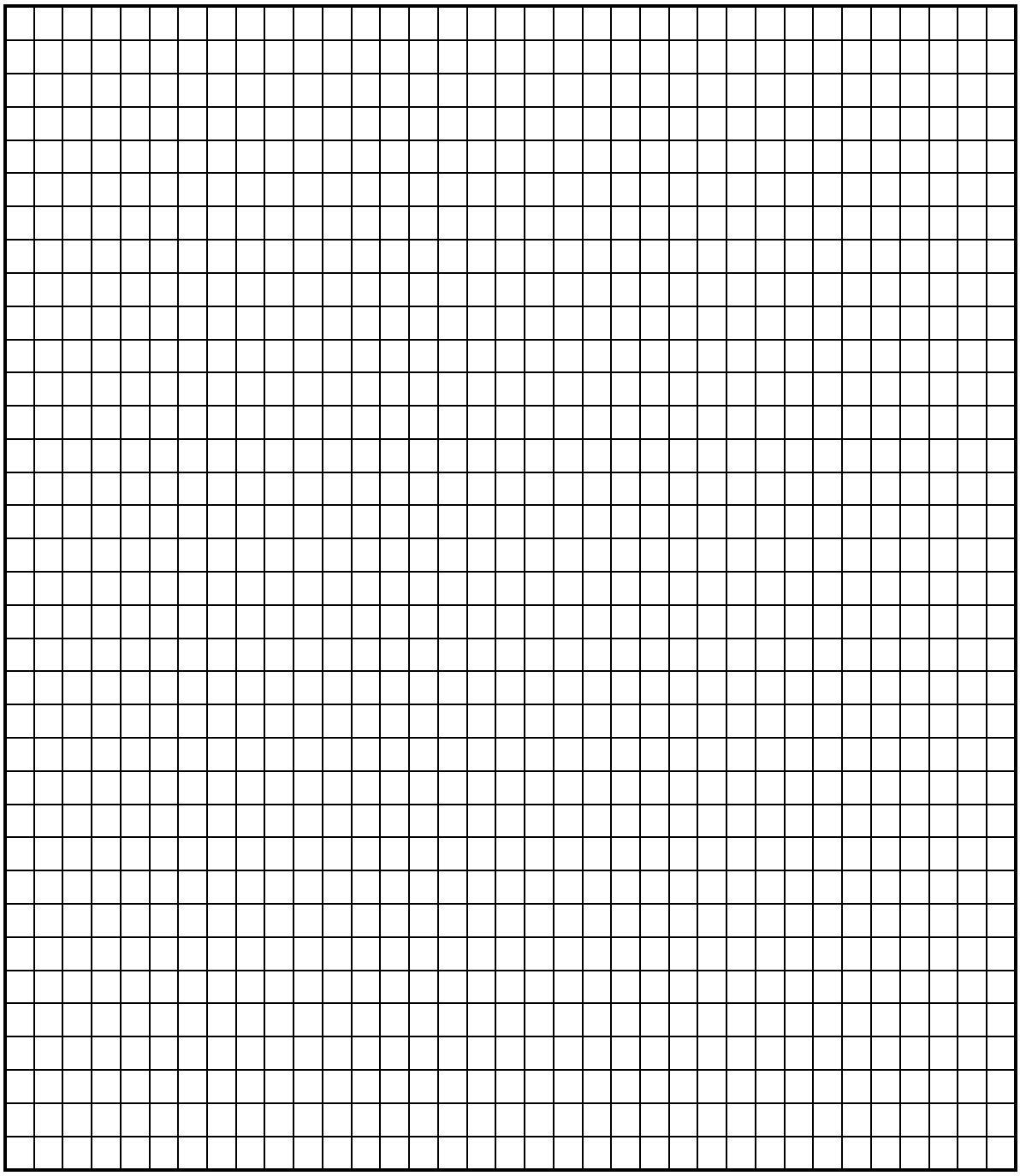
4. If it is necessary to cut holes in floor joists where should they be cut and explain why.

5. What are the advantages of using plywood for sub flooring? Explain.

6. Calculate the amount of material need to frame out a floor for an 8' x 10' shed. Be sure to include the floor covering as well. Provide a rough sketch to show your calculations.

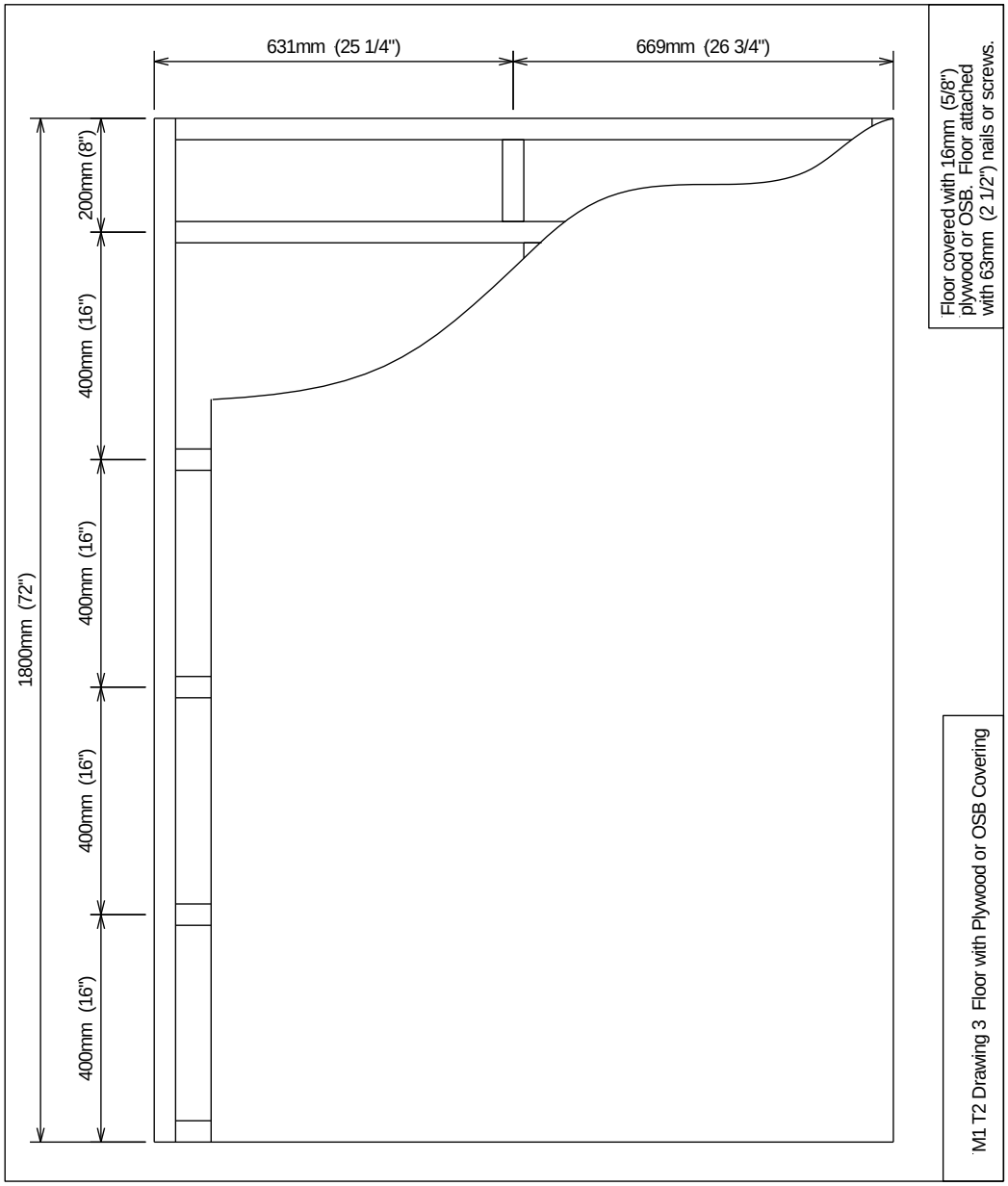
Labeling and Defining Floor Components
Assignment #ASG-M1-T1-2

Using the grid paper below sketch a diagram of a floor section with the proper layout for a floor opening. Label each floor member properly and give a brief description of each.



Materials Pricing Activity
Assignment #ASG-M1-T1-3

Using the technical drawing below, provide a cost breakdown for each of the materials used to construct the floor provided. These prices can be obtained using local suppliers, business flyers, or online quotes. Ensure that the total price is comprised of an itemized breakdown for each different material used.



Topic 2: Floor Fabrication

Suggested Duration: 4 hours
Suggested Format: Fabrication Lab

Following the completion of this activity, students will be able to:

- 3.2.1 Review and demonstrate safe practices for use of standard hand, portable power, and stationary power tools for floor construction [2.401][2.402][2.405][3.401][5.402]
- 3.2.6 Construct and sheath a floor frame based on the technical drawings supplied by the instructor [1.403][1.404][1.405][2.401][2.402][2.405] [4.402][5.401][5.402][5.403]

Teacher Required Resources

Skilled Trades 1201 Teacher's Resource Guide

Student Required Resources

Skilled Trades 1201 Student Reference Textbooks
Student Materials Pack

Teacher Preparation

1. Purchase material needed to complete the assembly of a floor section. This would include floor joists, floor covering, nails or screws, etc. This material should be stored safely in an area easily accessible to students.

2. Compile a tool kit necessary for students to use for this activity. This tools kit would preferably be on wheels so it can be wheeled out at the beginning of class and then wheeled to a suitable storage area at the end of class. One of the large stackable toolboxes would be ideal for this application. A labeling system on the toolbox would also be effective for orderly storage of tools.

3. Ensure all tools are in proper and safe working order. Checking all tools prior to assigning them to students also reinforces the idea of safety to students.

4. Prepare copies of technical drawings located in Student Materials Pack. Appropriate technical drawings are Learning Resource Sheet #M1-T2-Drawing 1, Learning Resource Sheet #M1-T2-Drawing 2, and Learning Resource Sheet #M1-T2-Drawing 3. These can either be copied and passed

out in paper format or placed in a folder electronically on a shared resource for students to access.

Introduction

- State the purpose of this activity and the expected learning outcomes.
- State how this activity relates to the other activities in this module.
- Summarize what will be covered in this lesson and the related student activity.

Presentation

Students are provided with a brief description of their activity for this module. The teacher would provide a cross section of a sample floor for the students to study. A discussion would ensue as to the best building practices to employ to build their own floor. They are reminded of all safe shop and tool operation practices and are given a quick overview of the tools and operations they will be completing during this activity. Potential hazards are also pointed out as a point of emphasis.

Suggested Student Activity

The floor module involves students creating a work plan for the construction of a floor of a predetermined size after analyzing a supplied technical drawing (see Learning Resource Sheet #M1-T2-Drawing 1). In a group of 2, students will be expected to select the proper materials based on proper nominal lumber size and based on lumber quality. They will measure and cut the selected material to proper sizes using their technical drawing. Once they have assembled their floor frame, with proper blocking, they will then choose their floor covering of choice. There are many different materials to choose from but our selection is lumber, plywood, or OSB. The students will then refer to the proper technical drawings (see Learning Resource Sheet #M1-T2-Drawing 2 and Learning Resource Sheet #M1-T2-Drawing 3), choose their floor covering, measure and cut the floor covering to the appropriate size, and then attach the floor covering to the floor frame. The toolkit that was compiled prior to this module would be made available to students for use in this construction phase. Throughout this entire process the students will be exhibiting safe work practices and be employing work practices used in the construction industry. Each student should be given an opportunity to actively participate in the use of shop tools.

Required Tools

Safety

Safety Glasses
Hearing Protection
Safety Footwear
Coveralls

Hand Tools

Steel Tape
Try Square
Miter Square
Framing Square
2-Foot Level
Hand Saw
Chalk Line with Chalk
Framing Hammer
Chisels
Drill bits
Screw Diver Bits

Power Tools

Compound Miter Saw
Drill
Circular Saw
Jig Saw

Required Materials

50mm x 150mm (2" x 6") for Floor Joists
50mm x 150mm (2" x 6") for Blocking
2400mm x 4800mm x 16mm (4' x 8'x 5/8") Plywood or OSB
or 25mm x 200mm (1" x 8") Lumber for Floor Covering
Quantity of 63mm (2 ½") Nails or Screws for Attaching Flooring
Quantity of 88mm (3 1/2"") Nails or Screws for Framing Floor
Construction Adhesive

Assessment and Evaluation

The teacher will formally evaluate the completed floor. Students will be assessed based on how well their floor meets the technical drawing specifications. Students will be graded on the quality of the floor construction, the effort they put into the project, their attendance throughout the module, and their ability to work as a team to complete the project on time without sacrificing quality. Teachers should be aware that both members of the group would probably get different grades even though it is a group project. Students will also be graded on their use of acceptable shop practices and their proper use of shop etiquette and shop clean up. This practical portion will be worth 60% of the grade for this module.

Learning Resources

Feirer and Feirer. 2004. Carpentry and Building Construction, Sixth Edition. New York, New York. Glencoe/Mcgraw-Hill.

Wagner and Smith. 2003. Modern Carpentry. Tinley Park, Illinois. The Goodheart-Willcox Company, Inc.

Lecture from a certified carpenter.

Student Materials Pack

The Student Material Pack for Topic 1 includes the following attached documents:

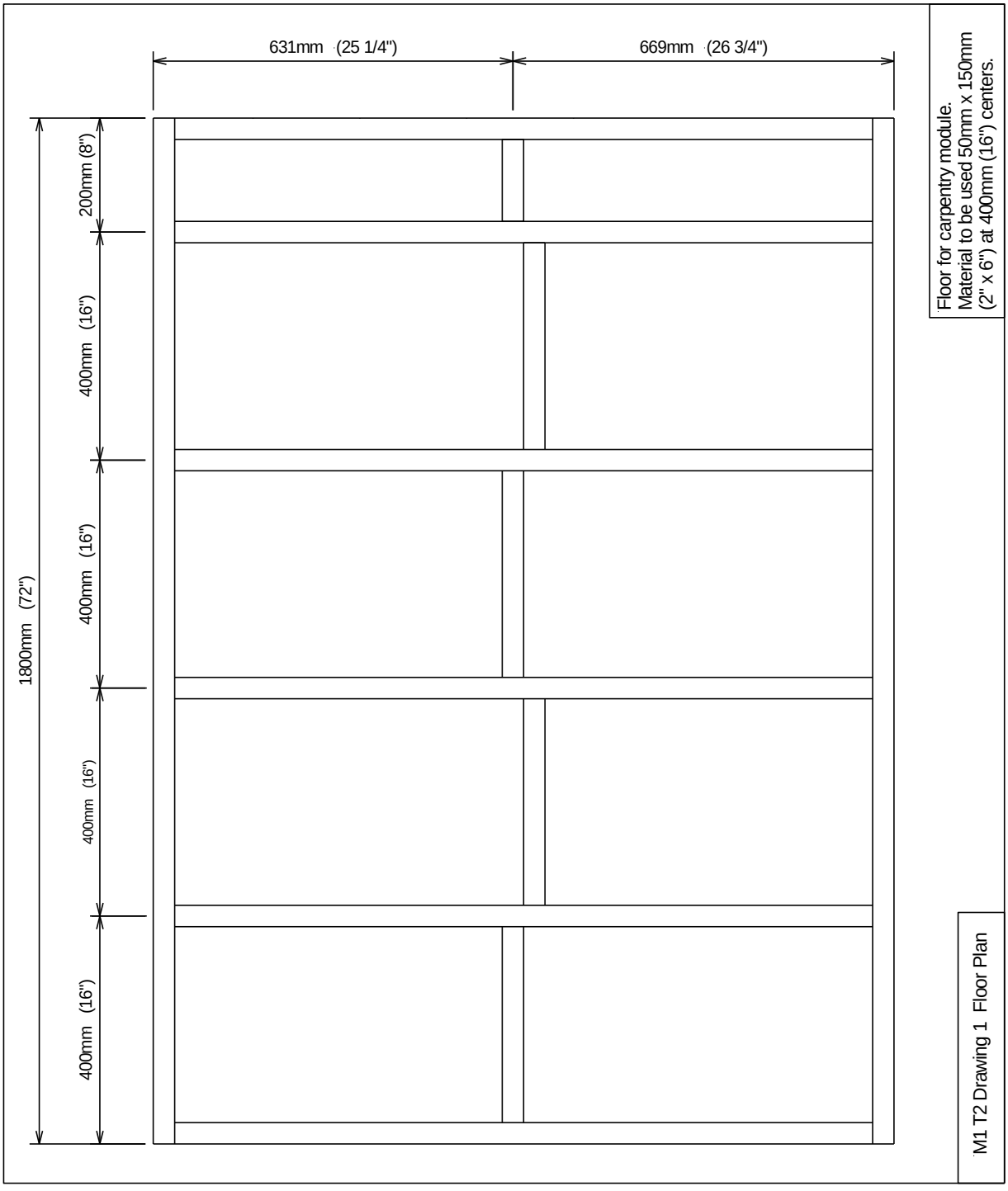
1. Learning Resource Sheet # M1-T2-Drawing 1 “Floor Plan”.

2. Learning Resource Sheet #LRS M1-T2-Drawing 2, “Floor with Lumber Covering”

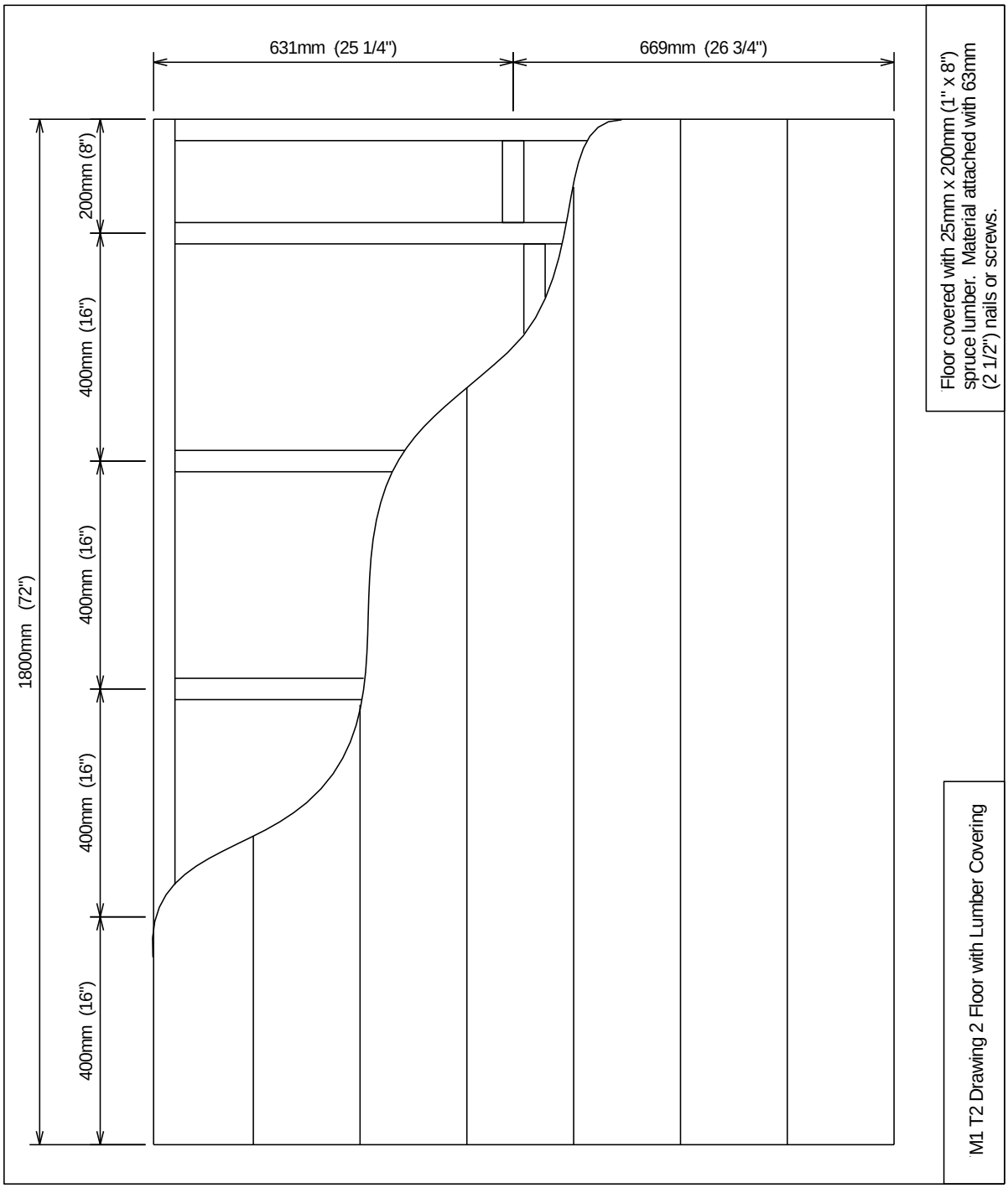
3. Learning Resource Sheet #LRS M1-T2-Drawing 3, “Floor with Plywood or OSB Covering”

4. Materials needed to complete the module as listed in the required materials section.

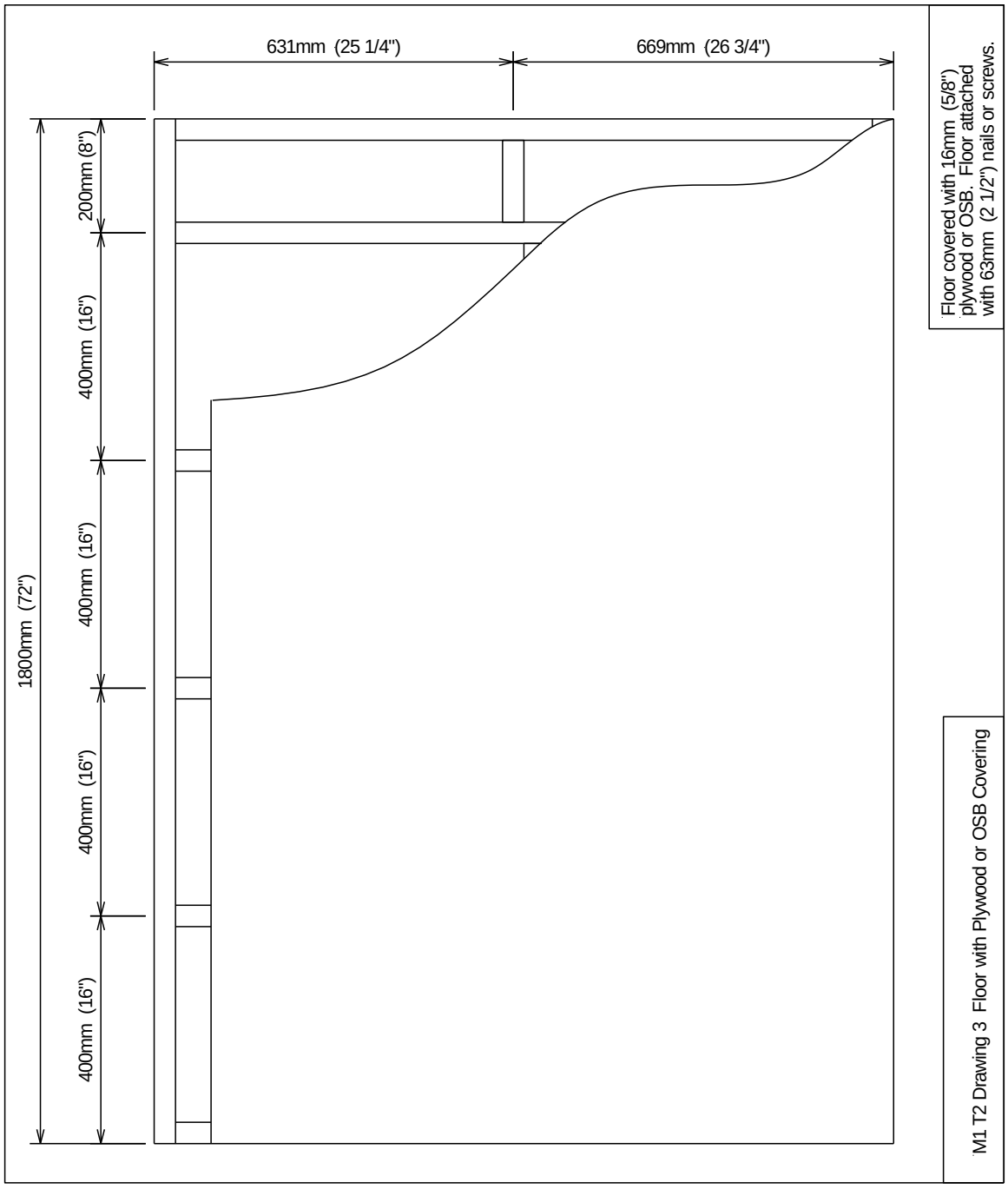
Floor
Learning Resource Sheet #LRS-M1-T2-Drawing 1



Floor With Lumber Covering
Learning Resource Sheet #LRS-M1-T2-Drawing 2



Floor With Plywood or OSB Covering
Learning Resource Sheet #LRS-M1-T2-Drawing 3



Topic 3: Reflection

Suggested Duration: 1 hour
Suggested Format: Fabrication Lab/Computer Lab

Following the completion of this activity, students will be able to:

2.3.2 Develop strategies for managing individual and team activities [4.401][5.401][5.402][5.403]

2.3.3 Maintain a work log (portfolio) for personal and professional assessment [1.405]

Teacher Required Resources

Skilled Trades 1201 Teacher's Resource Guide

Student Required Resources

Skilled Trades 1201 Student Reference Textbooks
Student Materials Pack

Teacher Preparation

1. Check materials stock to ensure that all necessary materials are available for next group of students.

2. Check all tools to ensure they are in working order and have been properly maintained.

3. Copy Assignment #ASG-M1-T3-1 Reflection Activity and Assignment #ASG-M1-T3-2 Work Log for students to complete.

Introduction

- State the purpose of this activity and the expected learning outcomes.

- Emphasize how the completion of the floor allows for the other trades to move in and start the next phase of the project , in particular, the wall framing crew..

- Point out to the students how the accuracy of the project just completed will affect the finished project. If the floor is poorly built the wall framers will have to try and fix problems as they go along. If these problems cannot be fixed the overall appearance of the house will be affected.

Presentation

Teacher explains to students the importance of evaluating the completed activity. Students must be cognizant of the necessity of being accurate in their measuring and cutting and of taking pride in completing their project using good construction practices. Students need to understand the importance of reassessing their completed work and learning from the activity. Teacher explains the importance of the work log and the role it plays in real life situations.

Suggested Student Activity

Students are given a "Reflection Activity" (Assignment #ASG-M1-T3-1 Reflection Activity) to complete. Each group member must complete his or her own reflection sheet to be submitted and evaluated. Students must also complete their work log (Assignment #ASG-M1-T3-2 Work Log) and get it initialed (in this case, graded) by their teacher. This work log should be worked on throughout the entire module and should be dated and initialed at the appropriate stages throughout the module. Failure to keep the log updated will result in lost marks at evaluation time.

Assessment and Evaluation

Students must submit their "Reflection Activity" and their "Work Log" to be evaluated. This will account for 10% of their overall grade in this module.

Student Materials Pack

The Student Material Pack for Topic 3 should include:

1. Assignment #ASG-M1-T3-1 Reflection Activity.

2. Assignment #ASG-M1-T3-2 Work Log.

Reflection
Assignment #ASG-M1-T3-1

Read each of the following questions and provide a written response to each.

1. If doing the floor project again what would you do differently?

2. What are the advantages provided by using power tools as opposed to non-power tools years ago?

3. How could you have divided your duties differently to make the project go more smoothly?

4. Discuss the advantages of working inside in a shop as opposed to outside on a typical jobsite. Give at least three advantages and disadvantages of each.

5. Collate your blueprints and your work plan (completed in Topic 2) to be submitted for grading.

Work Log
Assignment #ASG-M1-T3-2

Record of Workplace Skills (LOG) **Name:** _____ Module**:** _____		
Workplace Skills Required For Successful Completion of Carpentry Module	Date	Initials of Instructor
Blueprint Reading and Sketching		
Read basic drawings and diagrams		
Sketch drawings and diagrams		
Interpret specifications		
Floor Framing		
Select proper lumber		
Measure and layout material		
Cut material to proper lengths		
Prepare and install floor framing		
Prepare and install floor covering		
Wall Framing		
Select proper lumber		
Measure and layout material		
Cut material to proper lengths		
Frame exterior walls		
Install wall sheathing		
Erect exterior walls		
Install top plate		
Roof Truss Construction		
Select proper lumber		
Measure and layout material		
Cut material to proper lengths		
Assemble roof truss		
Attach roof truss		
Install roof sheathing		

Module 2

Carpentry: Wall Framing

Module 2

Wall Framing

Module Overview

This module will introduce students to the principles of wall framing. Students will learn about wall framing terminology, measuring, wall construction techniques, proper building techniques and proper building practices. They will draw on knowledge gained in Unit 2 in relation to reading blueprints and technical drawings. They will have to interpret a technical drawing, develop a work plan, select proper materials and layout and cut their materials, and then assemble their materials to create a finished wall. They will employ the safe cutting and construction practices covered in the earlier safety section and will emulate safe building and workplace guidelines. Students will learn the value of teamwork and the importance of planning ahead to achieve proper results. The work plan and pricing will give them real life experience with building projects.

Specific Curriculum Outcomes and Suggested Timelines

Module 2 addresses 6 specific curriculum outcomes from the Carpentry: Wall Framing section in the Skilled Trades 1201 curriculum guide. The time allocated in each module is recommended but can be adjusted if the teachers sees fit. However, it should be noted that the entire module is only allocated 7 hours and this needs to be adhered to.

Topic 1: Theory of Wall Framing (2 hours)

- 3.3.2 List and describe types of wall framing [1.401][1.402] [2.401][3.401]
- 3.3.3 Identify the important loading conditions to be considered when framing walls [1.401][1.402][2.401][3.401]
- 3.3.4 Identify the various types of wall sheathing and the advantages and disadvantages of each [1.401][1.402] [2.401][3.401]
- 3.3.5 Create a work plan for the structural component of the wall framing project [1.402][1.405][4.402][4.403]

Topic 2: Wall Fabrication (4 hours)

- 3.3.1 Review and demonstrate safe practices for use of standard hand, portable power, and stationary power tools for wall framing [2.401][2.402][2.405][3.401][5.402]
- 3.3.6 Construct and sheathe a wall frame based on the technical drawings supplied by the instructor [1.403][1.404][1.405][2.401][2.402][2.405] [4.402][5.401][5.402][5.403]

Topic 3: Reflection (1 hour)

- 2.3.2 Develop strategies for managing individual and team activities [4.401][5.401][5.402][5.403]
- 2.3.3 Maintain a work log (portfolio) for personal and professional assessment [1.405]

Topic 1: Theory of Wall Framing

Suggested Duration: 2 hours
Suggested Format: Computer Lab

Following the completion of this activity, students will be able to:

- 3.3.2 List and describe types of wall framing [1.401][1.402] [2.401][3.401]
- 3.3.3 Identify the important loading conditions to be considered when framing walls [1.401][1.402][2.401][3.401]
- 3.3.4 Identify the various types of wall sheathing and the advantages and disadvantages of each [1.401][1.402] [2.401][3.401]
- 3.3.5 Create a work plan for the structural component of the wall framing project [1.402][1.405][4.402][4.403]

Teacher Required Resources

Skilled Trades 1201 Teacher's Resource Guide

Student Required Resources

Skilled Trades 1201 Student Reference Textbooks
Student Materials Pack

Teacher Preparation

1. Review the theory of wall construction and the new tools, materials, and building techniques used in today's construction industry. This review can be done by referring to the resources listed below.

   Wagner and Smith. 2003. Modern Carpentry. Tinley Park, Illinois. The Goodheart-Willcox Company, Inc.

   Feirer and Feirer. 2004. Carpentry and Building Construction, Sixth Edition. New York, New York. Glencoe/Mcgraw-Hill.

2. Prepare copies of assignment sheets located in resource guide at the end of this unit. Appropriate assignments are #ASG-M2-T1-1, #ASG-M2-T1-2, and #ASG-M2-T1-3. These can either be copied and passed out in paper format or placed in a folder electronically on a shared resource for students to access.

Introduction

- State the purpose of this activity and the expected learning outcomes.
- State how this activity relates to the other activities in this module.
- Summarize what will be covered in this lesson and the related student activity.

Presentation

Discuss with students the importance of the theoretical aspect of training for any trade. Students have to be made aware of the vast knowledge base needed to become a qualified carpenter. This knowledge base is partially gained through theoretical learning and class work. Students need to be informed of the value (grade) placed on the completion of the theoretical portion of the module. It is important that students are aware of the fact that the theoretical portion is compulsory and must be completed before the practical portion of the activity can be engaged. Students will be given 2 hours to complete these activities and if they feel that they are at risk of not finishing then they should supplement class time with homework or after school work arranged with the teacher. Of utmost importance is the necessity that students be aware of the absolute limit of 7 hours as it impacts every other group and every other module. There can be **no extension** to the time allocated for the module.

Assessment and Evaluation

The teacher will formally evaluate the completed assignments as completed by each individual in each group. Teachers can choose whether to make the group responsible for one copy of all assigned work **or** a separate copy of all assignments from each individual in the group. These theoretical assignments will be valued at 30% of the module.

Learning Resources

Feirer and Feirer. 2004. Carpentry and Building Construction, Sixth Edition. New York, New York. Glencoe/Mcgraw-Hill.

Wagner and Smith. 2003. Modern Carpentry. Tinley Park, Illinois. The Goodheart-Willcox Company, Inc.

Student Materials Pack

The Student Material Pack for Topic 1 includes the following attached documents:

1. Assignment #ASG-M2-T1-1, “Theory of Wall Framing”.
2. Assignment #ASG-M2-T1-2, “Labeling and Defining Wall Components”
3. Assignment #ASG-M2-T1-3, “Materials Pricing Activity”

Theory of Wall Framing
Assignment #ASG-M2-T1-1

Answer the following questions using the textbook "Modern Carpentry".

1. What is the most common material used for wall studs? What are the common stud spacing used in residential construction?

2. What are *headers*? Where are they used and what purpose do they serve?

3. What is the advantage of installing wall sheathing before the wall is erected?

4. What purpose does the double top plate serve?

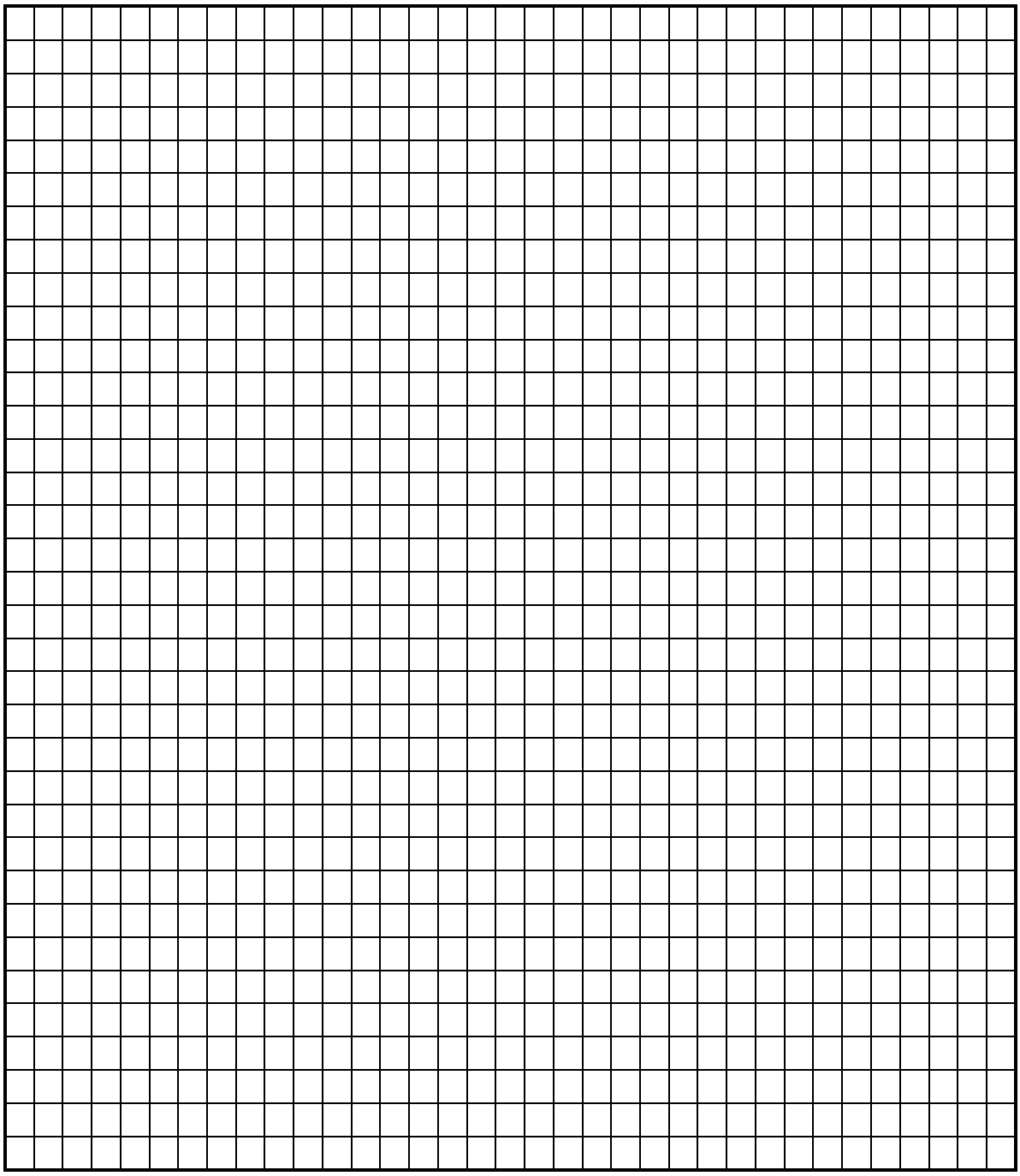
5. Explain the difference between bearing and nonbearing partitions.

6. List three common types of sheathing, the nominal sizes, and the advantages of each.

7. What is the formula for estimating the number of studs needed for a wall of a given length? Using this formula, calculate the number of studs needed to construct a 12000mm (40') wall with one door and two windows.

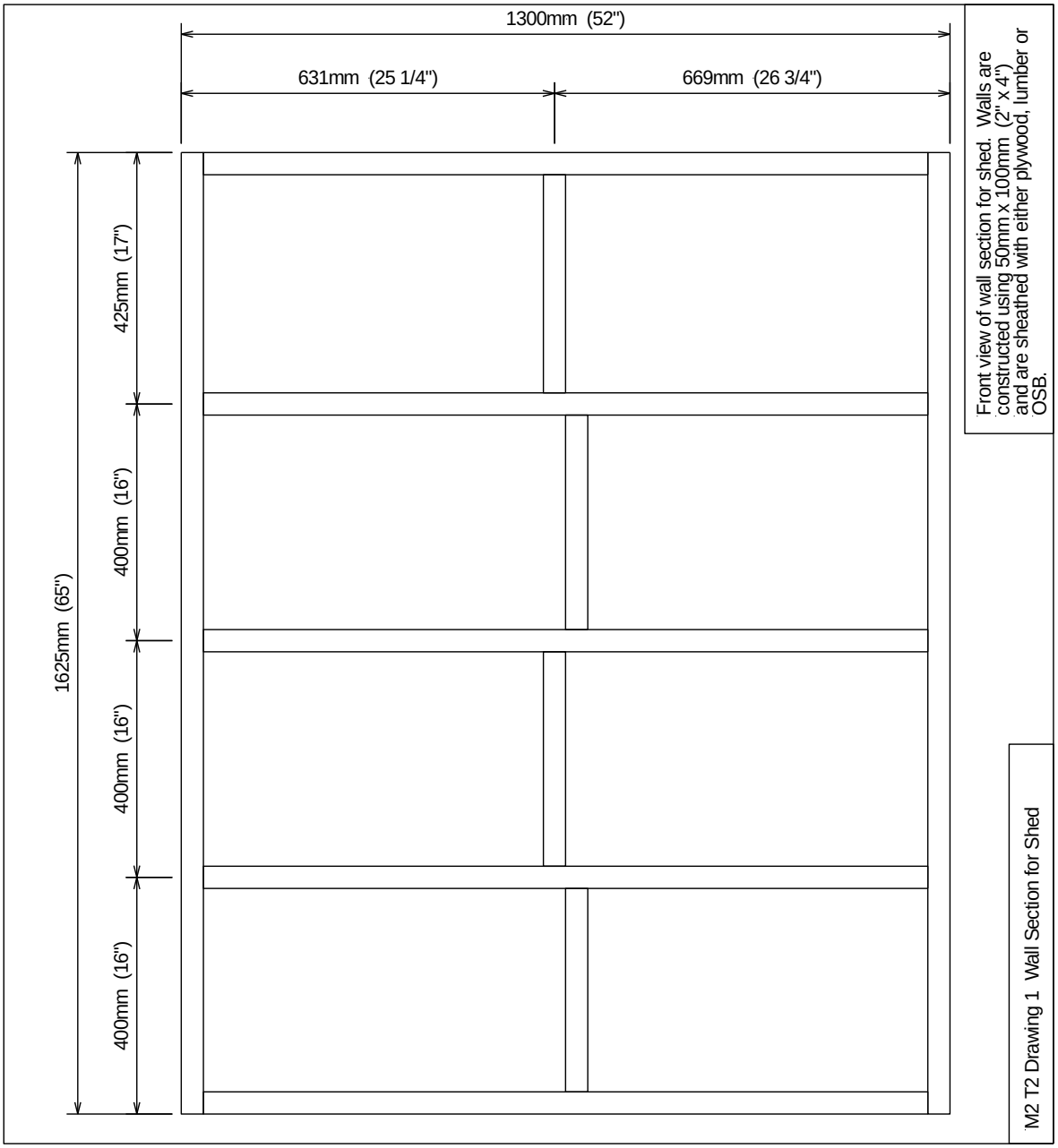
Labeling and Defining Wall Components
Assignment #ASG-M2-T1-2

Using the grid paper below sketch a diagram of a wall section with the proper layout for a door opening. Label each member properly and give a brief description of each.



Materials Pricing Activity
Assignment #ASG-M2-T1-3

Using the technical drawing below, provide a cost breakdown for each of the materials used to construct the wall provided. These prices can be obtained using local suppliers, business flyers, or online quotes. Calculate the price using lumber, plywood and OSB for wall sheathing. Ensure that the total price is comprised of an itemized breakdown for each different material used.



Topic 2: Wall Fabrication

Suggested Duration: 4 hours
Suggested Format: Fabrication Lab

Following the completion of this activity, students will be able to:

- 3.3.1 Review and demonstrate safe practices for use of standard hand, portable power, and stationary power tools for wall framing [2.401][2.402][2.405][3.401][5.402]
- 3.3.6 Construct and sheathe a wall frame based on the technical drawings supplied by the instructor [1.403][1.404][1.405][2.401][2.402][2.405] [4.402][5.401][5.402][5.403]

Teacher Required Resources

Skilled Trades 1201 Teacher's Resource Guide

Student Required Resources

Skilled Trades 1201 Student Reference Textbooks
Student Materials Pack

Teacher Preparation

1. Purchase material needed to complete the assembly of a wall section. This would include wall studs, nails, screws, and material for headers. This material should be stored safely in an area easily accessible to students.

2. Compile a tool kit necessary for students to use for this activity. This tools kit would preferably be on wheels so it can be wheeled out at the beginning of class and then wheeled to a suitable storage area at the end of class. One of the large stackable toolboxes would be ideal for this application. A labeling system on the toolbox would also be effective for orderly storage of tools.

3. Ensure all tools are in proper and safe working order. Checking all tools prior to assigning them to students also reinforces the idea of safety to students.

4. Prepare copies of technical drawings located in Students Materials Pack. Appropriate technical drawings are Learning Resource Sheet # M2-T2-Drawing 1, Learning Resource Sheet # M2-T2-Drawing 2, Learning Resource Sheet # M2-

T2-Drawing 3. These can either be copied and passed out in paper format or placed in a folder electronically on a shared resource for students to access.

Introduction

- State the purpose of this activity and the expected learning outcomes.
- State how this activity relates to the other activities in this module.
- Summarize what will be covered in this lesson and the related student activity.

Presentation

Students are provided with a brief description of their activity for this module. They are shown sample wall sections and the teacher stresses the need for accurate layout and the need to follow the blueprints very carefully. A mistake now can be very costly to fix at a later date. They will be reminded of the proper procedures for selecting material and for measuring and cutting material. They are reminded of all safe shop and tool operation practices and are given a quick overview of the tools and operations they will be completing during this activity. Potential hazards are also pointed out as a point of emphasis.

Suggested Student Activity

The wall module involves students creating a work plan for the construction of a wall section of a predetermined size (to fit the floor constructed in Module 1) after analyzing a supplied technical drawing (see Learning Resource Sheet # M2-T2-Drawing 1). In a group of 2 students will be expected to select the proper materials based on proper nominal lumber size and based on lumber quality. They will measure and cut the selected material to proper sizes using their technical drawing. Once they have assembled their wall section, with proper blocking, they will then choose their wall sheathing of choice. There are many different materials to choose from but our selection is lumber, plywood, or OSB. The students will then refer to the proper technical drawings (see Learning Resource Sheet # M2-T2-Drawing 2 and Learning Resource Sheet # M2-T2-Drawing 3), choose their wall sheathing, measure and cut the wall sheathing to the appropriate size, and then attach the wall sheathing to the studded wall. Throughout this entire process the students will be exhibiting safe work practices and be employing work practices used in the construction industry. Each student should be given an opportunity to actively participate in the use of shop tools.

It is noted at this point that many groups may not actually proceed to the actual wall sheathing in the time provided. However, during the next rotation the next group will carry on with the wall section that is partially completed.

Required Tools

Safety

Safety Glasses
Hearing Protection
Safety Footwear
Coveralls

Hand Tools

Steel Tape
Try Square
Miter Square
Framing Square
2-Foot Level
Hand Saw
Plumb Bob
Framing Hammer
Drill bits
Screw Diver Bits

Power Tools

Compound Miter Saw
Drill
Circular Saw
Jig Saw
Pneumatic Nailer

Required Materials

50mm x 100mm (2” x 4”) for Wall Studs
50mm x 100mm (2” x 4”) for Blocking
2400mm x 4800mm x 16mm (4’ x 8’ x 5/8”) Plywood or OSB
or 25mm x 200mm (1” x 8”) Lumber for Wall Sheathing
Quantity of 63mm (2 ½”) Nails or Screws for Attaching Wall Sheathing
Quantity of 88mm (3 1/2"”) Nails or Screws for Wall framing
Construction Adhesive

Assessment and Evaluation

The teacher will formally evaluate the completed floor. Students will be assessed based on how well their floor meets the technical drawing specifications. Students will be graded on the quality of the floor construction, the effort they put into the project, their attendance throughout the module, and their ability to work as a team to complete the project on time without sacrificing quality. Teachers should be aware that both members of the group would probably get different grades even though it is a group project. Students will also be graded on their use of acceptable shop practices and their proper use

of shop etiquette and shop clean up. This practical portion will be worth 60% of the grade for this module.

Learning Resources

Feirer and Feirer. 2004. Carpentry and Building Construction, Sixth Edition. New York, New York. Glencoe/Mcgraw-Hill.

Wagner and Smith. 2003. Modern Carpentry. Tinley Park, Illinois. The Goodheart-Willcox Company, Inc.

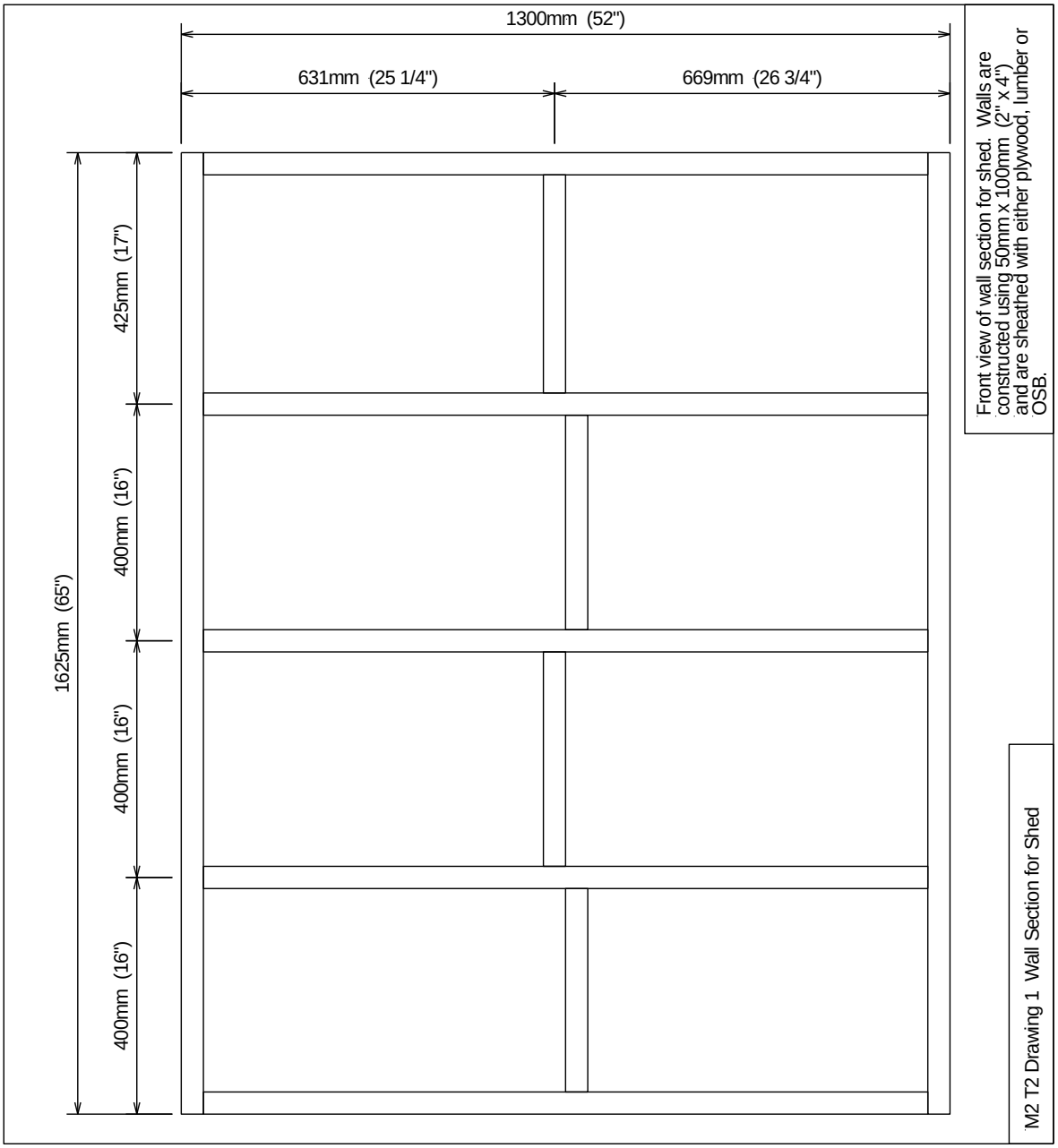
Lecture from a certified carpenter.

Student Materials Pack

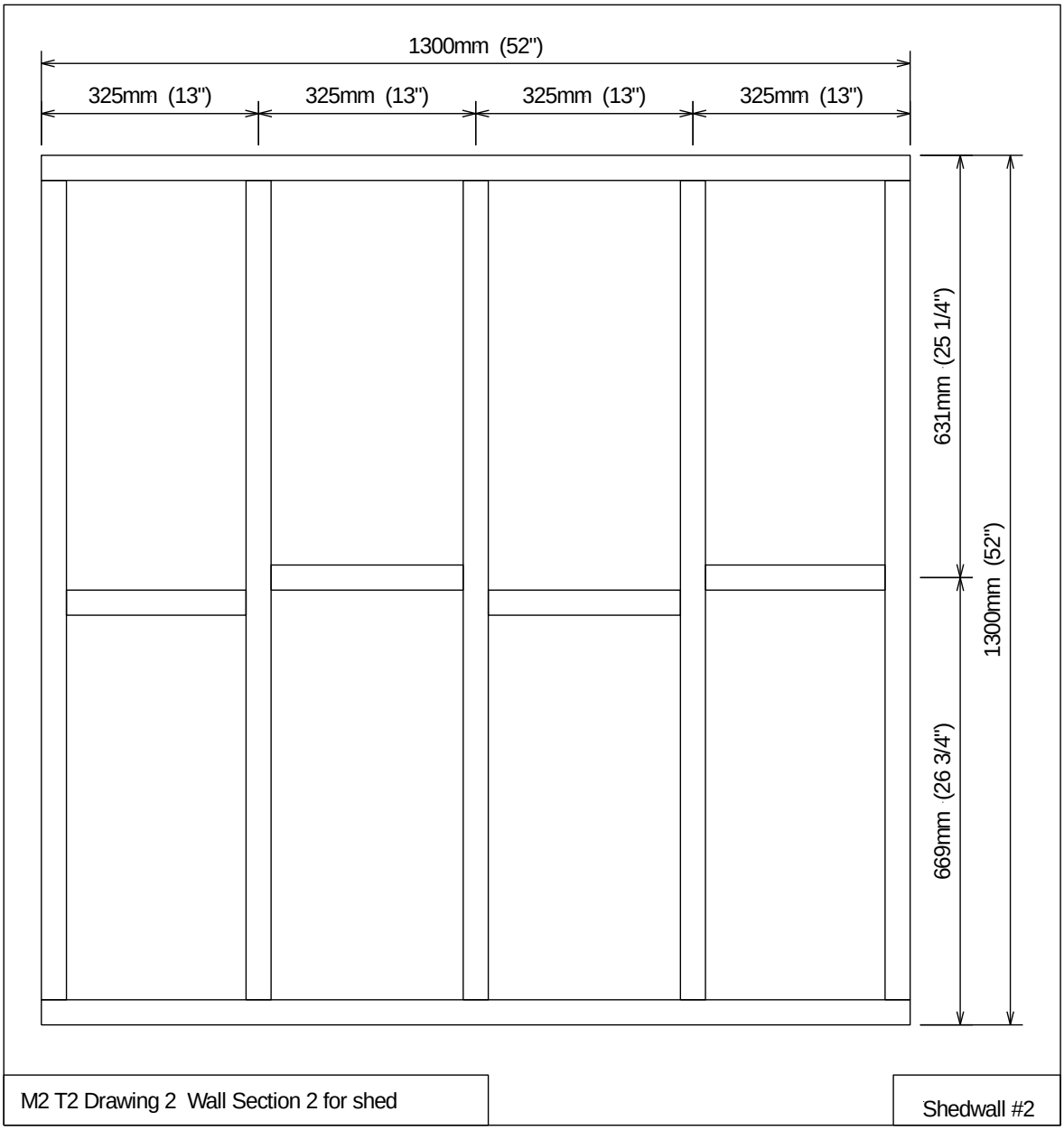
The Student Material Pack for Topic 2 includes the following attached documents:

1. Learning Resource Sheet # M2-T2-Drawing 1 “Wall Section for Shed”.
2. Learning Resource Sheet # M2-T2-Drawing 2, “Wall Section 2 for Shed”
3. Learning Resource Sheet # M2-T2-Drawing 3, “Shed Wall with Door Opening”

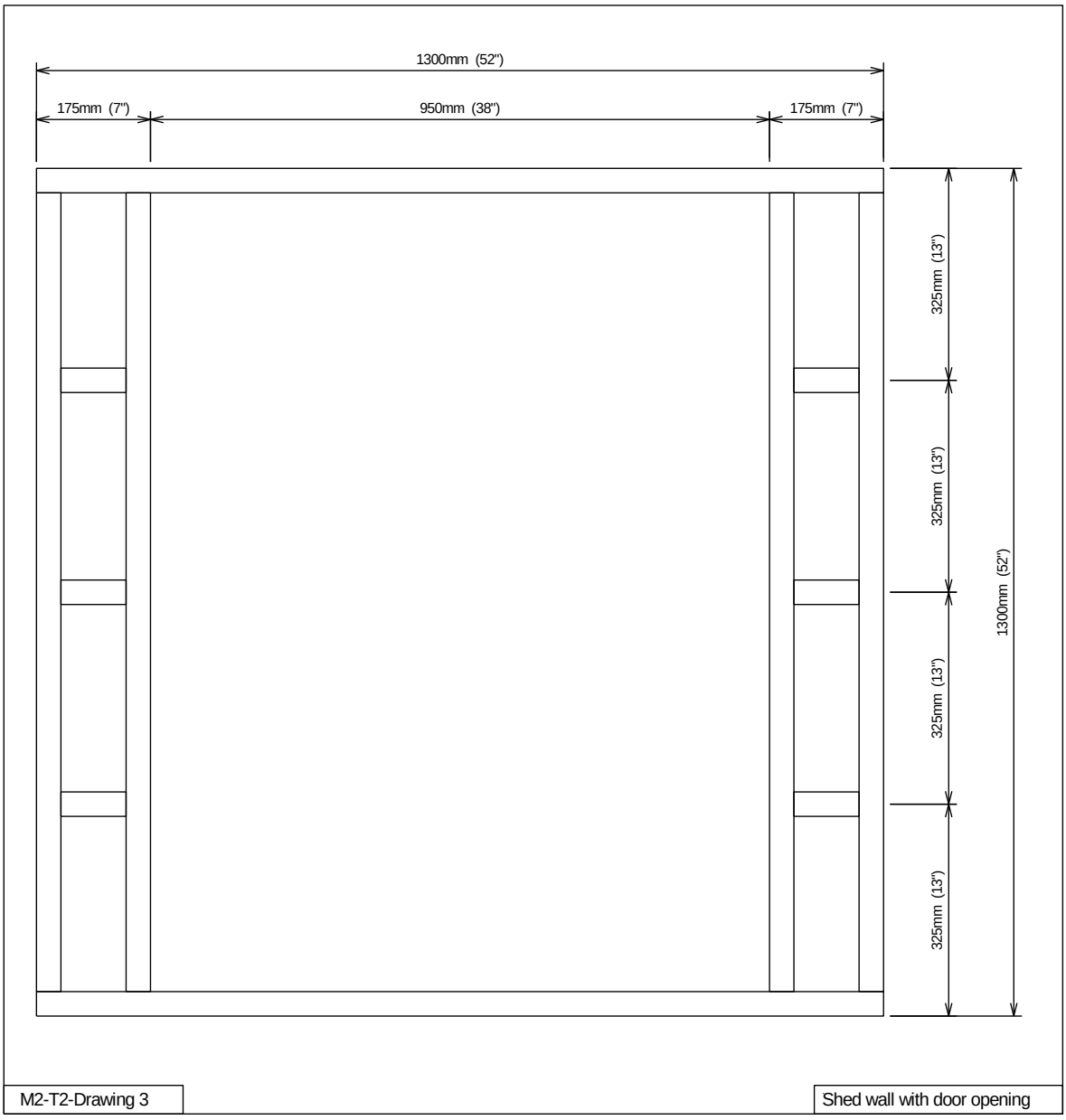
Wall Section For Shed
Learning Resource Sheet #LRS-M2-T2-Drawing 1



Wall Section 2 For Shed
Learning Resource Sheet #LRS-M2-T2-Drawing 2



Shed Wall with Door Opening
Learning Resource Sheet #LRS-M2-T2-Drawing 3



Topic 3: Reflection

Suggested Duration: 1 hour
Suggested Format: Fabrication Lab/Computer Lab

Following the completion of this activity, students will be able to:

2.3.2 Develop strategies for managing individual and team activities [4.401][5.401][5.402][5.403]

2.3.3 Maintain a work log (portfolio) for personal and professional assessment [1.405]

Teacher Required Resources

Skilled Trades 1201 Teacher's Resource Guide

Student Required Resources

Skilled Trades 1201 Student Reference Textbooks
Student Materials Pack

Teacher Preparation

1. Check materials stock to ensure that all necessary materials are available for next group of students.

2. Check all tools to ensure they are in working order and have been properly maintained.

3. Copy Assignment #ASG-M2-T3-1 Reflection Activity and Assignment #ASG-M2-T3-2 Work Log for students to complete.

Introduction

- State the purpose of this activity and the expected learning outcomes.

- Emphasize how the completion of the walls allows for the other trades to move in and start the next phase of the project which if the roof framing. It is important

that students understand the connection between each section of the house and the importance they all play in the completed project.

- Point out to the students how the accuracy of the project just completed will affect the finished project.

Presentation

Teacher explains to students the importance of evaluating the completed activity. Students must carefully examine their completed walls and look for imperfections. They then need to investigate the causes of the imperfections to prevent them from happening again. For example a twisted wall may be the result of choosing low quality wood for their framing. Students need to understand the importance of reassessing their completed work and learning from the activity. The teacher can stress the fact that mistakes are only a problem if the student fails to learn from them. An effective tradesperson will learn from their mistakes to ensure that they complete a quality product. The teacher explains the importance of the work log and the role it plays in real-life situations. This work log is essential to track the skills covered and the tradespersons' level of competency while completing those skills.

Suggested Student Activity

Students are given a "Reflection Activity" (Assignment #ASG-M2-T3-1 Reflection Activity) to complete. Each group member must complete his or her own reflection sheet to be submitted and evaluated. Students must also complete their work log (Assignment #ASG-M2-T3-2 Work Log) and get it initialed (in this case, graded) by their teacher.

Assessment and Evaluation

Students must submit their "Reflection Activity" and their "Work Log" to be evaluated. This will account for 10% of their overall grade in this module.

Student Materials Pack

The Student Material Pack for Topic 3 should include:

1. Assignment #ASG-M2-T3-1 Reflection Activity.

2. Assignment #ASG-M2-T3-2 Work Log.

Reflection
Assignment #ASG-M2-T3-1

Read each of the following questions and provide a written response to each.

1. If doing the wall project again what would you do differently?

2. What are the advantages provided by using power tools as opposed to non-power tools years ago?

3. How could you have divided your duties differently to make the project go more smoothly?

4. Discuss the advantages of working inside in a shop as opposed to outside on a typical jobsite. Give at least three advantages and disadvantages of each.

5. Collate your blueprints and your work plan (completed in Topic 2) to be submitted for grading.

Work Log
Assignment #ASG-M2-T3-2

Record of Workplace Skills (LOG) **Name:** _____ Module**:** _____		
Workplace Skills Required For Successful Completion of Carpentry Module	Date	Initials of Instructor
Blueprint Reading and Sketching		
Read basic drawings and diagrams		
Sketch drawings and diagrams		
Interpret specifications		
Floor Framing		
Select proper lumber		
Measure and layout material		
Cut material to proper lengths		
Prepare and install floor framing		
Prepare and install floor covering		
Wall Framing		
Select proper lumber		
Measure and layout material		
Cut material to proper lengths		
Frame exterior walls		
Install wall sheathing		
Erect exterior walls		
Install top plate		
Roof Truss Construction		
Select proper lumber		
Measure and layout material		
Cut material to proper lengths		
Assemble roof truss		
Attach roof truss		
Install roof sheathing		

Module 3

Carpentry: Roof Framing

Module 3

Roof Framing

Module Overview

This module will introduce students to the principles of roof framing. Students will learn about roof truss terminology, measuring, roof construction techniques, proper building techniques and proper building practices. They will draw on knowledge gained in Unit 2 in relation to reading blueprints and technical drawings. They will have to interpret a technical drawing, develop a work plan, select proper materials and layout and cut their materials, and then assemble their materials to create a finished truss. They will employ the safe cutting and construction practices covered in the earlier safety section and will emulate safe building and workplace guidelines. Students will learn the value of teamwork and the importance of planning ahead to achieve proper results. The work plan and pricing will give them real life experience with building projects.

Specific Curriculum Outcomes and Suggested Timelines

Module 3 addresses 6 specific curriculum outcomes (SCOs) from the Carpentry: Roof Framing section in the Skilled Trades 1201 curriculum guide. The time allocated in each module is recommended but can be adjusted if the teachers sees fit. However, it should be noted that the entire module is only allocated 7 hours and this needs to be adhered to.

Topic 1: Theory of Roof Truss Framing (2 hours)

- 3.4.2 List and describe different roof styles [1.401][1.402][2.401][3.401]
- 3.4.3 Explain construction and installation techniques for different types of roof frames[1.401][1.402][2.401][3.401]
- 3.4.4 Identify the various types of roof sheathing and the advantages and disadvantages of each [1.401][1.402] [2.401][3.401]
- 3.4.5 Given the span, develop a layout for a standard "w" roof truss [1.401][1.402][1.403][1.404][1.405][2.401][2.402][5.402]
- 3.4.6 Create a work plan for the roof truss project [1.402][1.405][4.402] [4.403]

Topic 2: Roof Truss Fabrication (4 hours)

- 3.4.1 Review and demonstrate safe practices for use of standard hand, portable power, and stationary power tools for roof truss fabrication [2.401][2.402][2.405][3.401][5.402]
- 3.4.7 Construct and sheathe a roof section based on the technical drawings supplied by the instructor [1.403][1.404][1.405][2.401][2.402][2.405] [4.402][5.401][5.402][5.403]

Topic 3: Reflection (1 hour)

- 2.3.2 Develop strategies for managing individual and team activities [4.401][5.401][5.402][5.403]
- 2.3.3 Maintain a work log (portfolio) for personal and professional assessment [1.405]

Topic 1: Theory of Roof Truss Framing

Suggested Duration: 2 hours
Suggested Format: Computer Lab

Following the completion of this activity, students will be able to:

- 3.4.2 List and describe different roof styles [1.401][1.402][2.401][3.401]
- 3.4.3 Explain construction and installation techniques for different types of roof frames[1.401][1.402][2.401][3.401]
- 3.4.4 Identify the various types of roof sheathing and the advantages and disadvantages of each [1.401][1.402] [2.401][3.401]
- 3.4.5 Given the span, develop a layout for a standard "w" roof truss [1.401][1.402][1.403][1.404][1.405][2.401][2.402][5.402]
- 3.4.6 Create a work plan for the roof truss project [1.402][1.405][4.402] [4.403]

Teacher Required Resources

Skilled Trades 1201 Teacher's Resource Guide

Student Required Resources

Skilled Trades 1201 Student Reference Textbooks
Student Materials Pack

Teacher Preparation

1. Review the theory of roof truss framing and the new tools, materials, and building techniques used in today's construction industry. This review can be done by referring to the resources listed below.

   Wagner and Smith. 2003. Modern Carpentry. Tinley Park, Illinois. The Goodheart-Willcox Company, Inc.

   Feirer and Feirer. 2004. Carpentry and Building Construction, Sixth Edition. New York, New York. Glencoe/Mcgraw-Hill.

2. Prepare copies of assignment sheets located in resource guide at the end of this unit. Appropriate assignments are #ASG-M3-T1-1, #ASG-M3-T1-2, and #ASG-M3-T1-3. These can either be copied and passed out in paper format or placed in a folder electronically on a shared resource for students to access.

Introduction

- State the purpose of this activity and the expected learning outcomes.
- State how this activity relates to the other activities in this module.
- Summarize what will be covered in this lesson and the related student activity.

Presentation

Discuss with students the importance of the theoretical aspect of training for any trade. Students have to be made aware of the vast knowledge base needed to become a qualified carpenter. This knowledge base is partially gained through theoretical learning and class work. Students need to be informed of the value (grade) placed on the completion of the theoretical portion of the module. It is important that students are aware of the fact that the theoretical portion is compulsory and must be completed before the practical portion of the activity can be engaged. A good understanding of the mathematical concepts of rise and run will be a benefit here. Students will be given 2 hours to complete these activities and if they feel that they are at risk of not finishing then they should supplement class time with homework or after school work arranged with the teacher. Of utmost importance is the necessity that students be aware of the absolute limit of 7 hours as it impacts every other group and every other module. There can be **no extension** to the time allocated for the module.

Assessment and Evaluation

The teacher will formally evaluate the completed assignments as completed by each individual in each group. Teachers can choose whether to make the group responsible for one copy of all assigned work **or** a separate copy of all assignments from each individual in the group. These theoretical assignments will be valued at 30% of the module.

Learning Resources

Feirer and Feirer. 2004. Carpentry and Building Construction, Sixth Edition. New York, New York. Glencoe/Mcgraw-Hill.

Wagner and Smith. 2003. Modern Carpentry. Tinley Park, Illinois. The Goodheart-Willcox Company, Inc.

Student Materials Pack

The Student Material Pack for Topic 1 includes the following attached documents:

1. Assignment #ASG-M3-T1-1, “Theory of Roof Truss Framing”.
2. Assignment #ASG-M3-T1-2, “Labeling and Defining Roof Truss Components”
3. Assignment #ASG-M3-T1-3, “Materials Pricing Activity”

Theory of Roof Truss Framing
Assignment #ASG-M3-T1-1

Answer the following questions using the textbook "Modern Carpentry". The answers can be typed as a document or presented using a PowerPoint presentation.

1. Explain the difference between a truss and a rafter system.

2. Draw and label a proper rafter using the appropriate terminology.

3. Using graph paper design a rafter for the snow blower shed. Check with your teacher for the exact measurements of the shed.

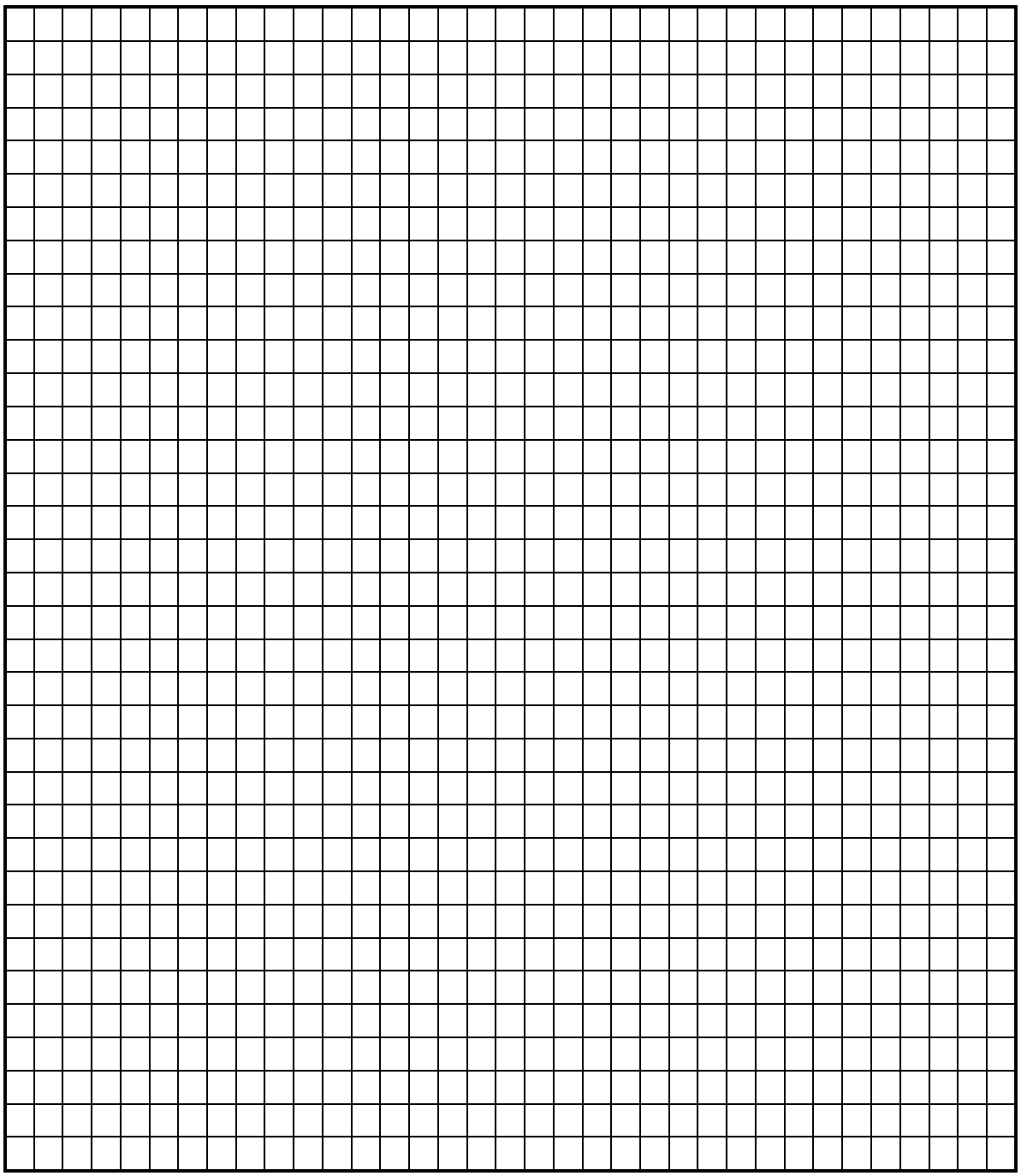
4. Using graph paper design a standard w truss for the snow blower shed. Check with your teacher for the exact measurements of the shed.

5. What purpose does roof sheathing serve? What materials are available to be used as roof sheathing?

6. Define the following terminology:
    - Framing Square
    - Slope
    - Bird's Mouth
    - Tail Cut
    - Truss Plates
    - Panel Clips

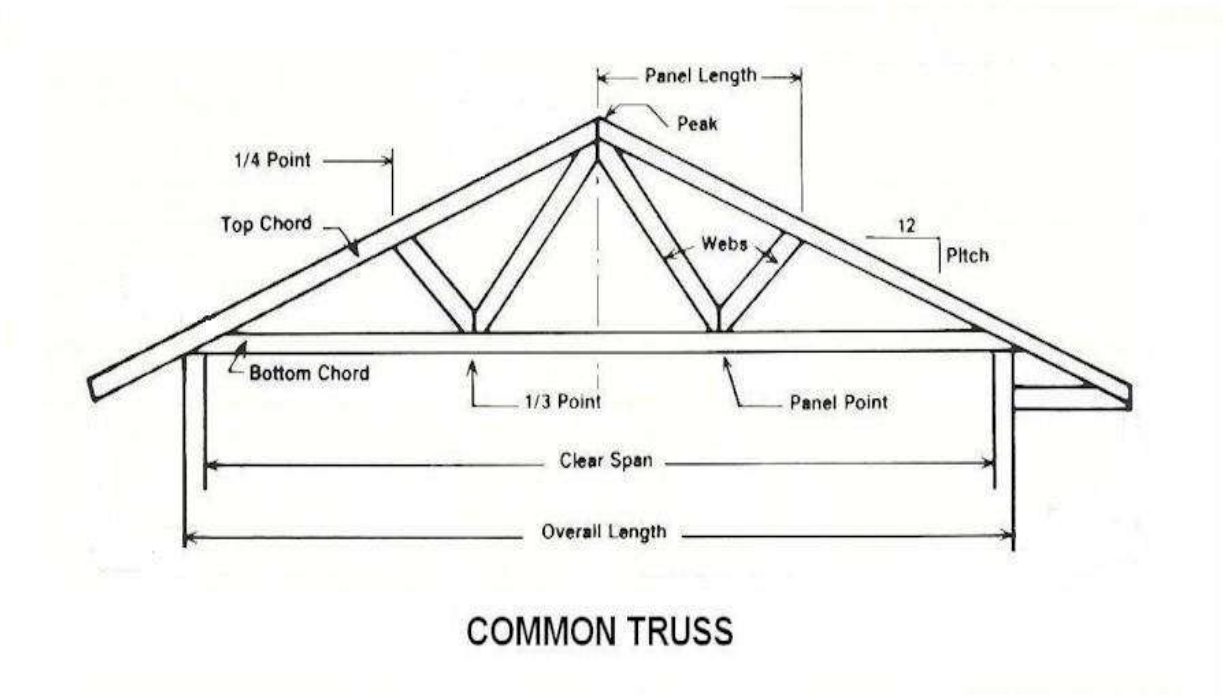
Labeling and Defining Roof Truss Components Assignment #ASG-M3-T1-2

Using the grid paper below sketch a diagram of a standard W or Fink roof truss with the proper layout for a roof truss. Label each member properly and give a brief description of each.



Materials Pricing Activity
Assignment #ASG-M3-T1-3

Using the available resource materials (books and Internet sources), determine the number of standard W trusses needed to complete the roof for a 2400mm x 3000mm (8' x 10') shed. Then contact local suppliers, business flyers, or online quotes to determine the total cost to build the number of trusses needed. Ensure that the total price is comprised of an itemized breakdown for each different material used (50mm x 100mm (2" x 4") lumber, 13mm (1/2") plywood). After you have priced the cost to build the trusses then price the cost of having the trusses supplied by a local truss company. Use the sample truss below as a guide.



COMMON TRUSS

Topic 2: Roof Truss Fabrication

Suggested Duration: 4 hours
Suggested Format: Fabrication Lab

Following the completion of this activity, students will be able to:

- 3.4.1 Review and demonstrate safe practices for use of standard hand, portable power, and stationary power tools for roof truss fabrication [2.401][2.402][2.405][3.401][5.402]
- 3.4.7 Construct and sheathe a roof section based on the technical drawings supplied by the instructor [1.403][1.404][1.405][2.401][2.402][2.405] [4.402][5.401][5.402][5.403]

Teacher Required Resources

Skilled Trades 1201 Teacher's Resource Guide

Student Required Resources

Skilled Trades 1201 Student Reference Textbooks
Student Materials Pack

Teacher Preparation

1. Purchase material needed to complete the assembly of a roof truss. This would include wood of appropriate sizes, nails, screws, and material (plywood) for gusset plates. This material should be stored safely in an area easily accessible to students.

2. Compile a tool kit necessary for students to use for this activity. This tools kit would preferably be on wheels so it can be wheeled out at the beginning of class and then wheeled to a suitable storage area at the end of class. One of the large stackable toolboxes would be ideal for this application. A labeling system on the toolbox would also be effective for orderly storage of tools.

3. Ensure all tools are in proper and safe working order. Checking all tools prior to assigning them to students also reinforces the idea of safety to students.

4. Prepare copies of technical drawings located in the Student Materials Pack. Appropriate technical drawings are Learning Resource Sheet # M3-T2-Drawing 1, Learning Resource Sheet # M3-T2-Drawing 2. These can either be copied and passed out in paper format or placed in a folder electronically on a shared resource for students to access.

Introduction

- State the purpose of this activity and the expected learning outcomes.
- State how this activity relates to the other activities in this module.
- Summarize what will be covered in this lesson and the related student activity.

Presentation

Students are provided with a brief description of their activity for this module. Students are supplied with a technical drawing which they will follow to complete their truss. Explain to students the importance of having all trusses exactly the same to ensure you have an accurate roof when finished. They are reminded of all safe shop and tool operation practices and are given a quick overview of the tools and operations they will be completing during this activity. Potential hazards are also pointed out as a point of emphasis. This is a good time to talk about working overhead and the hazards that are commonplace when doing so.

Suggested Student Activity

The roof truss module involves students creating a work plan for the construction of a roof truss of a predetermined size (to fit the shed constructed in Module 1 and Module 2) after analyzing a supplied technical drawing (see Learning Resource Sheet # M3-T2-Drawing 1). In a group of 2 students will be expected to select the proper materials based on proper nominal lumber size and based on lumber quality. They will measure and cut the selected material to proper sizes using their technical drawing. Once they have assembled their roof truss they will attach them to the existing shed structure. There are many different materials to choose from but our selection is either lumber or plywood. The students will then choose their roof sheathing, measure and cut the roof sheathing to the appropriate size, and then attach the roof sheathing to the roof trusses. Throughout this entire process the students will be exhibiting safe work practices and be employing work practices used in the construction industry. Each student should be given an opportunity to actively participate in the use of shop tools.

It is noted at this point that many groups may not actually proceed to the actual roof sheathing in the time provided. However, during the next rotation the next group will carry on with the roof that is partially completed.

Required Tools

Safety

- Safety Glasses
- Hearing Protection
- Safety Footwear
- Coveralls

Hand Tools

- Steel Tape
- Try Square
- Miter Square
- Framing Square
- 2-Foot Level
- Hand Saw
- Plumb Bob
- Framing Hammer
- Drill bits
- Screw Diver Bits

Power Tools

- Compound Miter Saw
- Drill
- Circular Saw
- Jig Saw
- Pneumatic Nailer

Required Materials

50mm x 100mm (2” x 4”) for Roof Trusses
50mm x 100mm (2” x 4”) for Blocking
2400mm x 4800mm (4’ x 8’) Plywood or OSB
Or 25mm x 200mm (1” x 8”) Lumber for Roof Sheathing
Quantity of 63mm (2 ½”) Nails or Screws for Attaching Roof Sheathing
Quantity of 88mm (3 1/2") Nails or Screws for Truss Construction
16mm x 200mm x 200mm (5/8” x 8” x 8”) Plywood for Gusset Plates
Construction Adhesive

Assessment and Evaluation

The teacher will formally evaluate the completed roof truss. Students will be assessed based on how well their trusses meet the technical drawing specifications. Students will be graded on the quality of the truss construction, the effort they put into the project, their attendance throughout the module, and their ability to work as a team to complete the project on time without sacrificing quality. Teachers should be aware that both members of the group would probably get different grades even though it is a group project. Students will also be graded on their use of acceptable shop practices and their proper use of shop etiquette and shop clean up. This practical portion will be worth 60% of the grade for this module.

Learning Resources

Feirer and Feirer. 2004. Carpentry and Building Construction, Sixth Edition. New York, New York. Glencoe/Mcgraw-Hill.

Wagner and Smith. 2003. Modern Carpentry. Tinley Park, Illinois. The Goodheart-Willcox Company, Inc.

Lecture from a certified carpenter.

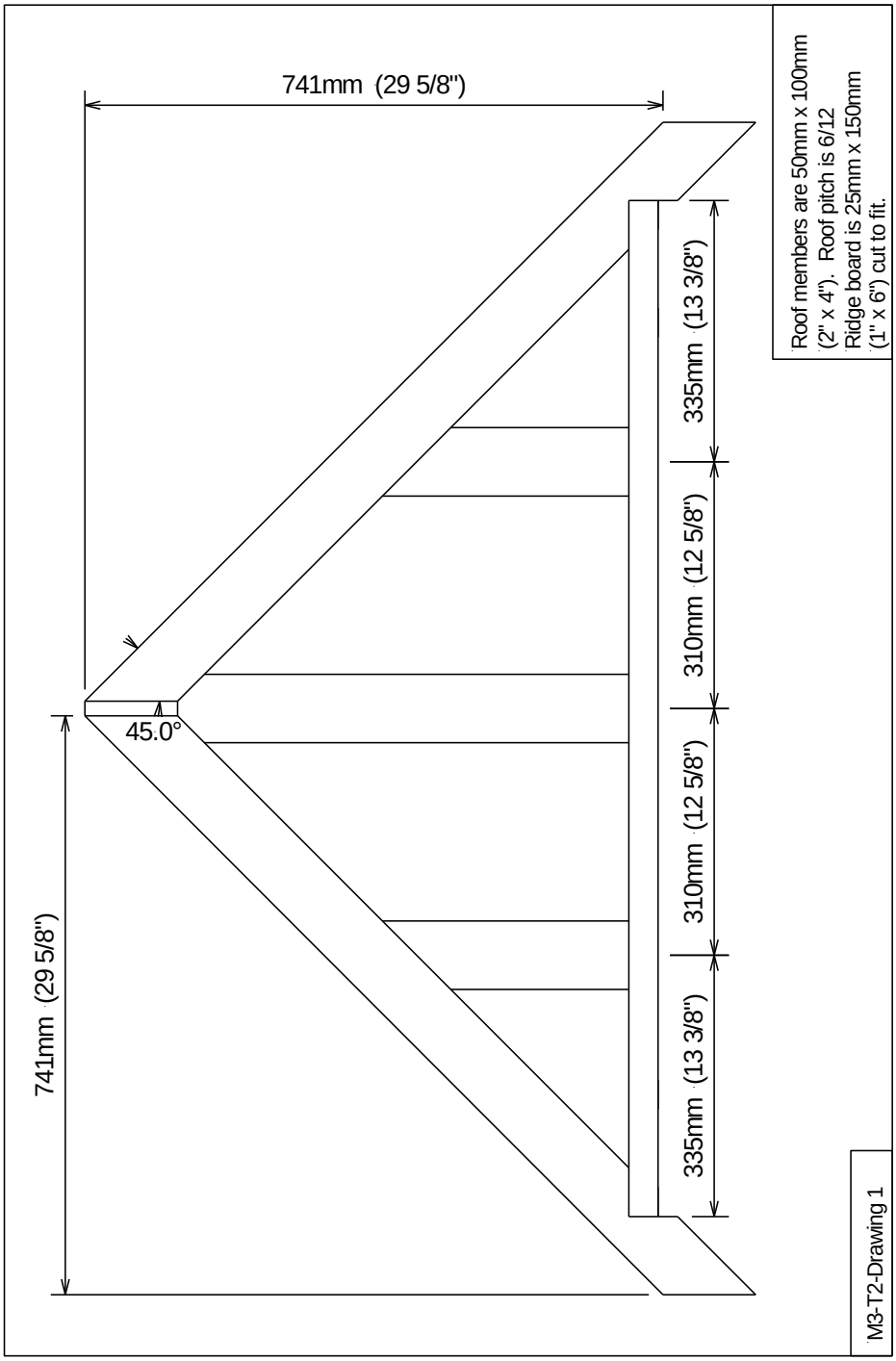
Student Materials Pack

The Student Material Pack for Topic 2 includes the following attached documents:

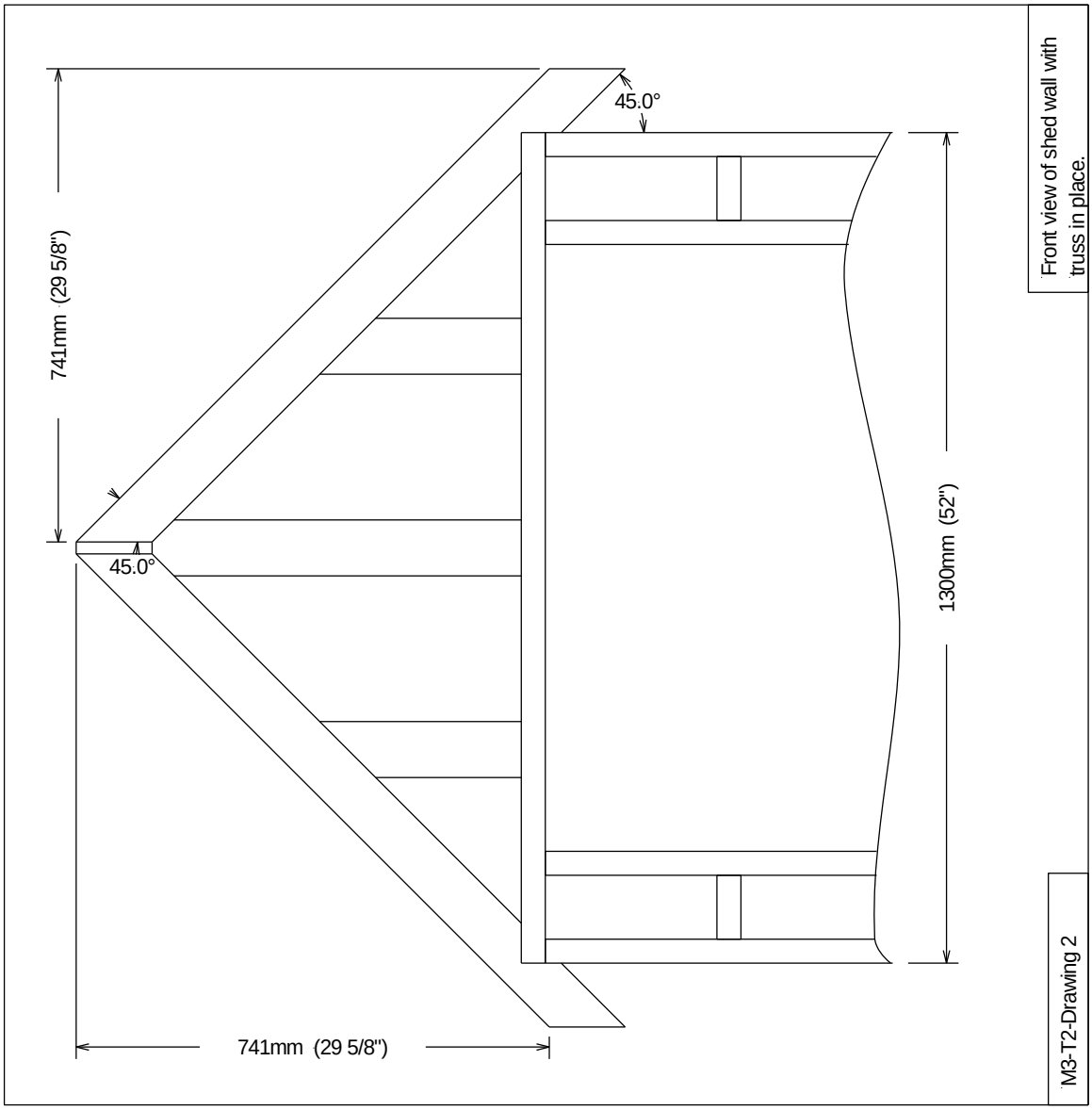
1. Learning Resource Sheet # M3-T2-Drawing 1 “Roof Truss”.

2. Learning Resource Sheet # M3-T2-Drawing 2 “Roof Truss with Wall”.

Roof Truss
Learning Resource Sheet #LRS-M3-T2-Drawing 1



Roof Truss With Wall
Learning Resource Sheet #LRS-M3-T2-Drawing 2



Topic 3: Reflection

Suggested Duration: 1 hour
Suggested Format: Fabrication Lab/Computer Lab

Following the completion of this activity, students will be able to:

2.3.2 Develop strategies for managing individual and team activities [4.401][5.401][5.402][5.403]

2.3.3 Maintain a work log (portfolio) for personal and professional assessment [1.405]

Teacher Required Resources

Skilled Trades 1201 Teacher's Resource Guide

Student Required Resources

Skilled Trades 1201 Student Reference Textbooks
Student Materials Pack

Teacher Preparation

1. Check materials stock to ensure that all necessary materials are available for next group of students.

2. Check all tools to ensure they are in working order and have been properly maintained.

Introduction

- State the purpose of this activity and the expected learning outcomes.

- Emphasize how the completion of the roof allows for the other trades to move in and start the next phase of the project. (Roof coverings)

- Point out to the students how the accuracy of the project just completed will affect the finished project. A poor roof design will severely affect the look of the shingles.

Presentation

Teacher explains to students the importance of evaluating the completed activity. Students should examine their roof trusses and compare them and they need to understand why their trusses don't match if that's the case. Students need to understand the importance of reassessing their completed work and learning from the activity. A close look at the trusses and the finished roof will quickly let students know how well their trusses all match. Accuracy is a very important feature of roof truss building. Teacher explains the importance of the work log and the role it plays in real life situations.

Suggested Student Activity

Students are given a "Reflection Activity" (Assignment #ASG-M3-T3-1 Reflection Activity) to complete. Each group member must complete his or her own reflection sheet to be submitted and evaluated. Students must also complete their work log (Assignment #ASG-M3-T3-2 Work Log) and get it initialed (in this case, graded) by their teacher.

Assessment and Evaluation

Students must submit their "Reflection Activity" and their "Work Log" to be evaluated. This will account for 10% of their overall grade in this module.

Student Materials Pack

The Student Material Pack for Topic 3 should include:

a. Assignment #ASG-M3-T3-1 Reflection Activity.

b. Assignment #ASG-M3-T3-2 Work Log.

Reflection
Assignment #ASG-M3-T3-1

Read each of the following questions and provide a written response to each.

1. If doing the roof truss project again what would you do differently?

2. What are the advantages of buying trusses from a truss company as opposed to making your own?

3. How could you have divided your duties differently to make the project go more smoothly?

4. Discuss the advantages of working inside in a shop as opposed to outside on a typical jobsite. Give at least three advantages and disadvantages of each.

5. Collate your blueprints and your work plan (completed in Topic 2) to be submitted for grading.

Work Log
Assignment #ASG-M3-T3-2

Record of Workplace Skills (LOG) **Name:** _____ Module**: _____**		
Workplace Skills Required For Successful Completion of Carpentry Module	Date	Initials of Instructor
Blueprint Reading and Sketching		
Read basic drawings and diagrams		
Sketch drawings and diagrams		
Interpret specifications		
Floor Framing		
Select proper lumber		
Measure and layout material		
Cut material to proper lengths		
Prepare and install floor framing		
Prepare and install floor covering		
Wall Framing		
Select proper lumber		
Measure and layout material		
Cut material to proper lengths		
Frame exterior walls		
Install wall sheathing		
Erect exterior walls		
Install top plate		
Roof Truss Construction		
Select proper lumber		
Measure and layout material		
Cut material to proper lengths		
Assemble roof truss		
Attach roof truss		
Install roof sheathing		

Module 4

Construction Electrician-Circuits

The following pictures are of a sample tool kit and a sample component kit to be used in the electrical section.

Module 4

Construction Electrician-Circuits

Module Overview

This module will introduce students to the principles of residential electrical wiring. Students will learn about wiring terminology, electrical theory, tools, proper wiring techniques, proper electrical safety, and proper wiring practices. They will draw on knowledge gained in Unit 2 in relation to reading blueprints and technical drawings. They will have to interpret a technical drawing (electrical wiring diagram), develop a work plan, select proper materials, and then layout and install their materials. They will employ the safe shop (workplace) practices covered in the earlier safety section and will emulate safe building and workplace guidelines. Students will learn the value of teamwork and the importance of planning ahead to achieve proper results. The work plan and pricing will give them real life experience with building projects.

Specific Curriculum Outcomes and Suggested Timelines

Module 4 will cover all the specific curriculum outcomes (SCOs) from the Construction Electrician-Circuits topic in the Skilled Trades 1201 curriculum guide. The time allocated in each module is recommended but can be adjusted if the teachers sees fit. However, it should be noted that the entire module is only allocated 7 hours and this needs to be adhered to.

Topic 1: Theory of Construction Electrician-Circuits (2 hours)

- 3.5.1 Discuss safe practices when working with electricity [2.401][2.402][2.405][3.401][5.402]
- 3.5.3 Define electricity and electrical terms [1.405]
- 3.5.4 Describe the components of a standard residential electrical System [1.405]
- 3.5.5 List the electrical code requirements for residential lighting and receptacle circuits [1.405]

Topic 2: Electrical Fabrication (4 hours)

- 3.5.2 Demonstrate safe practices for use of hand tools common in the creation of electrical circuits [2.401][2.402][2.405][3.401][5.402]
- 3.5.6 Configure and test low voltage circuits in common residential use [1.401][1.402][1.403][1.404][1.405][2.401][2.402][5.402]

Topic 3: Reflection and Disassembly(1 hour)

- 2.3.2 Develop strategies for managing individual and team activities [4.401][5.401][5.402][5.403]
- 2.3.3 Maintain a work log (portfolio) for personal and professional assessment [1.405]

Topic 1: Theory of Construction Electrician-Circuits

Suggested Duration: 2 hours
Suggested Format: Computer Lab

Following the completion of this activity, students will be able to:

- 3.5.1 Discuss safe practices when working with electricity [2.401][2.402][2.405][3.401][5.402]
- 3.5.3 Define electricity and electrical terms [1.405]
- 3.5.4 Describe the components of a standard residential electrical System [1.405]
- 3.5.5 List the electrical code requirements for residential lighting and receptacle circuits [1.405]

Teacher Required Resources

Skilled Trades 1201 Teacher's Resource Guide

Student Required Resources

Skilled Trades 1201 Student Reference Textbooks
Student Materials Pack

Teacher Preparation

1. Review the theory of residential electrical construction and the new tools, materials, and building techniques used in today's construction industry. This review can be done by referring to the resources listed below.

   Mullin, Ray C. 2005. Electrical Wiring Residential. Clifton Park, New York. Delmar Thompson Learning.

   Bartlett, Walter C. Lab Manual to Accompany Electrical Wiring Residential 2nd Edition. Clifton Park, New York. Delmar Thompson Learning.

   http://www.hometime.com/Howto/projects/electrical.htm

2. Prepare copies of assignment sheets located in resource guide at the end of this unit. Appropriate assignments are #ASG-M4-T1-1, #ASG-M4-T1-2, and #ASG-M4-T1-3. These can either be copied and passed out in paper format or placed in a folder electronically on a shared resource for students to access.

Introduction

- State the purpose of this activity and the expected learning outcomes.
- State how this activity relates to the other activities in this module.
- Summarize what will be covered in this lesson and the related student activity.

Presentation

Discuss with students the importance of the theoretical aspect of training for any trade. The Electrician trade has a great deal of electrical theory that students must learn and understand before dealing with electrical current. This theoretical knowledge can only be gained in the classroom. Students especially need to be aware of the hazards of working with electricity and the need to emphasize safety at all times. Students need to be informed of the value (grade) placed on the completion of the theoretical portion of the module. It is important that students are aware of the fact that the theoretical portion is compulsory and must be completed before the practical portion of the activity can be engaged. This emulates standard practice at the post secondary level. Students will be given 2 hours to complete these activities and if they feel that they are at risk of not finishing then they should supplement class time with homework or after school work arranged with the teacher. Of utmost importance is the necessity that students be aware of the absolute limit of 7 hours as it impacts every other group and every other module. There can be **no extension** to the time allocated for the module.

Assessment and Evaluation

The teacher will formally evaluate the completed assignments as completed by each individual in each group. Teachers can choose whether to make the group responsible for one copy of all assigned work **or** a separate copy of all assignments from each individual in the group. These theoretical assignments will be valued at 30% of the module.

Learning Resources

Mullin, Ray C. 2005. Electrical Wiring Residential. Clifton Park, New York. Delmar Thompson Learning.

Bartlett, Walter C. Lab Manual to Accompany Electrical Wiring Residential 2nd Edition. Clifton Park, New York. Delmar Thompson Learning.

http://www.hometime.com/Howto/projects/electrical.htm

Student Materials Pack

The Student Material Pack for Topic 1 includes the following attached documents:

1. Assignment #ASG-M4-T1-1, "Theory of Construction Electrician-Circuits".
2. Assignment #ASG-M4-T1-2, "Electrical Wiring Tools"
3. Assignment #ASG-M4-T1-3, "Electrical Theory"

Theory of Construction Electrician-Circuits
Assignment #ASG-M4-T1-1

Go to the following web site and answer the questions that follow. Answers can be submitted as a word document or as a PowerPoint presentation.
http://www.hometime.com/Howto/projects/electrical.htm

1. List four electrical safety steps.
2. Define the following:
    a. circuit breakers
    b. hot wire
    c. neutral wire
    d. tester
3. What purpose does an electrical panel serve?
4. Explain the difference between a circuit breaker and a fuse.
5. What is "fish tape"? Where is it used?
6. How do you calculate minimum box size when choosing electrical boxes?
7. What is the difference between a single pole switch and a three-way switch?
8. Give one electrical code for each of the following:
    a. kitchens
    b. appliances
    c. outlets
    d. Switches

Electrical Wiring Tools
Assignment #ASG-M4-T1-2

Using the Internet or the resource books provided find a picture of, and a description of the use for each of the following electrical tools.

- Linesman's Pliers
- Needle-nose pliers
- Wire Strippers
- Cable cutters
- Multimeter
- Robertson Screwdriver
- Utility Knife
- Wire Ripper
- Slotted Screwdriver

Electrical Theory
Assignment #ASG-M4-T1-3

Using the resource books provided or the Internet, answer the following questions.

1. Define Ohms Law. Briefly define the three parts of Ohms law and explain the correlation between the three of them

2. Briefly explain the difference between conductors and insulators.

3. What is a circuit? Give a description of a parallel circuit and a series circuit.

4. What are the two types of current? Explain the difference between the two.

5. What is the difference between a fuse and a circuit breaker?

6. What are the three basic types of circuits used in house wiring? Briefly describe each.

7. Describe each of the following types of cable:
   - Nonmetallic Sheathed Cable Wiring
   - Armoured Cable
   - Rigid Metal or Plastic Conduit

Topic 2: Electricial Fabrication

Suggested Duration: 4 hours
Suggested Format: Fabrication Lab

Following the completion of this activity, students will be able to:

- 3.5.2 Demonstrate safe practices for use of hand tools common in the creation of electrical circuits [2.401][2.402][2.405][3.401][5.402]
- 3.5.6 Configure and test low voltage circuits in common residential use [1.401][1.402][1.403][1.404][1.405][2.401][2.402][5.402]

Teacher Required Resources

Skilled Trades 1201 Teacher's Resource Guide

Student Required Resources

Skilled Trades 1201 Student Reference Textbooks
Student Materials Pack

Teacher Preparation

1. Purchase material needed to complete the wiring of various electrical circuits. This would include wire (14-2 and 14-3), receptacle boxes, octagon boxes, receptacles, single-pole switches, 3-way switches, and twist-on wire connectors. This material should be stored safely in an area easily accessible to students.

2. Compile a tool kit necessary for students to use for this activity. This tools kit would preferably be a Rubbermaid container large enough to hold the tools from the tool list. Compile a resource kit that would be a Rubbermaid kit large enough to hold all the components necessary to wire the various circuits in this module. This kit will also include wiring schematics for the various circuits that they will be expected to complete. A labeling system on the toolbox would also be effective for orderly storage of tools and components and also for ease of doing inventory.

3. Ensure all tools are in proper and safe working order. Checking all tools prior to assigning them to students also reinforces the idea of safety to students.

Introduction

- State the purpose of this activity and the expected learning outcomes.
- State how this activity relates to the other activities in this module.
- Summarize what will be covered in this lesson and the related student activity.

Presentation

Students are provided with a brief description of their activity for this module. They are given a sample circuit which displays the proper way to strip wire, feed wire into electrical boxes, and attach electrical components. They will use his sample to help them wire their first circuit. They are reminded of the earlier presentation where proper methods of stripping wire, feeding wire, and connecting electrical components was covered. They will be given a brief refresher by the instructor if necessary. They are reminded of all safe shop and tool operation practices and are given a quick overview of the tools and operations they will be completing during this activity. The teacher should have a sample circuit completed so that students have a model to go by which should make the start of this module easier for the student. Potential hazards are also pointed out as a point of emphasis.

Suggested Student Activity

The residential wiring/bench module will consist of a group of 2 students working at the workbench wiring 3-4 different circuits common to residential wiring. The wiring will require students to read a technical drawing, select wire, choose components, feed wire in boxes, strip wire, connect components, connect twist-on wire connectors, and test their circuits using a power supply. Students will also need to make use of various component testers to ensure their circuits are wired correctly. These circuits will be wired at the workbench using short (900mm (3')) lengths of wire. Throughout this entire process the students will be exhibiting safe work practices and be employing work practices used in the construction industry. Each student should be given an opportunity to actively participate in the use of shop tools.

Required Tools

Safety

Safety Glasses

Hearing Protection
Safety Footwear
Coveralls

Hand Tools

Linesman Pliers
Needle-nose Pliers
Wire Strippers
Utility knife
Wire Ripper
Robertson Screwdrivers #0, 1, & 2
Slotted Screwdriver
Multimeter
½" Drill Bit

Power Tools

Electric/Rechargeable Drill

Required Materials

14-2 and 14-3 Wire
Receptacle Boxes
Octagon Box
Receptacles
Single Pole Switches
Three Way Switches
Twist-on Wire Connectors
Light Fixtures

Assessment and Evaluation

The teacher will formally evaluate the completed circuits. Students will be assessed based on how well their circuits meet the electrical wiring diagrams. Students will be graded on the quality of the electrical wiring, the effort they put into the project, their attendance throughout the module, and their ability to work as a team to complete the project on time without sacrificing quality. Teachers should be aware that both members of the group would probably get different grades even though it is a group project. Students will also be graded on their use of acceptable shop practices and their proper use of shop etiquette and shop clean up. This practical portion will be worth 60% of the grade for this module.

Learning Resources

Mullin, Ray C. 2005. Electrical Wiring Residential. Clifton Park, New York. Delmar Thompson Learning.

Bartlett, Walter C. Lab Manual to Accompany Electrical Wiring Residential 2nd Edition. Clifton Park, New York. Delmar Thompson Learning.

http://www.hometime.com/Howto/projects/electrical.htm

Lecture from a certified electrician.

Student Materials Pack

The Student Material Pack for Topic 2 should include:

1. Electrical Tool Kit
2. Electrical Resource Kit (Electrical Components)
3. Circuit Diagrams (schematics)
    a. Single pole switch with feed at switch (Fig 5-12)
    b. Ceiling Outlet controlled by single-pole switch with live receptacle and feed at switch (Fig. 5-14)
    c. Circuit with three-way switch control with feed at first switch (5-17)
    d. Two lighting outlets controlled with two three-way switches with feed at first switch. Receptacle is live at all times. (Fig. 5-29)

These electrical diagrams can be copied, enlarged and laminated. These are then included in the components kit so students can have easy access to these diagrams. All diagrams are from the Electrical Wiring: Residential resource book referenced above. The teacher can substitute these for other circuits from other sources if the want. Students will work at their own pace so one group may complete 3 circuits while another may complete 4. It is important to recognize that neat and proper work and safe work habits are more important than speed, especially when working with electrical current.

Topic 3: Reflection

Suggested Duration: 1 hour
Suggested Format: Fabrication Lab/Computer Lab

Following the completion of this activity, students will be able to:

2.3.2 Develop strategies for managing individual and team activities [4.401][5.401][5.402][5.403]

2.3.3 Maintain a work log (portfolio) for personal and professional assessment [1.405]

Teacher Required Resources

Skilled Trades 1201 Teacher's Resource Guide

Student Required Resources

Skilled Trades 1201 Student Reference Textbooks
Student Materials Pack

Teacher Preparation

1. Check materials stock to ensure that all necessary materials are available for next group of students.

2. Check all tools to ensure they are in working order and have been properly maintained.

Introduction

- State the purpose of this activity and the expected learning outcomes.

- Emphasize how the completion of the electrical wiring allows the other trades the opportunity to move in and start the next phase of the project. (drywall)

- Point out to the students how the accuracy of the project just completed will affect the finished project.

Presentation

Teacher explains to students the importance of evaluating the completed activity. Students need to understand the importance of reassessing their completed work and learning from the activity. Teacher explains the importance of the work log and the role it plays in real life situations.

Suggested Student Activity

Students are given a "Reflection Activity" (Assignment #ASG-M4-T3-1 Reflection Activity) to complete. Each group member must complete his or her own reflection sheet to be submitted and evaluated. Students must also complete their work log (Assignment #ASG-M4-T3-2 Work Log) and get it initialed (in this case, graded) by their teacher. Students are also responsible for ensuring that their tool kits and component kits are neat, tidy, and complete. Students must inform teacher of anything that is missing so the teacher can replenish the missing item before the next group starts this module.

Assessment and Evaluation

Students must submit their "Reflection Activity" and their "Work Log" to be evaluated. This will account for 10% of their overall grade in this module.

Student Materials Pack

The Student Material Pack for Topic 3 should include:

a. Assignment #ASG-M4-T3-1 Reflection Activity.

b. Assignment #ASG-M4-T3-2 Work Log.

Reflection
Assignment #ASG-M4-T3-1

Read each of the following questions and provide a written response to each.

1. If doing the residential electrical wiring project again what would you do differently?

2. What are the advantages of wiring at the workbench as opposed to running the wires in an actual wall?

3. How could you have divided your duties differently to make the project go more smoothly?

4. Discuss the advantages of working inside in a shop as opposed to working on a typical jobsite. Give at least three advantages and disadvantages of each.

5. Finalize your work plan (completed in Topic 2) to be submitted for grading.

Work Log
Assignment #ASG-M4-T3-2

Record of Workplace Skills (LOG) **Name:** _____ Module**:** **_____**		
Workplace Skills Required For Successful Completion of Residential Electrical Wiring Module	Date	Initials of Instructor
Blueprint Reading and Sketching		
Read basic drawings and diagrams		
Sketch drawings and diagrams		
Interpret specifications		
Electrical Wiring		
Select proper wire		
Measure and cut wire		
Select proper electrical boxes		
Select proper electrical components		
Feed wire through boxes		
Strip wire		
Attach electrical components		
Properly install marettes		
Testing Circuits		
Properly hook circuits to power supply		
Properly use multimeter		

Module 5

Construction Electrician-Residential Wiring

The following is a picture of the wall section needed for the Electrical/Wall module. This particular picture represents three classes of Skilled Trades.

Module 5

Construction Electrician-Residential Wiring

Module Overview

This module will introduce students to the principles of residential electrical wiring. Students will learn about wiring terminology, electrical theory, tools, proper wiring techniques, proper electrical safety, and proper building practices. They will draw on knowledge gained in Unit 2 in relation to reading blueprints and technical drawings. They will have to interpret a technical drawing, develop a work plan, select proper materials and then layout and install their materials. They will employ the safe shop (workplace) practices covered in the earlier safety section and will emulate safe building and workplace guidelines. Students will learn the value of teamwork and the importance of planning ahead to achieve proper results. The work plan and pricing will give them real life experience with building projects.

Specific Curriculum Outcomes and Suggested Timelines

Module 5 will cover all the specific curriculum outcomes (SCOs) from the Construction Electrician-Residential Wiring topic in the Skilled Trades 1201 curriculum guide. The time allocated in each module is recommended but can be adjusted if the teachers sees fit. However, it should be noted that the entire module is only allocated 7 hours and this needs to be adhered to.

Topic 1: Theory of Residential Electrical Wiring (2 hours)

- 3.6.1 Review safe practices when working with electricity [2.401][2.402][2.405][3.401][5.402]
- 3.6.3 Review electricity and electrical terms [1.405]
- 3.6.4 Identify and describe the devices used in a residential electrical system [1.405]
- 3.6.5 List the electrical code requirements in the installation of cables and wiring [1.405]
- 3.6.6 Create a work plan for the installation of a residential electrical circuit[1.402][1.405][4.402][4.403][1.405]

Topic 2: Electrical Fabrication (4 hours)

- 3.6.2 Demonstrate safe practices for use of hand and power tools common in the installation of residential electrical circuits [2.401][2.402][2.405][3.401][5.402]
- 3.6.7 Install a residential electrical circuit based on the technical drawings supplied by the instructor [1.403][1.404][1.405][2.401][2.402][2.405] [4.402][5.401][5.402][5.403]

Topic 3: Reflection and Disassembly(1 hour)

- 2.3.2 Develop strategies for managing individual and team activities [4.401][5.401][5.402][5.403]
- 2.3.3 Maintain a work log (portfolio) for personal and professional assessment [1.405]

Topic 1: Theory of Residential Wiring

Suggested Duration: 2 hours
Suggested Format: Computer Lab

Following the completion of this activity, students will be able to:

- 3.6.1 Review safe practices when working with electricity [2.401][2.402][2.405][3.401][5.402]
- 3.6.3 Review electricity and electrical terms [1.405]
- 3.6.4 Identify and describe the devices used in a residential electrical system [1.405]
- 3.6.5 List the electrical code requirements in the installation of cables and wiring [1.405]
- 3.6.6 Create a work plan for the installation of a residential electrical circuit[1.402][1.405][4.402][4.403][1.405

Teacher Required Resources

Skilled Trades 1201 Teacher's Resource Guide

Student Required Resources

Skilled Trades 1201 Student Reference Textbooks
Student Materials Pack

Teacher Preparation

1. Review the theory of residential electrical construction and the new tools, materials, and building techniques used in today's construction industry. This review can be done by referring to the resources listed below.

   Mullin, Ray C. 2005. Electrical Wiring Residential. Clifton Park, New York. Delmar Thompson Learning.

   Bartlett, Walter C. Lab Manual to Accompany Electrical Wiring Residential 2nd Edition. Clifton Park, New York. Delmar Thompson Learning.

   http://www.hometime.com/Howto/projects/electrical.htm

2. Prepare copies of assignment sheets located in resource guide at the end of this unit. Appropriate assignments are #ASG-M5-T1-1, #ASG-M5-T1-2, and #ASG-

M5-T1-3. These can either be copied and passed out in paper format or placed in a folder electronically on a shared resource for students to access.

Introduction

- State the purpose of this activity and the expected learning outcomes.
- State how this activity relates to the other activities in this module.
- Summarize what will be covered in this lesson and the related student activity.

Presentation

Discuss with students the importance of the theoretical aspect of training for any trade. The Electrician trade has a great deal of electrical theory that students must learn and understand before dealing with electrical current. This theoretical knowledge can only be gained in the classroom. Students especially need to be aware of the hazards of working with electricity and the need to emphasize safety at all times. Students need to be informed of the value (grade) placed on the completion of the theoretical portion of the module. It is important that students are aware of the fact that the theoretical portion is compulsory and must be completed before the practical portion of the activity can be engaged. Students will be given 2 hours to complete these activities and if they feel that they are at risk of not finishing then they should supplement class time with homework or after school work arranged with the teacher. Of utmost importance is the necessity that students be aware of the absolute limit of 7 hours as it impacts every other group and every other module. There can be **no extension** to the time allocated for the module.

Assessment and Evaluation

The teacher will formally evaluate the completed assignments as completed by each individual in each group. Teachers can choose whether to make the group responsible for one copy of all assigned work **or** a separate copy of all assignments from each individual in the group. These theoretical assignments will be valued at 30% of the module.

Learning Resources

Mullin, Ray C. 2005. Electrical Wiring Residential. Clifton Park, New York. Delmar Thompson Learning.

Bartlett, Walter C. Lab Manual to Accompany Electrical Wiring Residential 2nd Edition. Clifton Park, New York. Delmar Thompson Learning.

http://www.hometime.com/Howto/projects/electrical.htm

Student Materials Pack

The Student Material Pack for Topic 1 includes the following attached documents:

1. Assignment #ASG-M5-T1-1, “Theory of Residential Wiring”.
2. Assignment #ASG-M5-T1-2, “Electrical Wiring Tools”
3. Assignment #ASG-M5-T1-3, “Electrical Theory”

Theory of Residential Wiring
Assignment #ASG-M5-T1-1

Go to the following web site and answer the questions that follow. Answers can be submitted as a word document or as a PowerPoint presentation.
http://www.hometime.com/Howto/projects/electrical.htm

1. List four electrical safety steps.
2. Define the following:
    a. circuit breakers
    b. hot wire
    c. neutral wire
    d. tester
3. What purpose does an electrical panel serve?
4. Explain the difference between a circuit breaker and a fuse.
5. What is "fish tape"? Where is it used?
6. How do you calculate minimum box size when choosing electrical boxes?
7. What is the difference between a single pole switch and a three-way switch?
8. Give one electrical code for each of the following:
    a. kitchens
    b. appliances
    c. outlets
    d. Switches

Electrical Assignment: Electrical Wiring Tools Assignment #ASG-M5-T1-2

Using the Internet or the resource books provided find a picture of, and a description of the use for each of the following electrical tools.

- Linesman’s Pliers
- Needle-nose pliers
- Wire Strippers
- Cable cutters
- Multimeter
- Robertson Screwdriver
- Utility Knife
- Wire Ripper
- Slotted Screwdriver

Electrical Theory
Assignment #ASG-M5-T1-3

State the purpose and function of each of the following components of the service entrance.

- The service entrance
- The electrical meter
- The distribution panel
- The branch circuits
- Specialty electrical systems (multimedia, computer networks, security.)

Identify and describe the devices used in a residential electrical system

- Breakers and fuses
- Wires (types and gauges)
- Octagon and outlet boxes
- Receptacles
- Switches
- Lighting fixtures
- Appliances
- Connections
- GFCI
- Ballasts
- Thermostats
- Transformers
- Smoke Detectors
- Large voltage relays
- Telephone /data wiring
- Chime and doorbell transformer

Topic 2: Electrician Fabrication

Suggested Duration: 4 hours
Suggested Format: Fabrication Lab

Following the completion of this activity, students will be able to:

- 3.6.2 Demonstrate safe practices for use of hand and power tools common in the installation of residential electrical circuits [2.401][2.402][2.405][3.401][5.402]
- 3.6.7 Install a residential electrical circuit based on the technical drawings supplied by the instructor [1.403][1.404][1.405][2.401][2.402][2.405] [4.402][5.401][5.402][5.403]

Teacher Required Resources

Skilled Trades 1201 Teacher's Resource Guide

Student Required Resources

Skilled Trades 1201 Student Reference Textbooks
Student Materials Pack

Teacher Preparation

1. Purchase materials and construct the wall section needed for the completion of the wall wiring section (Teacher Resource Kit). Teacher needs to ensure that the wall sections are screwed together to ensure ease of switching top plates when they have been used too much. Studded wall sections should be attached to an existing wall space to minimize the amount of floor space needed for this activity. These wall sections can easily be switched out and replaced as the need arises. This wall section would ideally integrate with the ceramic tile and drywall wall units as well.

2. Purchase material needed to complete the wiring of various electrical circuits. This would include wire (14-2 and 14-3), receptacle boxes, octagon boxes, receptacles, single-pole switches, 3-way switches, and twist-on wire connectors. This material should be stored safely in an area easily accessible to students.

3. Compile a tool kit necessary for students to use for this activity. This tools kit would preferably be a Rubbermaid container large enough to hold the tools from the tool list. Compile a resource kit that would be a Rubbermaid kit large enough

to hold all the components necessary to wire the various circuits in this module. This kit would also include laminated copies of the electrical circuits needed for this module. A labeling system on the toolbox would also be effective for orderly storage of tools and components and also for ease of doing inventory.

4. Ensure all tools are in proper and safe working order. Checking all tools prior to assigning them to students also reinforces the idea of safety to students.

Introduction

- State the purpose of this activity and the expected learning outcomes.
- State how this activity relates to the other activities in this module.
- Summarize what will be covered in this lesson and the related student activity.

Presentation

Students are provided with a brief description of their activity for this module. Students are given a brief lesson on drilling holes in studded walls for running wire and on proper stapling techniques for attaching wire to the studded walls. The teacher stresses the importance of safety when working with electrical power tools and also the care needed when working with electricity in relation to the wiring activities. Students are also reminded of the importance of keeping their wiring neat and tidy. They are reminded that electricians view their neat wiring as their own personal "signature". They are reminded of all safe shop and tool operation practices and are given a quick overview of the tools and operations they will be completing during this activity. Potential hazards are also pointed out as a point of emphasis.

Suggested Student Activity

The residential wiring/wall module will consist of a group of 2 students working at the studded wall wiring 3-4 different circuits common to residential wiring. The wiring will require students to read an electrical drawing, select wire, choose components, attach boxes to studs, feed wire in boxes, strip wire, connect components, connect marettes, and test their circuits using a power supply. These circuits will be run through a studded wall simulating real life experience with residential wiring. Students will need to attach the electrical boxes to the studded wall, drill holes to feed the wire where necessary, feed the wire and properly attach the wire to the studs with electrical wire staples. Students will also need to make use of various component testers to ensure their circuits are wired

correctly. Throughout this entire process the students will be exhibiting safe work practices and be employing work practices used in the construction industry. Each student should be given an opportunity to actively participate in the use of shop tools.

Required Tools

Safety

- Safety Glasses
- Hearing Protection
- Safety Footwear
- Coveralls

Hand Tools

- Linesman Pliers
- Needle-nose Pliers
- Wire Strippers
- Utility knife
- Wire Ripper
- Robertson Screwdrivers #0, 1, & 2
- Slotted Screwdriver
- ½" Drill Bit

Power Tools

- Electric/Rechargeable Drill
- Multimeter

Required Materials

- 14-2 and 14-3 Wire
- Receptacle Boxes
- Octagon Box
- Receptacles
- Single Pole Switches
- Three Way Switches
- Twist-on Wire Connectors
- Light Fixtures
- Wiring Staples

Assessment and Evaluation

The teacher will formally evaluate the completed circuits. Students will be assessed based on how well their circuits meet the electrical drawing specifications. Students will be graded on the quality of the electrical wiring, the effort they put into the project, their attendance throughout the module, and their ability to work as a team to complete the

project on time without sacrificing quality. Teachers should be aware that both members of the group would probably get different grades even though it is a group project. Students will also be graded on their use of acceptable shop practices and their proper use of shop etiquette and shop clean up. This practical portion will be worth 60% of the grade for this module.

Learning Resources

Mullin, Ray C. 2005. Electrical Wiring Residential. Clifton Park, New York. Delmar Thompson Learning.

Bartlett, Walter C. Lab Manual to Accompany Electrical Wiring Residential 2nd Edition. Clifton Park, New York. Delmar Thompson Learning.

http://www.hometime.com/Howto/projects/electrical.htm

Lecture by a certified electrician.

Teacher Resource Kit

The Teacher Resource Kit for Topic 2 includes the following technical drawings:

1. Learning Resource Sheet #LRS-M5-T2-Drawing 1
2. Learning Resource Sheet #LRS-M5-T2-Drawing 1

Student Materials Pack

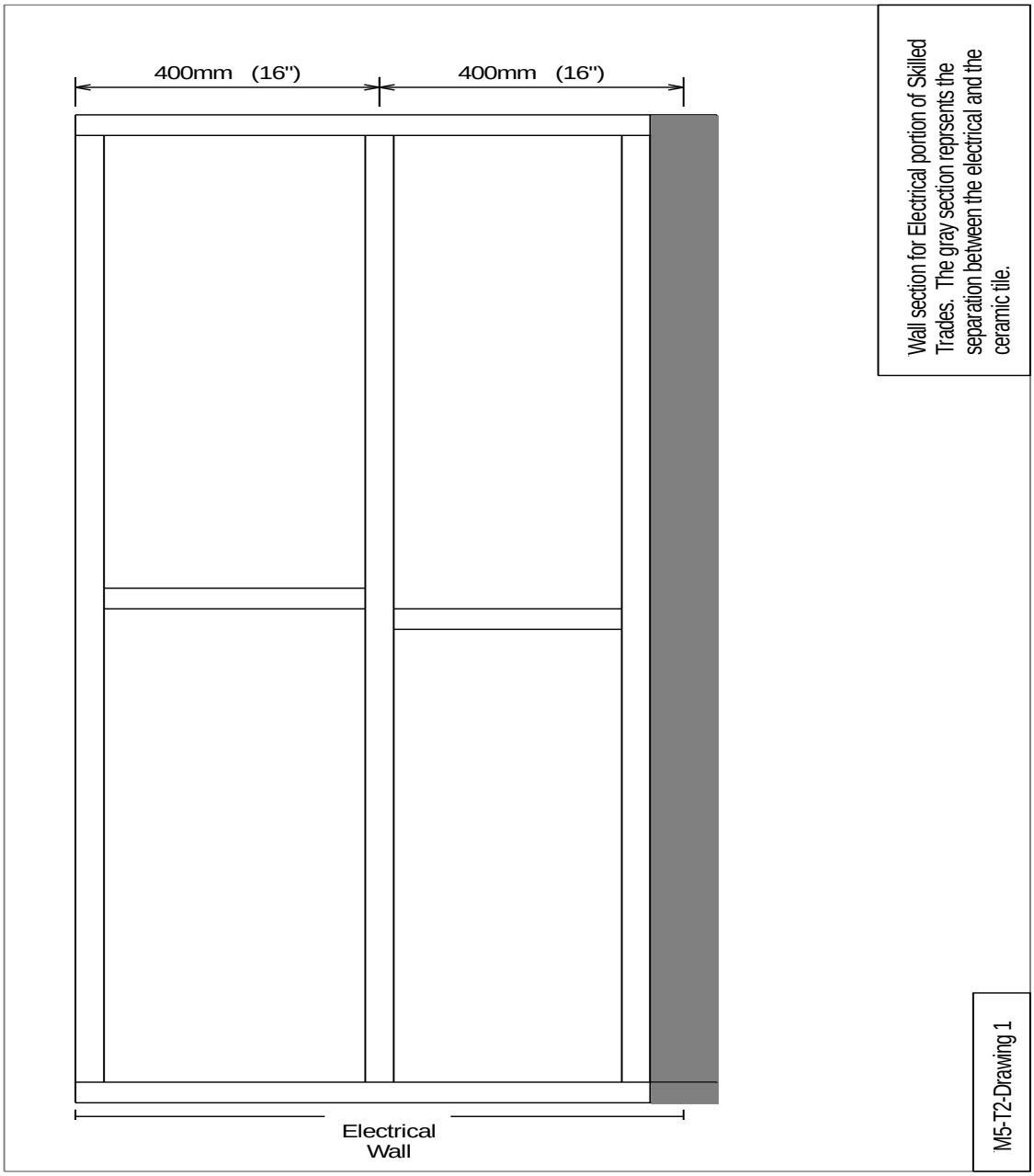
The Student Material Pack for Topic 2 should include:

1. Electrical Tool Kit
2. Electrical Resource Kit (Electrical Components)
3. Circuit Diagrams (schematics)
    a. Single pole switch with feed at switch (Fig 5-12)
    b. Ceiling Outlet controlled by single-pole switch with live receptacle and feed at switch (Fig. 5-14)
    c. Circuit with three-way switch control with feed at first switch (5-17)
    d. Two lighting outlets controlled with two three-way switches with feed at first switch. Receptacle is live at all times. (Fig. 5-29)

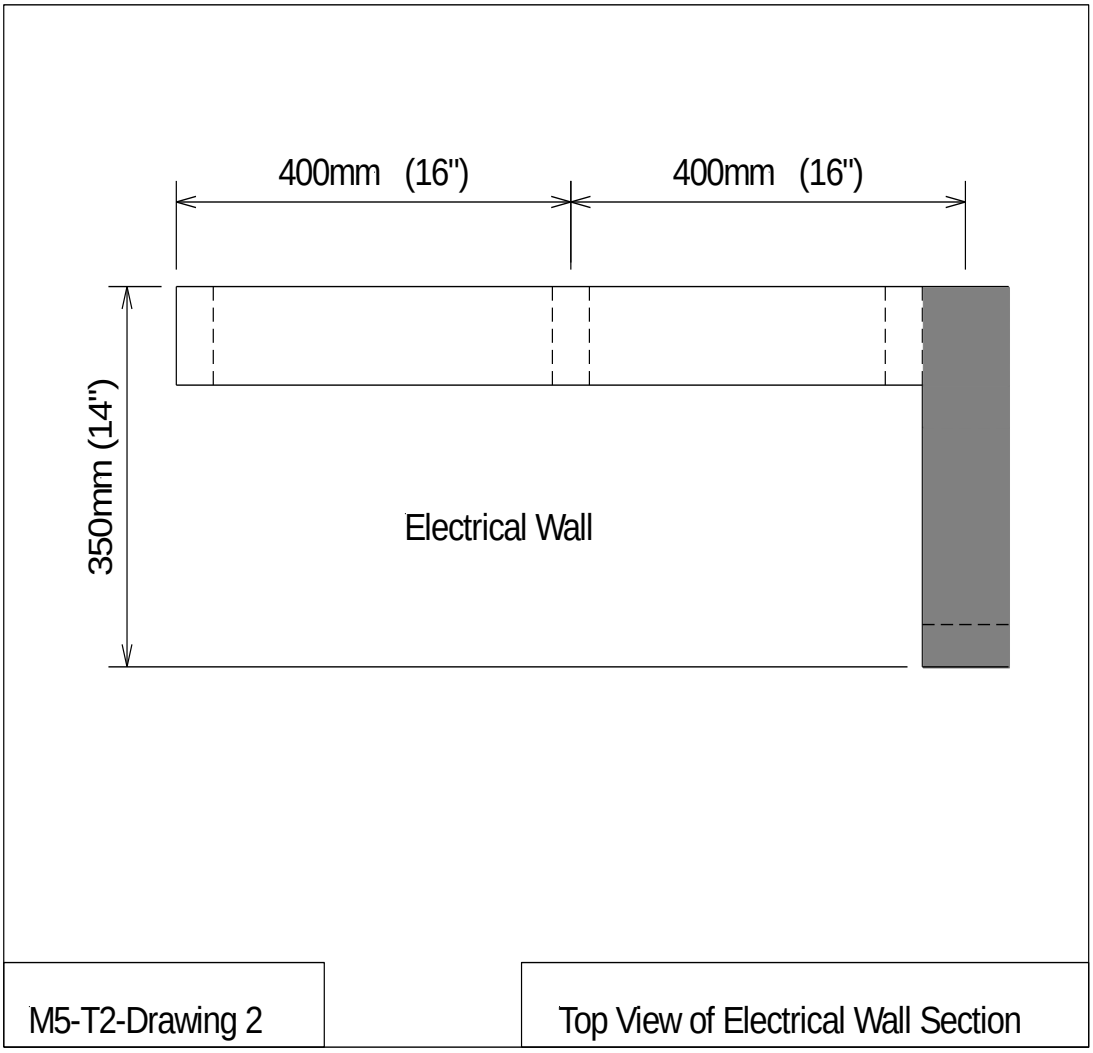
These electrical diagrams can be copied, enlarged and laminated. These are then included in the components kit so students can have easy access to these diagrams. All diagrams are from the Electrical Wiring: Residential resource book referenced above. The teacher can substitute these for other circuits from other sources if the want. It is also important for the teacher to have a sample circuit already wired so the student can see the proper way of doing things, especially on their first circuit.

The wiring for this module will also follow all proper electrical codes and students must be aware of these codes. These can be found in the "Electrical Wiring: Residential" book that was referenced earlier in this module. Some examples are the proper height for electrical boxes for switches and receptacles which can be found on page 55, Table 2.2 of the resource text "Electrical Wiring: Residential" by Ray C. Mullin. This text is also very useful for other electrical codes as well.

Electrical Wall
Learning Resource Sheet #LRS-M5-T2-Drawing 1



Top View of Electrical Wall
Learning Resource Sheet #LRS-M5-T2-Drawing 2



Topic 3: Reflection

Suggested Duration: 1 hour
Suggested Format: Fabrication Lab/Computer Lab

Following the completion of this activity, students will be able to:

2.3.2 Develop strategies for managing individual and team activities [4.401][5.401][5.402][5.403]

2.3.3 Maintain a work log (portfolio) for personal and professional assessment [1.405]

Teacher Required Resources

Skilled Trades 1201 Teacher's Resource Guide

Student Required Resources

Skilled Trades 1201 Student Reference Textbooks
Student Materials Pack

Teacher Preparation

1. Check materials stock to ensure that all necessary materials are available for next group of students.

2. Check all tools to ensure they are in working order and have been properly maintained.

Introduction

- State the purpose of this activity and the expected learning outcomes.

- Emphasize how the completion of the residential wiring allows for the other trades to move in and start the next phase of the project. (Drywall)

- Point out to the students how the accuracy of the project just completed will affect the finished project.

Presentation

Teacher explains to students the importance of evaluating the completed activity. Students need to recognize their mistakes and take steps to prevent them from happening again on future circuits. Students need to understand the importance of reassessing their completed work and learning from the activity. Teacher explains the importance of the work log and the role it plays in real life situations.

Suggested Student Activity

Students are given a "Reflection Activity" (Assignment #ASG-M5-T3-1 Reflection Activity) to complete. Each group member must complete his or her own reflection sheet to be submitted and evaluated. Students must also complete their work log (Assignment #ASG-M5-T3-2 Work Log) and get it initialed (in this case, graded) by their teacher. Students must also check the inventory on their tool and component kits to ensure all items are there for the next group. Any missing items must be reported to the teacher so the item can be replenished before the next module starts.

Assessment and Evaluation

Students must submit their "Reflection Activity" and their "Work Log" to be evaluated. This will account for 10% of their overall grade in this module.

Student Materials Pack

The Student Material Pack for Topic 3 should include:

a. Assignment #ASG-M5-T3-1 Reflection Activity.

b. Assignment #ASG-M5-T3-2 Work Log.

Reflection
Assignment #ASG-M5-T3-1

Read each of the following questions and provide a written response to each.

1. If doing the residential electrical construction project again what would you do differently?

2. What are the advantages of wiring circuits in properly studded walls?

3. How could you have divided your duties differently to make the project go more smoothly?

4. Discuss the advantages of working inside in a shop as opposed to working on a typical jobsite. Give at least three advantages and disadvantages of each.

5. Finalize your work plan (completed in Topic 2) to be submitted for grading.

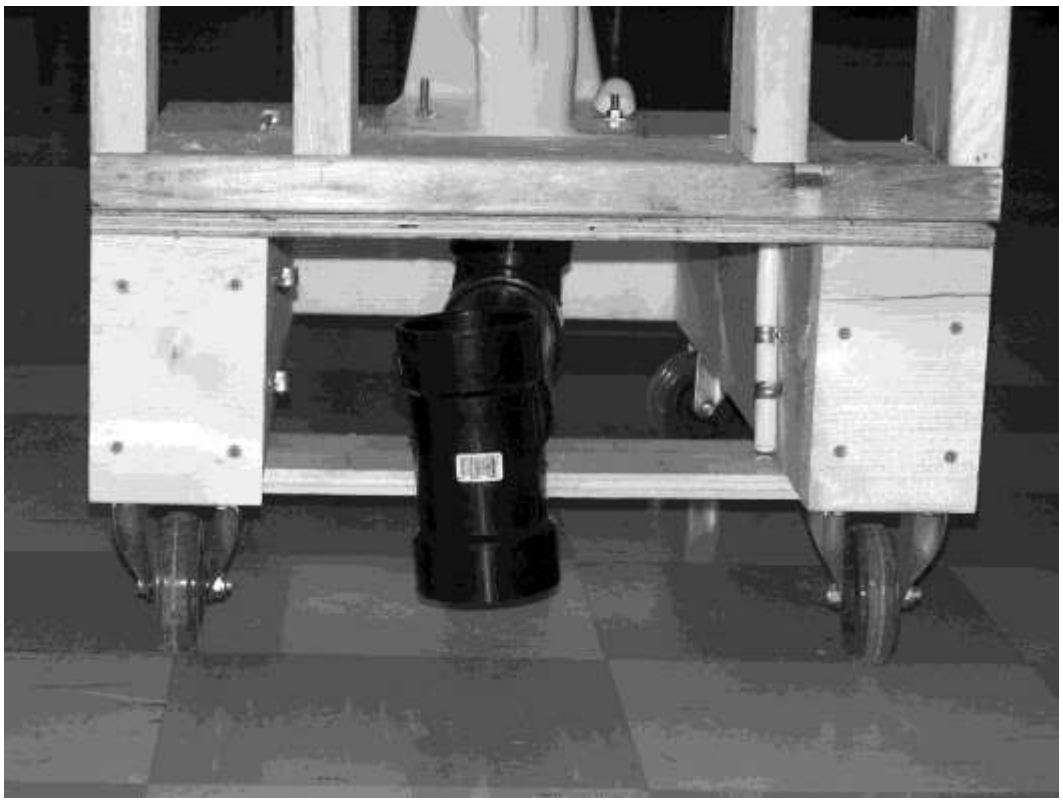
Work Log
Assignment #ASG-M5-T3-2

Record of Workplace Skills (LOG) **Name:** _____ Module**:** _____		
Workplace Skills Required For Successful Completion of Residential Electrical Wiring Module	Date	Initials of Instructor
Blueprint Reading and Sketching		
Read basic drawings and diagrams		
Sketch drawings and diagrams		
Interpret specifications		
Electrical Wiring		
Select proper wire		
Measure and cut wire		
Select proper electrical boxes		
Select proper electrical components		
Drill necessary holes to feed wire		
Feed wire through studs		
Feed wire through boxes		
Strip wire		
Attach electrical components		
Properly install marettes		
Testing Circuits		
Properly hook circuits to power supply		
Properly use multimeter		

Module 6

Plumber: Toilet Installation

The pictures below are samples of the toilet bases.



Module 6

Plumber: Toilet Installation

Module Overview

This module will introduce students to the principles of residential plumbing. Students will learn about plumbing terminology and tools, different plumbing technologies, proper plumbing techniques and proper plumbing practices. They will draw on knowledge gained in Unit 2 in relation to reading blueprints and technical drawings. They will have to interpret technical drawings, develop a work plan, select and identify toilet parts, assemble and install a toilet, install the water supply and the install the drain/waste/vent system. Students will use Pex pipe for the water supply and use current plumbing techniques to install the water supply complete with appropriate shut-offs. They will then use ABS pipe and the proper drain components to complete the drain system. The drain system will be dry-fit to save on materials and reduce cost. They will employ the safe shop and construction practices covered in the earlier safety section and will emulate safe building and workplace guidelines. Students will learn the value of teamwork and the importance of planning ahead to achieve proper results. The work plan and pricing will give them real life experience with building projects.

Specific Curriculum Outcomes and Suggested Timelines

Module 6 will cover all the specific curriculum outcomes (SCOs) from the Plumber: Toilet Installation Topic of the Skilled Trades 1201 curriculum guide. The time allocated in each module is recommended but can be adjusted if the teachers sees fit. However, it should be noted that the entire module is only allocated 7 hours and this needs to be adhered to.

Topic 1: Theory of Residential Plumbing (2 hours)

- 3.7.2 Identify, describe, and give the function of the components of a residential water supply system for a toilet [1.401][1.402] [2.401][3.401]
- 3.7.3 Identify, describe, and give the function of the components of a waste water drainage system for a toilet [1.401][1.402] [2.401][3.401]
- 3.7.4 Identify the different types of fixtures, tubing, pipes, connectors, and fittings used in toilet installation [1.401][1.402] [2.401][3.401]

Topic 2: Plumbing Fabrication (4 hours)

- 3.7.1 Demonstrate safe practices for use of hand and power tools common in toilet installation procedures. [2.401][2.402][2.405][3.401][5.402]
- 3.7.5 Install components in a toilet tank [1.401][1.402][1.403][1.404] [1.405][2.401][2.402][5.402]
- 3.7.6 Install a toilet, including supply and waste lines, using manufacturers instructions [1.401][1.402][1.403][1.404][1.405][2.401][2.402][5.402]

Topic 3: Reflection and Disassembly(1 hour)

- 2.3.2 Develop strategies for managing individual and team activities [4.401][5.401][5.402][5.403]
- 2.3.3 Maintain a work log (portfolio) for personal and professional assessment [1.405]

Topic 1: Theory of Residential Plumbing

Suggested Duration: 2 hours
Suggested Format: Computer Lab

Following the completion of this activity, students will be able to:

- 3.7.2 Identify, describe, and give the function of the components of a residential water supply system for a toilet [1.401][1.402] [2.401][3.401]
- 3.7.3 Identify, describe, and give the function of the components of a waste water drainage system for a toilet [1.401][1.402] [2.401][3.401]
- 3.7.4 Identify the different types of fixtures, tubing, pipes, connectors, and fittings used in toilet installation [1.401][1.402] [2.401][3.401]

Teacher Required Resources

Skilled Trades 1201 Teacher's Resource Guide

Student Required Resources

Skilled Trades 1201 Student Reference Textbooks
Student Materials Pack

Teacher Preparation

1. Review the theory of residential plumbing (specifically as it relates to toilet installation) and the new tools, materials, and building techniques used in today's plumbing industry. This review can be done by referring to the resources listed below.

   Blankenbaker, Keith E. 2005. Modern Plumbing. Tinley Park, Illinois. The Goodheart-Willcox Company, Inc.

   Smith, Lee. 2000. Plumbing Technology: Design & Installation. Albany, New York. Delmar Thompson Learning.

2. Prepare copies of assignment sheets located in resource guide at the end of this unit. Appropriate assignments are #ASG-M6-T1-1, #ASG-M6-T1-2, and #ASG-M6-T1-3. These can either be copied and passed out in paper format or placed in a folder electronically on a shared resource for students to access.

Introduction

- State the purpose of this activity and the expected learning outcomes.
- State how this activity relates to the other activities in this module.
- Summarize what will be covered in this lesson and the related student activity.

Presentation

Discuss with students the importance of the theoretical aspect of training for any trade. A knowledge of the theory behind how a Drain/Waste/Vent and a water supply system works is necessary for a complete understanding of a proper toilet installation. Students have to understand that in order to become a plumber there is a requirement that the theoretical portion of the course be completed before the practical can be started. The requirement at the post-secondary level will be emulated in this course as well. Students need to be informed of the value (grade) placed on the completion of the theoretical portion of the module. Students will be given 2 hours to complete these activities and if they feel that they are at risk of not finishing then they should supplement class time with homework or after school work arranged with the teacher. Of utmost importance is the necessity that students be aware of the absolute limit of 7 hours as it impacts every other group and every other module. There can be **no extension** to the time allocated for the module. Attendance and completion of this section allows for ease of movement to the practical portion and enables the group to finish the practical portion in the time allotted.

Assessment and Evaluation

The teacher will formally evaluate the completed assignments as completed by each individual in each group. Teachers can choose whether to make the group responsible for one copy of all assigned work **or** a separate copy of all assignments from each individual in the group. These theoretical assignments will be valued at 30% of the module.

Learning Resources

Blankenbaker, Keith E. 2005. Modern Plumbing. Tinley Park, Illinois. The Goodheart-Willcox Company, Inc.

Smith, Lee. 2000. Plumbing Technology: Design & Installation. Albany, New York. Delmar Thompson Learning.

Student Materials Pack

The Student Material Pack for Topic 1 includes the following attached documents:

1. Assignment #ASG-M6-T1-1, “Theory of Residential Plumbing”.
2. Assignment #ASG-M6-T1-2, “Labeling and Identifying Toilet Components”
3. Assignment #ASG-M6-T1-3, “Materials Pricing Activity”

Theory of Residential Plumbing
Assignment #ASG-M6-T1-1

Using the resource materials below answer the following questions.

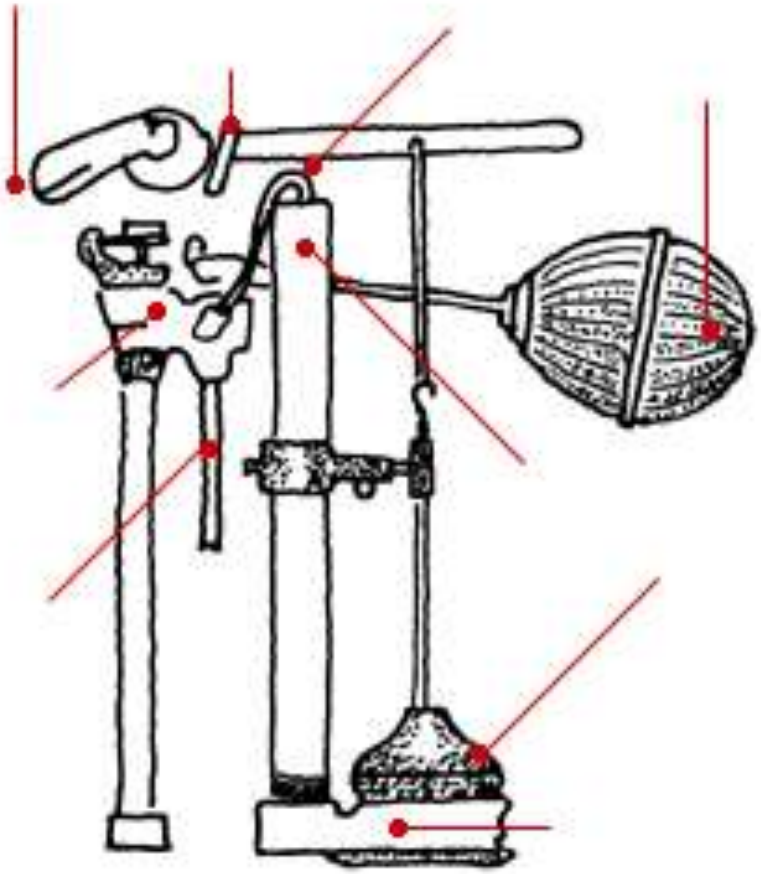
Blankenbaker, Keith E. 2005. **Modern Plumbing**. Tinley Park, Illinois. The Goodheart-Willcox Company, Inc.

Smith, Lee. 2000. **Plumbing Technology: Design & Installation**. Albany, New York. Delmar Thompson Learning.

1. What are two main things that must be considered when designing a plumbing system?
2. How is pressure maintained in a water supply system? (municipal and well)
3. What is the purpose of valves in a water system?
4. Describe two types of valves used in a plumbing system
5. Why is selecting the right size pipe important in a DWV system?
6. Explain the various venting methods.
7. What is the difference between a Sanitary Tee and a Vent Tee?
8. What is the difference between a Wye and a TY?

Labeling Toilet Components
Assignment #ASG-M6-T1-2

Label the diagram provided below and give a brief description of each of the parts.



Descriptions:

Materials Pricing Activity
Assignment #ASG-M6-T1-3

Using your components kit provided with this module, calculate the cost of doing a typical toilet installation for a bathroom. Be sure to include the cost of the components, materials, and labor cost for a licensed plumber. You can get these cost estimates using an online quote or by calling the local hardware store and getting the prices. Put your information in the table below and then calculate a total cost.

Cost of Toilet Installation	
Materials Cost	
Material	Cost
Total	
Components Cost	
Components	Cost
Total	
Plumbers Cost	
Rate per hour	# of hours
Total	
Total cost	

Topic 2: Plumber Fabrication

Suggested Duration: 4 hours
Suggested Format: Fabrication Lab

Following the completion of this activity, students will be able to:

- 3.7.1 Demonstrate safe practices for use of hand and power tools common in toilet installation procedures. [2.401][2.402][2.405][3.401][5.402]
- 3.7.5 Install components in a toilet tank [1.401][1.402][1.403][1.404] [1.405][2.401][2.402][5.402]
- 3.7.6 Install a toilet, including supply and waste lines, using manufacturers instructions [1.401][1.402][1.403][1.404][1.405][2.401][2.402][5.402]

Teacher Required Resources

Skilled Trades 1201 Teacher's Resource Guide

Student Required Resources

Skilled Trades 1201 Student Reference Textbooks
Student Materials Pack

Teacher Preparation

1. Purchase material needed to complete the installation of a toilet. This would include wood and castors for mobile toilet base, a toilet, water supply materials and the drain/waste/vent materials. This material should be stored safely in an area easily accessible to students. Complete the construction of the toilet installation mobile base stations using the technical drawing provided in the Teacher Resource Kit, Learning Resource Sheet #LRS-M6-T2-Drawing 1. These bases should be complete prior to the start of the modules. The bases are mobile so students can move them to an open work area to do their installation. It also reduces injury because there is little lifting needed.

2. Compile the resource kits necessary for students to use for this activity. This resource kits include a component kit and a tool kit. The components kit would be a Rubbermaid container large enough to hold the inside workings of a toilet, the flange, elbow, wax or foam seal, and all necessary bolts. The tool kit, also a Rubbermaid container, needs to be large enough to hold all tools appropriate for the installation of the toilet. It would be a good idea to have a table of contents taped to the cover of each kit to make doing an inventory easier. The diagrams

needed to install the toilet can be copied, enlarged, and laminated and then placed in the kit. This will ensure that each group has their own instructions. These installation instructions can be found in the textbooks listed in the resource section or in the box with the toilet. These manufacturer instructions are usually straightforward and easy to follow.

3. Ensure all tools are in proper and safe working order. Checking all tools prior to assigning them to students also reinforces the idea of safety to students.

Introduction

- State the purpose of this activity and the expected learning outcomes.
- State how this activity relates to the other activities in this module.
- Summarize what will be covered in this lesson and the related student activity.

Presentation

Students are provided with a brief description of their activity for this module. They are given the resource kit which contains the totally disassembled toilet plus all the materials they need to complete their installation. They are reminded of the frail nature of porcelain toilets and are encouraged to handle them with care and caution. It would also be prudent to have both group members assist in the lifting of the toilet. The kit is now their responsibility until the module is complete. They are reminded of all safe shop and tool operation practices and are given a quick overview of the tools and operations they will be completing during this activity. Potential hazards are also pointed out as a point of emphasis.

Suggested Student Activity

The toilet installation module involves students creating a work plan for the assembly and installation of a toilet using the instruction sheets usually provided with any commercially available toilet. In a group of 2, students will be expected to study a diagram of a toilet and reassembly it properly. They will measure and cut the floor to a proper size to accept a toilet flange. Once the toilet has been assembled and installed students will then install the water supply line using Pex pipe and the proper crimping tools and materials. Next, students will measure and cut ABS pipe to properly install the DWV system. Throughout this entire process the students will be exhibiting safe work

practices and be employing work practices used in the plumbing industry. Each student should be given an opportunity to actively participate in the use of shop tools.

Required Tools

Safety

Safety Glasses
Safety Footwear
Coveralls

Hand Tools

Steel Tape
Try Square
Miter Square
Framing Square
2 Foot Level
Plumb Bob
Drill bits
Screw Diver Bits
Hack Saw
Reaming and Deburring Tools
Bench Vise
Pliers (groove joint, slip joint, locking)
Adjustable Wrenches, 6 and 10 inch sizes
Basin, Pipe, Strap, Monkey, and Spud Wrenches
Pex Crimper

Power Tools

Compound Miter Saw
Drill
Circular Saw
Jig Saw

Required Materials

1 Toilet in a Box
1500mm (5') 13mm (1/2") Pex Pipe
1200mm (4') 100mm (4") ABS Pipe
1 Toilet Flange
1 Sanitary T
1 Wax Ring Seal or Rubber Gasket
1 Roll of Teflon Tape
1 Straight Shut-off
Pex Crimping Rings
Wood (50mm x 200mm (2" x 8") spruce for floor joist and 16mm (5/8") plywood for floor
Castors needed for mobile base.
Nails or screws to build bases.

Assessment and Evaluation

The teacher will formally evaluate the completed toilet installation. Students will be assessed based on how well their toilet installation meets the technical drawing specifications. Students will be graded on the quality of the toilet installation, the effort they put into the project, their attendance throughout the module, and their ability to work as a team to complete the project on time without sacrificing quality. Teachers should be aware that both members of the group would probably get different grades even though it is a group project. Students will also be graded on their use of acceptable shop practices and their proper use of shop etiquette and shop clean up. This practical portion will be worth 60% of the grade for this module.

Learning Resources

Blankenbaker, Keith E. 2005. Modern Plumbing. Tinley Park, Illinois. The Goodheart-Willcox Company, Inc.

Smith, Lee. 2000. Plumbing Technology: Design & Installation. Albany, New York. Delmar Thompson Learning.

Visit by a certified plumber.

Teacher Resource Kit

The Teacher Resource Kit for Topic 2 includes the following technical drawings:

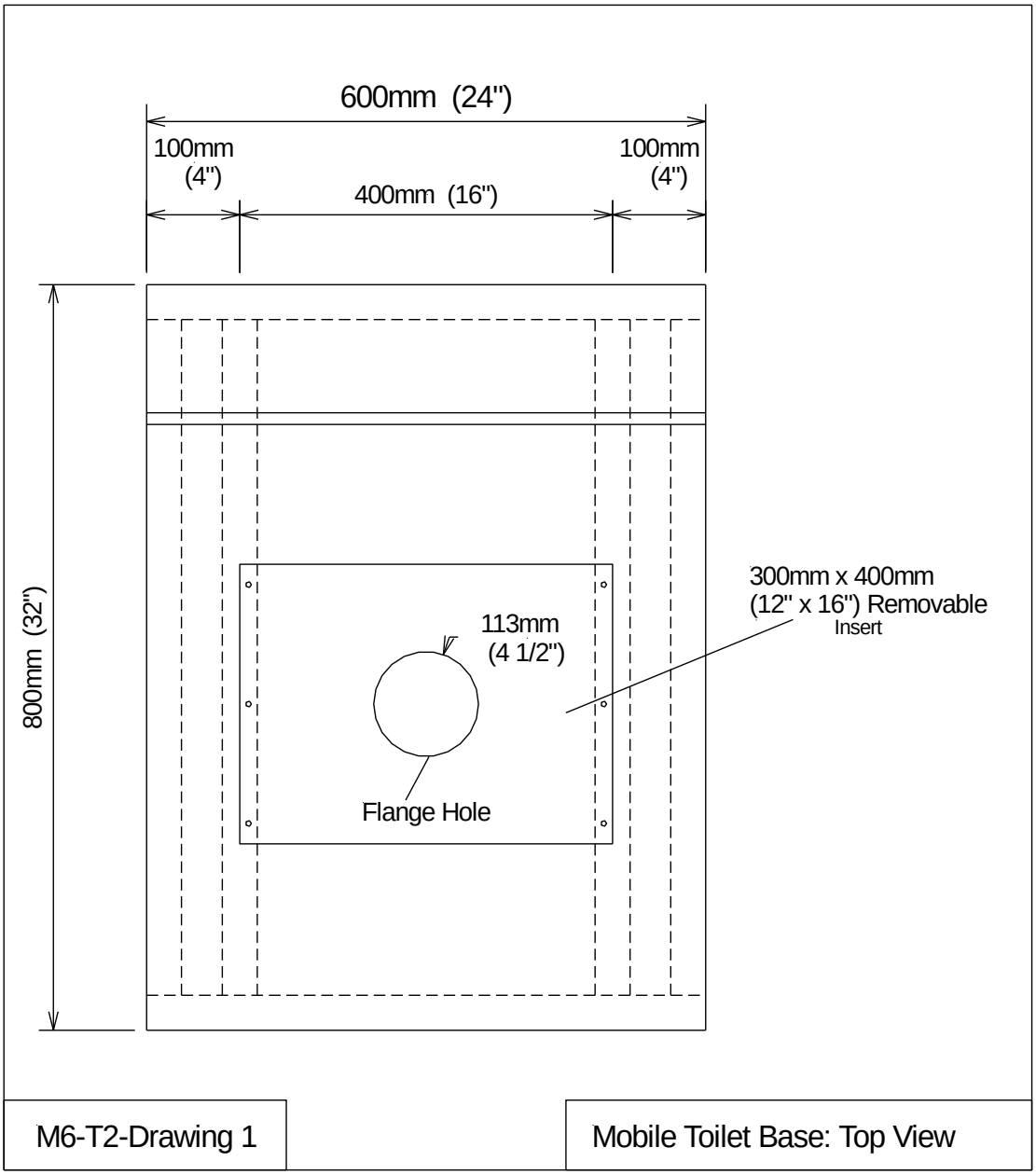
1. Learning Resource Sheet #LRS-M6-T2-Drawing 1
2. Learning Resource Sheet #LRS-M6-T2-Drawing 1

Student Material Pack

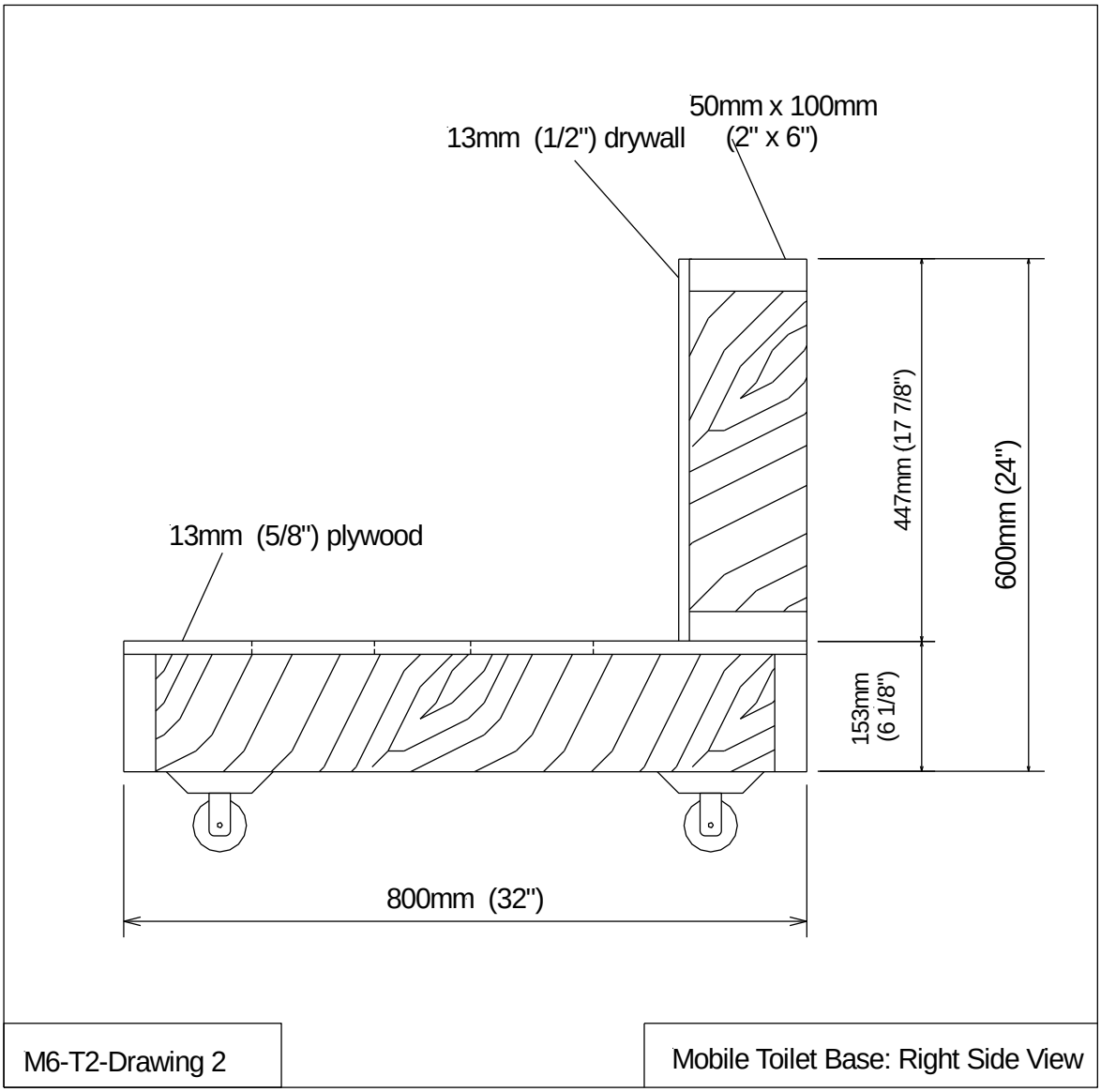
The Student Material Pack for Topic 2 should include:

1. Toilet Installation Tool Kit
2. Toilet Installation Resource Kit

Mobile Toilet Base: Top View
Learning Resource Sheet #LRS-M6-T2-Drawing 1



Mobile Toilet Base: Top View
Learning Resource Sheet #LRS-M6-T2-Drawing 1



M6-T2-Drawing 2

Mobile Toilet Base: Right Side View

Topic 3: Reflection

Suggested Duration: 1 hour
Suggested Format: Fabrication Lab/Computer Lab

Following the completion of this activity, students will be able to:

2.3.2 Develop strategies for managing individual and team activities [4.401][5.401][5.402][5.403]

2.3.3 Maintain a work log (portfolio) for personal and professional assessment [1.405]

Teacher Required Resources

Skilled Trades 1201 Teacher's Resource Guide

Student Required Resources

Skilled Trades 1201 Student Reference Textbooks
Student Materials Pack

Teacher Preparation

1. Check materials stock and do an inventory to ensure that all necessary materials are available for next group of students.

2. Check all tools to ensure they are in working order and have been properly maintained.

Introduction

- State the purpose of this activity and the expected learning outcomes.

- Emphasize how the proper installation of the toilet including water supply and DWV system makes for a well-plumbed house. Each individual component is a vital part of the entire system.

- Point out to the students how the accuracy of the project just completed will affect the finished project.

Presentation

Teacher explains to students the importance of evaluating the completed activity. The finished toilet must not only work properly but also look good. It should be level and parallel to the wall and should be seated securely. Students need to understand the importance of reassessing their completed work and learning from the activity. Teacher explains the importance of the work log and the role it plays in real life situations.

Suggested Student Activity

Students are given a "Reflection Activity" (Assignment #ASG-M6-T3-1 Reflection Activity) to complete. Each group member must complete his or her own reflection sheet to be submitted and evaluated. Students must also complete their work log (Assignment #ASG-M6-T3-2 Work Log) and get it initialed (in this case, graded) by their teacher. Students are responsible for replacing the removal insert so that the base is ready for the next group. They must also do an inventory of all tools and components and report any missing or broken items to the teacher. This allows the teacher time to replenish the item in question before the next module starts.

Assessment and Evaluation

Students must submit their "reflection activity" and their "work log" to be evaluated. This will account for 10% of their overall grade in this module.

Student Materials Pack

The Student Material Pack for Topic 3 should include:

a. Assignment #ASG-M6-T3-1 Reflection Activity.

b. Assignment #ASG-M6-T3-2 Work Log.

Reflection
Assignment #ASG-M6-T3-1

Read each of the following questions and provide a written response to each.

1. If doing the toilet installation project again what would you do differently?

2. What are the advantages of using a certified plumber as opposed to doing it yourself?

3. How could you have divided your duties differently to make the project go more smoothly?

4. Discuss the advantages of working inside in a shop as opposed to a typical jobsite. Give at least three advantages and disadvantages of each.

5. Finalize your work plan (completed in Topic 2) to be submitted for grading.

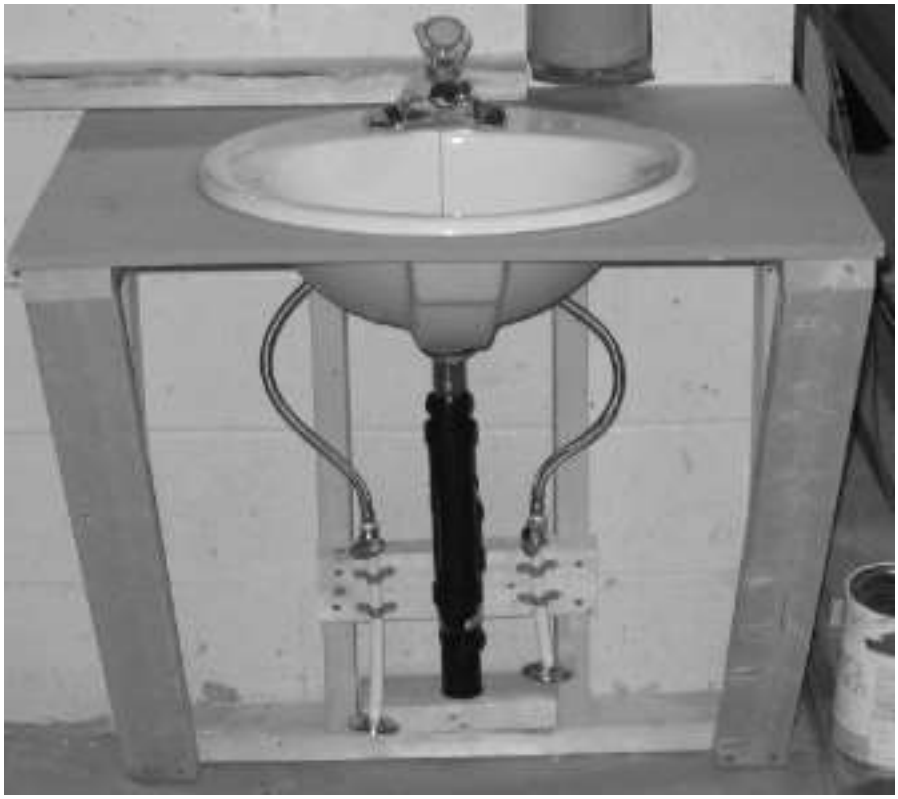
Work Log
Assignment #ASG-M6-T3-2

Record of Workplace Skills (LOG) **Name:** _____ Module**: _____**		
Workplace Skills Required For Successful Completion of Residential Plumbing Module	Date	Initials of Instructor
Blueprint Reading and Sketching		
Read basic drawings and diagrams		
Sketch drawings and diagrams		
Interpret specifications		
Residential Plumbing		
Layout floor for flange		
Drill hole and cut flange hole		
Install flange		
Attach toilet bowl		
Attach flush box		
Install Pex supply line		
Install shut-off and water supply (using Teflon tape)		
Install elbow		
Install sanitary-t		
Measure, cut and install abs pipe		
Check all connections		
Test		

Module 7

Plumber: Sink Installation

The picture below shows a sample sink installation station.



Module 7

Plumber: Sink Installation

Module Overview

This module will involve the proper setup and installation of a sink (can be either a kitchen or bathroom sink). The students will be expected to measure and layout the vanity top and then prepare the top for cutting. After the top is cut and the sink is in place students will install the faucets, install the drain kit using plumbers putty, install supply lines using Pex tubing, and install shut-offs and the water supply lines to the faucets. Students will follow accepted practice using the proper tools at each stage of the installation. Once the water supply is complete students will then complete the drain/waste/vent system for the sink. This will involve the use of ABS pipe using all appropriate parts. These include a p-trap, sanitary t, and the cutting of ABS pipe to connect each part. Students will dry fit most of these parts in order to reduce cost but it would be prudent to have student do a glue-up so they can experience the set times related with ABS cement. They will employ the safe shop and construction practices covered in the earlier safety section and will emulate safe building and workplace guidelines. Students will learn the value of teamwork and the importance of planning ahead to achieve proper results. The work plan and pricing will give them real life experience with building projects.

Specific Curriculum Outcomes and Suggested Timelines

Module 7 will cover all the specific curriculum outcomes (SCOs) from the Plumber: Sink Installation section in the Skilled Trades 1201 curriculum guide. The time allocated in each module is recommended but can be adjusted if the teachers sees fit. However, it should be noted that the entire module is only allocated 7 hours and this needs to be adhered to.

Topic 1: Theory of Residential Plumbing (2 hours)

- 3.8.2 Identify, describe, and give the function of the components of a residential water supply system for a sink [1.401][1.402] [2.401][3.401]
- 3.8.3 Identify, describe, and give the function of the components of a waste water drainage system for a sink [1.401][1.402] [2.401][3.401]
- 3.8.4 Identify the different types of fixtures, tubing, pipes, connectors, and fittings used in a sink installation [1.401][1.402] [2.401][3.401]

Topic 2: Plumbing Fabrication (4 hours)

- 3.8.1 Demonstrate safe practices for use of hand and power tools common in sink installation procedures. [2.401][2.402][2.405][3.401][5.402]
- 3.8.5 Install a sink and faucets, including supply and waste lines, using manufacturers instructions [1.401][1.402][1.403][1.404][1.405] [2.401][2.402][5.402]

Topic 3: Reflection and Disassembly (1 hour)

- 2.3.2 Develop strategies for managing individual and team activities [4.401][5.401][5.402][5.403]
- 2.3.3 Maintain a work log (portfolio) for personal and professional assessment [1.405]

Topic 1: Theory of Residential Plumbing

Suggested Duration: 2 hours
Suggested Format: Computer Lab

Following the completion of this activity, students will be able to:

- 3.8.2 Identify, describe, and give the function of the components of a residential water supply system for a sink [1.401][1.402] [2.401][3.401]
- 3.8.3 Identify, describe, and give the function of the components of a waste water drainage system for a sink [1.401][1.402] [2.401][3.401]
- 3.8.4 Identify the different types of fixtures, tubing, pipes, connectors, and fittings used in a sink installation [1.401][1.402] [2.401][3.401]

Teacher Required Resources

Skilled Trades 1201 Teacher's Resource Guide

Student Required Resources

Skilled Trades 1201 Student Reference Textbooks
Student Materials Pack

Teacher Preparation

1. Review the theory of residential plumbing (specifically as it relates to sink installation) and the new tools, materials, and building techniques used in today's plumbing industry. This review can be done by referring to the resources listed below.

   Blankenbaker, Keith E. 2005. Modern Plumbing. Tinley Park, Illinois. The Goodheart-Willcox Company, Inc.

   Smith, Lee. 2000. Plumbing Technology: Design & Installation. Albany, New York. Delmar Thompson Learning.

2. Prepare copies of assignment sheets located in resource guide at the end of this unit. Appropriate assignments are #ASG-M7-T1-1, #ASG-M7-T1-2, and #ASG-M7-T1-3. These can either be copied and passed out in paper format or placed in a folder electronically on a shared resource for students to access.

Introduction

- State the purpose of this activity and the expected learning outcomes.
- State how this activity relates to the other activities in this module.
- Summarize what will be covered in this lesson and the related student activity.

Presentation

Discuss with students the importance of the theoretical aspect of training for any trade. Students have to understand that in order to become a plumber there is a requirement that the theoretical portion of the course be completed before the practical can be started. The requirement at the post-secondary level will be emulated in this course as well. Students need to be informed of the value (grade) placed on the completion of the theoretical portion of the module. Students will be given 2 hours to complete these activities and if they feel that they are at risk of not finishing then they should supplement class time with homework or after school work arranged with the teacher. Of utmost importance is the necessity that students be aware of the absolute limit of 7 hours as it impacts every other group and every other module. There can be **no extension** to the time allocated for the module. Attendance and completion of this section allows for ease of movement to the practical portion and enables the group to finish the practical portion in the time allotted.

Assessment and Evaluation

The teacher will formally evaluate the completed assignments as completed by each individual in each group. Teachers can choose whether to make the group responsible for one copy of all assigned work **or** a separate copy of all assignments from each individual in the group. These theoretical assignments will be valued at 30% of the module.

Learning Resources

Blankenbaker, Keith E. 2005. Modern Plumbing. Tinley Park, Illinois. The Goodheart-Willcox Company, Inc.

Smith, Lee. 2000. Plumbing Technology: Design & Installation. Albany, New York. Delmar Thompson Learning.

Student Materials Pack

The Student Material Pack for Topic 1 includes the following attached documents:

1. Assignment #ASG-M7-T1-1, “Theory of Residential Plumbing”.

2. Assignment #ASG-M7-T1-2, “Labeling and Defining Sink and Faucet Components”

3. Assignment #ASG-M7-T1-3, “Materials Pricing Activity”

Theory of Residential Plumbing
Assignment #ASG-M7-T1-1

Using the resource materials below answer the following questions.

Blankenbaker, Keith E. 2005. **Modern Plumbing**. Tinley Park, Illinois. The Goodheart-Willcox Company, Inc.

Smith, Lee. 2000. **Plumbing Technology: Design & Installation**. Albany, New York. Delmar Thompson Learning.

1. What are the two types of pipes involved in a plumbing system? Explain.

2. Briefly describe the six types of plastic material used to make 90% of all plastic pipe.

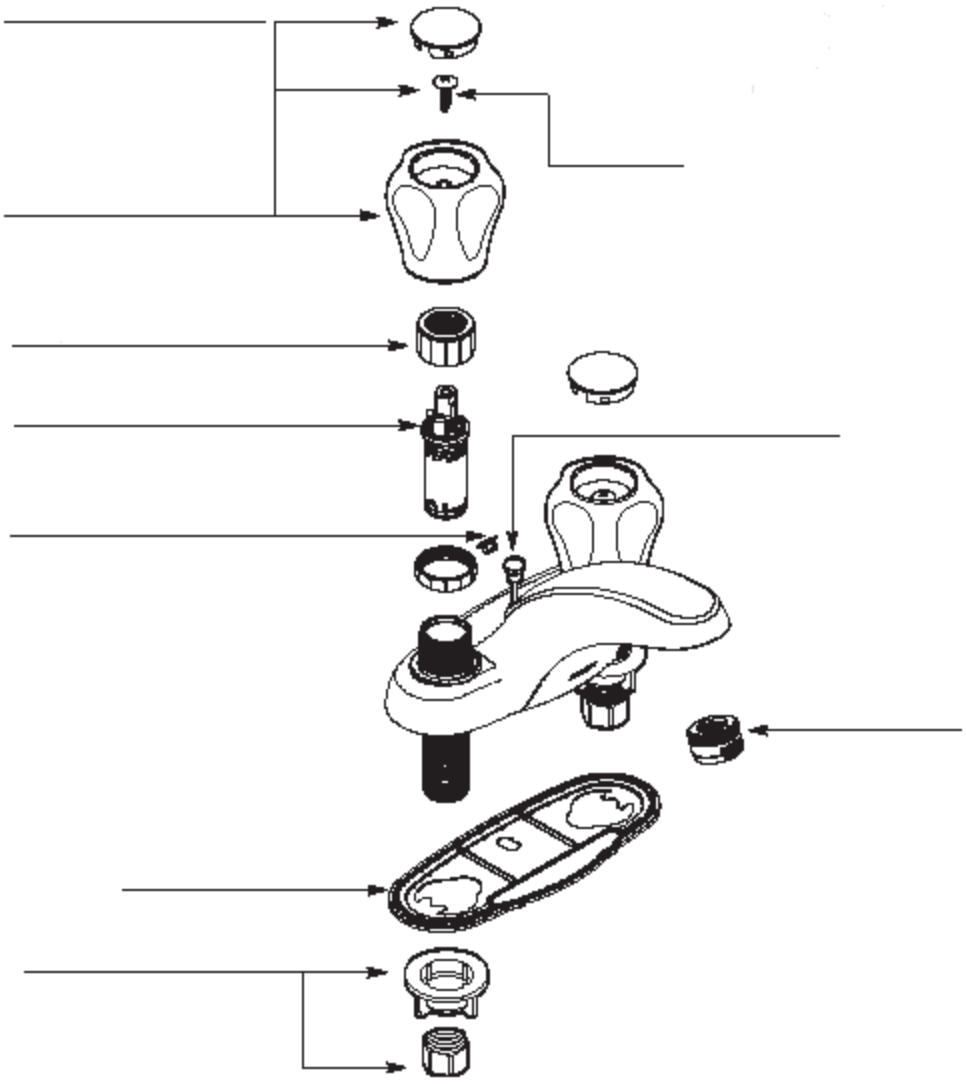
3. What does the term *outside diameter* refer to in relation to plastic pipe? Why is it important?

4. Discuss the differences between copper pipe and Pex pipe. Include the advantages and disadvantages of each.

5. Give a brief description of each of the following fittings and their uses:
   - Reducer
   - Elbow
   - Sanitary Tee
   - Vent Tee
   - P-Trap with Cleanout
   - P-Trap with Slip Joint

Labeling and Defining Faucet Components
Assignment #ASG-M7-T1-2

Label the parts of the faucet below. Give a brief description of how these parts work together to make a faucet work.



Materials Pricing Activity
Assignment #ASG-M7-T1-3

Using your components kit provided with this module, calculate the cost of doing a typical sink installation for a bathroom. Be sure to include the cost of the components, materials, and labor cost for a licensed plumber. You can get these cost estimates using an online quote or by calling the local hardware store and getting the prices. Put your information in the table below and then calculate a total cost.

Cost of Sink Installation	
Materials Cost	
Material	Cost
Total	
Components Cost	
Components	Cost
Total	
Plumbers Cost	
Rate per hour	# of hours
Total	
Total cost	

Topic 2: Plumber Fabrication

Suggested Duration: 4 hours
Suggested Format: Fabrication Lab

Following the completion of this activity, students will be able to:

- 3.8.1 Demonstrate safe practices for use of hand and power tools common in sink installation procedures. [2.401][2.402][2.405][3.401][5.402]
- 3.8.5 Install a sink and faucets, including supply and waste lines, using manufacturers instructions [1.401][1.402][1.403][1.404][1.405] [2.401][2.402][5.402]

Teacher Required Resources

Skilled Trades 1201 Teacher's Resource Guide

Student Required Resources

Skilled Trades 1201 Student Reference Textbooks
Student Materials Pack

Teacher Preparation

1. Purchase material needed to complete the assembly of sink work stations.. This would include wood of appropriate sizes, nails, and screws. This material should be stored safely in an area easily accessible to students. Complete the construction of the sink installation stations using the technical drawing provided in the Teacher Resource Kit, Learning Resource Sheet #LRS-M7-T2-Drawing 1. The sink stations can be assembled and attached to the wall using existing free wall space. Alternatively, they can be made with rectangular sides and placed on castors so they can be moved around when needed. The tops are attached with screws so they can be easily removed after they have been used.

2. Compile a tool kit and a resource kit necessary for students to use for this activity. The tools kit would preferably be a Rubbermaid container large enough to hold the tools necessary for a sink installation. The components kit would preferably be a Rubbermaid container that could hold all the components necessary for a sink installation. The instructions from the sink manufacturer can be laminated and included in the kit for the students to follow.

3. Ensure all tools are in proper and safe working order. Checking all tools prior to assigning them to students also reinforces the idea of safety to students.

Introduction

- State the purpose of this activity and the expected learning outcomes.
- State how this activity relates to the other activities in this module.
- Summarize what will be covered in this lesson and the related student activity.

Presentation

Students are provided with a brief description of their activity for this module. It is explained that they will go through the complete process of installing a sink. Students will need to work together as a group and be on task if they are to complete this module in the time allocated. Students are reminded of the fragile nature of porcelain and are reminded to be careful when handling the sink. They are reminded of all safe shop and tool operation practices and are given a quick overview of the tools and operations they will be completing during this activity. Potential hazards are also pointed out as a point of emphasis.

Suggested Student Activity

The sink installation module involves students doing a sink installation complete with water supply lines and a drain/waste/vent system. Students will measure and layouts the vanity top, drill a pilot hole, and then cut the hole to accept the sink. Once the sink has been installed the drain kit is installed using ensuring that plumbers putty is used to avoid leakage. Students then install the faucets using proper techniques and tools. Students will then measure and install the drain/waste/vent system including the installation of a sanitary-T, a p-trap with cleanout, and the proper vent system. These components will all be dry fit to save on cost. Students will then install their water supply system. This will involve the installation of Pex pipe, shut-offs, and water supply lines. They will use Pex crimpers and Pex connectors to simulate current practice in the plumbing industry.

Required Tools

Safety

Safety Glasses
Hearing Protection
Safety Footwear
Coveralls

Hand Tools

Steel Tape
Try Square
Miter Square
Framing Square
2 Foot Level
Plumb Bob
Drill bits
Screw Diver Bits
Hack Saw
Reaming and deburring tools
Bench vise
Pliers (groove joint, slip joint, locking)
Adjustable wrenches, 6 and 10 inch sizes
Basin, pipe, strap, monkey, and spud wrenches
Pex crimper

Power Tools

Compound Miter Saw
Drill
Circular Saw
Jig Saw

Required Materials

Bathroom Sink
Faucets
3/8” x 20” Water Supply Lines
½” x 40’ White Teflon Tape
1-1/2” ABS pipe
Plumbers Putty
½” Chrome Flange
ABS P-Trap with Cleanout 1-1/2”
½” Pex to 3/8” Straight Valve
ABS Trap Adapter 1-1/2” x 1-1/4”
1-1/2” ABS Sanitary-T
1-1/2” 90 Degree Elbow
13mm (1/2”) Pex Pipe
Drain Kit
50mm x 100mm (2” x 4”) for Sink Stations
16mm (5/8”) MDF for Countertops
25mm (1”) Screws for attaching tops
75mm (3”) Screws for building Sink Stations

Assessment and Evaluation

The teacher will formally evaluate the completed sink installation. Students will be assessed based on how well their sink installation meets the technical drawing specifications. Students will be graded on the quality of the sink installation including the installation of the water supply and drain/waste/vent systems, the effort they put into the project, their attendance throughout the module, and their ability to work as a team to complete the project on time without sacrificing quality. Teachers should be aware that both members of the group would probably get different grades even though it is a group project. Students will also be graded on their use of acceptable shop practices and their proper use of shop etiquette and shop clean up. This practical portion will be worth 60% of the grade for this module.

Learning Resources

Blankenbaker, Keith E. 2005. Modern Plumbing. Tinley Park, Illinois. The Goodheart-Willcox Company, Inc.

Smith, Lee. 2000. Plumbing Technology: Design & Installation. Albany, New York. Delmar Thompson Learning.

http://www.hometime.com/Howto/projects/plumbing.htm

Visit from a certified plumber

Teacher Resource Kit

The Teacher Resource Kit for Topic 2 includes the following technical drawings:

1. Learning Resource Sheet #LRS-M7-T2-Drawing 1

2. Learning Resource Sheet #LRS-M7-T2-Drawing 1

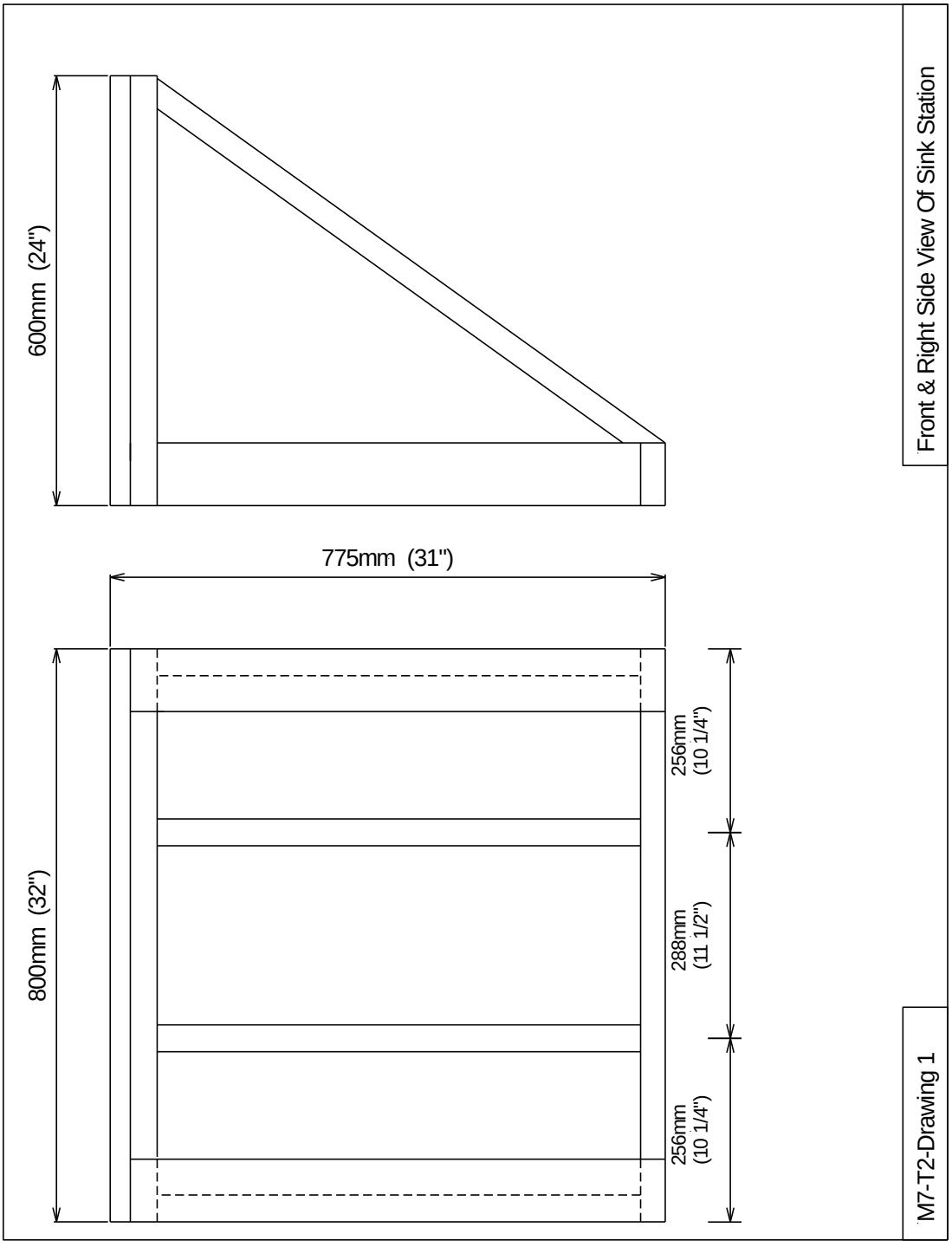
Student Material Pack

The Student Material Pack for Topic 2 should include:

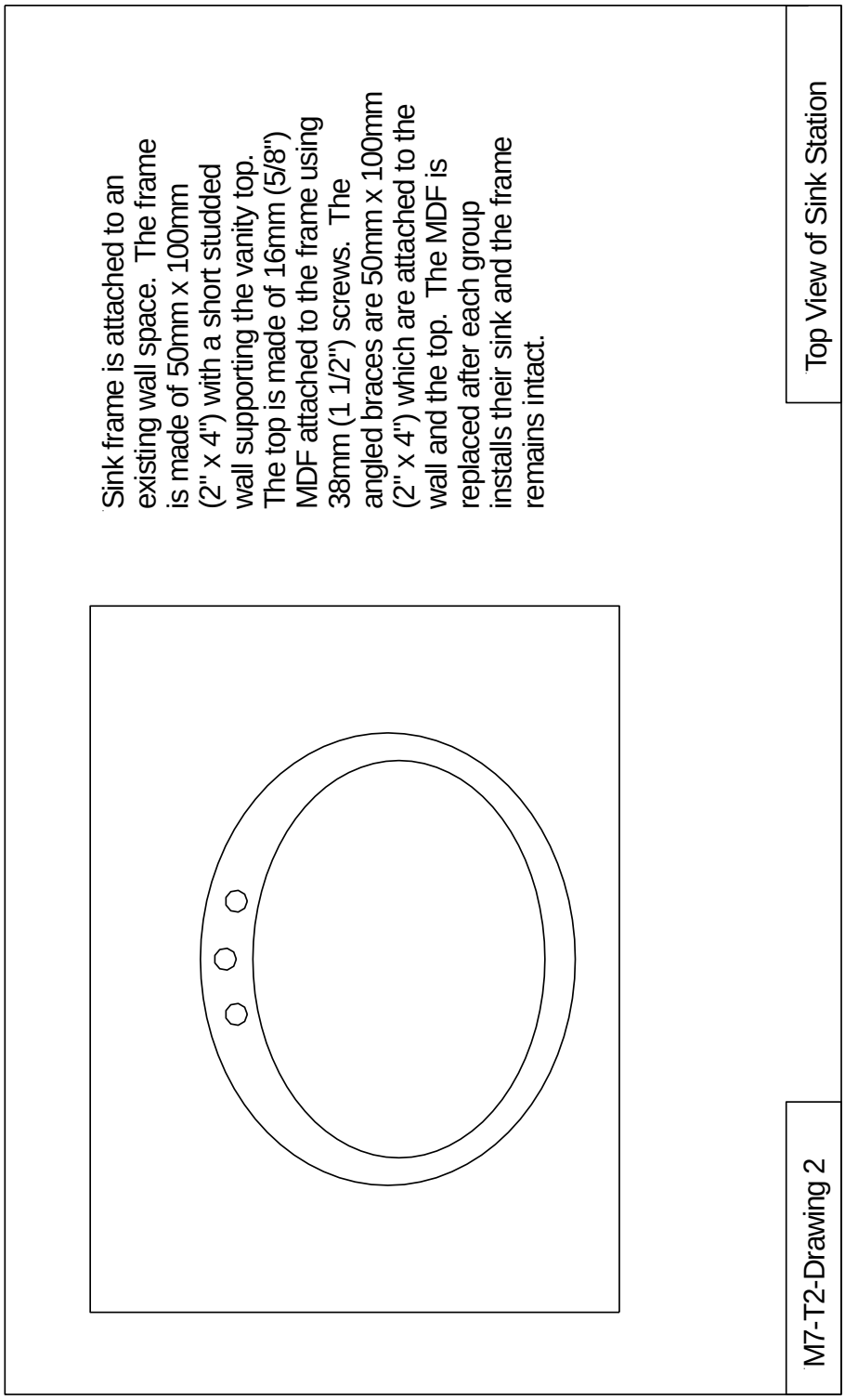
1. Sink Installation Tool Kit

2. Sink Installation Resource Kit

Sink Technical Drawing
Learning Resource Sheet #LRS-M7-T2-Drawing 1



Sink Technical Drawing
Learning Resource Sheet #LRS-M7-T2-Drawing 2



Topic 3: Reflection

Suggested Duration: 1 hour
Suggested Format: Fabrication Lab/Computer Lab

Following the completion of this activity, students will be able to:

2.3.2 Develop strategies for managing individual and team activities [4.401][5.401][5.402][5.403]

2.3.3 Maintain a work log (portfolio) for personal and professional assessment [1.405]

Teacher Required Resources

Skilled Trades 1201 Teacher's Resource Guide

Student Required Resources

Skilled Trades 1201 Student Reference Textbooks
Student Materials Pack

Teacher Preparation

1. Check materials stock to ensure that all necessary materials are available for next group of students.

2. Check all tools to ensure they are in working order and have been properly maintained.

Introduction

- State the purpose of this activity and the expected learning outcomes.

- Emphasize how the completion of the sink installation allows for the other trades to move in and start the next phase of the project. (flooring, painting, etc)

- Point out to the students how the accuracy of the project just completed will affect the finished project.

Presentation

Teacher explains to students the importance of evaluating the completed activity. Students should examine all phases of their installation and determine how they could have improved if there was indeed room for improvement. Students need to realize that the skills used here get better with practice and patience. Students need to understand the importance of reassessing their completed work and learning from the activity. Teacher explains the importance of the work log and the role it plays in real life situations.

Suggested Student Activity

Students will be responsible for the disassembly of their sink and all water supply and drain/waste/vent components. This involves the proper disassembly and storage of all reusable components involved. It also involves replacing the removable top for the sink station. Students are given a "Reflection Activity" (Assignment #ASG-M7-T3-1 Reflection Activity) to complete. Each group member must complete his or her own reflection sheet to be submitted and evaluated. Students must also complete their work log (Assignment #ASG-M7-T3-2 Work Log) and get it initialed (in this case, graded) by their teacher.

Assessment and Evaluation

Students must submit their "Reflection Activity" and their "Work Log" to be evaluated. This will account for 10% of their overall grade in this module.

Student Materials Pack

The Student Material Pack for Topic 3 should include:

a. Assignment #ASG-M7-T3-1 Reflection Activity.

b. Assignment #ASG-M7-T3-2 Work Log.

Reflection
Assignment #ASG-M7-T3-1

Read each of the following questions and provide a written response to each.

1. If doing the sink installation project again what would you do differently?

2. What are the advantages of using Pex pipe instead of the traditional copper tubing?

3. How could you have divided your duties differently to make the project go more smoothly?

4. Discuss the advantages of working inside in a shop as opposed to outside on a typical jobsite. Give at least three advantages and disadvantages of each.

5. Finalize your work plan (completed in Topic 2) to be submitted for grading.

Work Log
Assignment #ASG-M7-T3-2

Record of Workplace Skills (LOG) **Name:** _____ Module**:** **_____**		
Workplace Skills Required For Successful Completion of Residential Plumbing Module	Date	Initials of Instructor
Blueprint Reading and Sketching		
Read basic drawings and diagrams		
Sketch drawings and diagrams		
Interpret specifications		
Residential Plumbing		
Layout vanity top for sink		
Drill hole and cut sink hole		
Install sink		
Install drain kit using plumbers putty		
Install faucets		
Install Pex supply lines (hot and cold)		
Install shut-offs and water supply (use Teflon tape)		
Install p-trap		
Install sanitary-t		
Measure, cut and install abs pipe		
Check all connections		
Test		

Module 8

Lather

The picture below shows a sample wall section to be used for three classes of Skilled Trades 1201.

Module 8

Lather

Module Overview

This module will introduce students to the principles of drywall installation and plastering. Students will use modern materials and building techniques as they relate to drywall installation and plastering. They will employ the safe cutting and construction practices covered in the earlier safety section and will emulate safe building and workplace guidelines. Students will learn the value of teamwork and the importance of planning ahead to achieve proper results. The work plan and pricing will give them real life experience with building projects.

Specific Curriculum Outcomes and Suggested Timelines

Module 8 will cover all the specific curriculum outcomes (SCOs) from the Lather topic of the Skilled Trades 1201 curriculum guide. The time allocated in each module is recommended but can be adjusted if the teachers sees fit. However, it should be noted that the entire module is only allocated 7 hours and this needs to be adhered to.

Topic 1: Lather Theory (2 hours)

- 3.9.1 Research and demonstrate safe practices for use of use Lather tools [2.401][2.402][2.405][3.401][5.402]
- 3.9.2 Describe the properties, advantages and disadvantages, of various wall sheathing [1.405]
- 3.9.3 Create a workplan for installing drywall sheathing, green board, or concrete backerboard [1.405]

Topic 2: Lather Fabrication (4 hours)

- 3.9.1 Research and demonstrate safe practices for use of use Lather tools [2.401][2.402][2.405][3.401][5.402]
- 3.9.4 Install drywall to framed walls [1.401][1.402][1.403][1.404] [1.405][2.401][2.402][5.402]
- 3.9.5 Install corner beading [1.401][1.402][1.403][1.404][1.405] [2.401][2.402][5.402]

Topic 3: Reflection and Disassembly(1 hour)

- 2.3.2 Develop strategies for managing individual and team activities [4.401][5.401][5.402][5.403]
- 2.3.3 Maintain a work log (portfolio) for personal and professional assessment [1.405]

Topic 1: Lather Theory

Suggested Duration: 2 hours
Suggested Format: Computer Lab

Following the completion of this activity, students will be able to:

- 3.9.1 Research and demonstrate safe practices for use of use Lather tools [2.401][2.402][2.405][3.401][5.402]
- 3.9.2 Describe the properties, advantages and disadvantages, of various wall sheathing [1.405]
- 3.9.3 Create a workplan for installing drywall sheathing, green board, or concrete backerboard [1.405

Teacher Required Resources

Skilled Trades 1201 Teacher's Resource Guide

Student Required Resources

Skilled Trades 1201 Student Reference Textbooks
Student Materials Pack

Teacher Preparation

1. Review the theory of proper lather techniques, new lather tools and materials used in today's construction industry. This review can be done by referring to the resources listed below.

   Wagner and Smith. 2003. Modern Carpentry. Tinley Park, Illinois. The Goodheart-Willcox Company, Inc.

   Feirer and Feirer. 2004. Carpentry and Building Construction, Sixth Edition. New York, New York. Glencoe/Mcgraw-Hill.

   http://www.hometime.com/Howto/projects/drywall.htm

2. Prepare copies of assignment sheets located in resource guide at the end of this unit. Appropriate assignments are #ASG-M8-T1-1, #ASG-M8-T1-2, and #ASG-M8-T1-3. These can either be copied and passed out in paper format or placed in a folder electronically on a shared resource for students to access.

Introduction

- State the purpose of this activity and the expected learning outcomes.
- State how this activity relates to the other activities in this module.
- Summarize what will be covered in this lesson and the related student activity.

Presentation

Discuss with students the importance of the theoretical aspect of training for any trade. The theoretical portion allows for learning about new materials, processes and practices in the Lather trade. All tradespersons need to be lifelong learners to stay current in their trades. This ideology needs to be instilled in students at this level so they will be properly prepared if they decide to pursue a career in this trade. Students need to be informed of the value (grade) placed on the completion of the theoretical portion of the module. It is important that students are aware of the fact that the theoretical portion is compulsory and must be completed before the practical portion of the activity can be engaged. Students will be given 2 hours to complete these activities and if they feel that they are at risk of not finishing then they should supplement class time with homework or after school work arranged with the teacher. Of utmost importance is the necessity that students be aware of the absolute limit of 7 hours as it impacts every other group and every other module. There can be **no extension** to the time allocated for the module.

Assessment and Evaluation

The teacher will formally evaluate the completed assignments as completed by each individual in each group. Teachers can choose whether to make the group responsible for one copy of all assigned work **or** a separate copy of all assignments from each individual in the group. These theoretical assignments will be valued at 30% of the module.

Learning Resources

Feirer and Feirer. 2004. Carpentry and Building Construction, Sixth Edition. New York, New York. Glencoe/Mcgraw-Hill.

Wagner and Smith. 2003. Modern Carpentry. Tinley Park, Illinois. The Goodheart-Willcox Company, Inc.

http://www.hometime.com/Howto/projects/drywall.htm

Student Materials Pack

The Student Material Pack for Topic 1 includes the following attached documents:

1. Assignment #ASG-M8-T1-1, “Theory of Drywall Installation”.
2. Assignment #ASG-M8-T1-2, “Drywall Tools”
3. Assignment #ASG-M8-T1-3, “Materials Pricing Activity”

Theory of Drywall Installation
Assignment #ASG-M8-T1-1

Go to the HOMETIME.COM website and under the Drywall Section answer the following questions. The appropriate topics are listed below.

Tools and Materials
Preparations
Cutting Drywall
Hanging Drywall on Ceilings and Walls
Finishing Drywall Joints: Tape Coat

1. Give a brief description of the following types of drywall.
   a. Drywall
   b. Greenboard
   c. Concrete backerboard
2. Explain how to estimate materials for dry walling.
3. Explain how to layout and cut drywall using a utility knife.
4. Explain how to hang drywall on a wall. Why do you hang drywall on the ceiling before the walls?
5. Define:

   Factory Edge
   Lifter
   Butt joint
   Ripper

6. What is corner bead used for? How do you install it?
7. Explain how to embed joint tape.
8. Explain how to tape inside corners.

Drywall Tools
Assignment #ASG-M8-T1-2

Using the resources you have available to you, find a picture, and the uses for each of the following drywall tools.

Drywall Tools

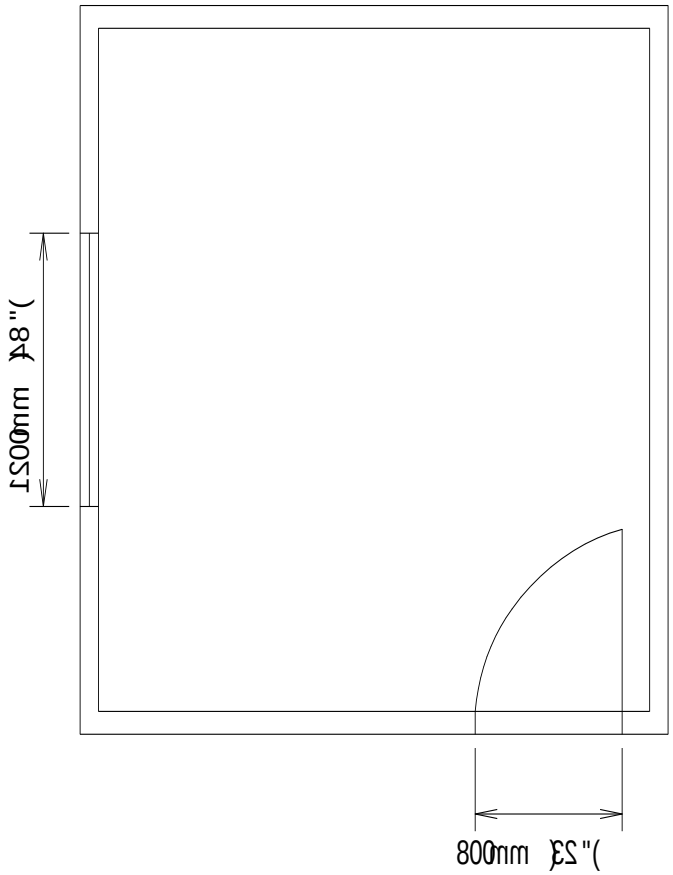
Wall Board Lifter
Hand Sander
Drywall Saw
Stud Finder
Drywall Square
Drywall Corner Tool
Plaster Hawk
Pole Sander
Drywall Hammer
Outside Corner Tool
Utility Knife
Taping Knives
Putty Knife
Finishing Knife
Plastering Trowels

Materials Pricing Activity
Assignment #ASG-M8-T1-3

Using the floor plan specifications listed below calculate the amount of drywall, screws, and drywall compound needed to complete the drywall and plastering of the room including the ceiling. After you have done your calculations, determine the cost based on local building supply prices. This can be done using flyers, online quotes, or by contacting a local building supplies company.

Floor plan Specifications:

Room is 3000mm x 300omm x (10’ x 10’)
Room Height is 2400mm (8’)
Room has one window 1200mm x 1200mm (4’ x 4’)
Room has one door 1950mm x 800mm (6’ 6” x 32”)



Topic 2: Lather Fabrication

Suggested Duration: 4 hours
Suggested Format: Fabrication Lab

Following the completion of this activity, students will be able to:

- 3.9.1 Research and demonstrate safe practices for use of use Lather tools [2.401][2.402][2.405][3.401][5.402]
- 3.9.4 Install drywall to framed walls [1.401][1.402][1.403][1.404] [1.405][2.401][2.402][5.402]
- 3.9.5 Install corner beading [1.401][1.402][1.403][1.404][1.405] [2.401][2.402][5.402]

Teacher Required Resources

Skilled Trades 1201 Teacher's Resource Guide

Student Required Resources

Skilled Trades 1201 Student Reference Textbooks
Student Materials Pack

Teacher Preparation

1. Purchase material needed to complete the lather activity. This would include drywall of proper size, drywall screws, drywall tape, and plaster. This material should be stored safely in an area easily accessible to students. Construct the wall section needed for the installation of the drywall (Learning Resource Sheet #LRS-M8-T2-Drawing 1 and Learning Resource Sheet #LRS-M8-T2-Drawing 2). These wall sections will be attached to free wall space and can be reused by each successive group. These wall sections should be easily removable so they can be replaced when they get damaged through repeated usage. This wall section would ideally integrate with the electrical wiring and ceramic tile wall units as well.

2. Compile a tool kit necessary for students to use for this activity. This tools kit would preferably be a Rubbermaid container large enough to hold the tools needed to complete the Lather module. A labeling system on the tool kit would also be effective for orderly storage of tools.

3. Ensure all tools are in proper and safe working order. Checking all tools prior to assigning them to students also reinforces the idea of safety to students.

Introduction

- State the purpose of this activity and the expected learning outcomes.
- State how this activity relates to the other activities in this module.
- Summarize what will be covered in this lesson and the related student activity.

Presentation

Students are provided with a brief description of their activity for this module. They are given an overview of safe methods for cutting drywall, and are reminded of the importance of accuracy in their measuring and cutting. They are reminded of all safe shop and tool operation practices and are given a quick overview of the tools and operations they will be completing during this activity. Potential hazards are also pointed out as a point of emphasis.

Suggested Student Activity

The lather module involves students creating a work plan for the installation of 13mm (1/2") drywall on a pre-existing studded wall. Students will be expected to cut the drywall to proper sizes, cut openings for obstacles (electrical boxes), install the drywall using drywall screws, and then plaster the wall using drywall tape on inside corners. They will sand appropriately between coats and put on additional coats of plaster as needed. Throughout this entire process the students will be exhibiting safe work practices and be employing work practices used in the construction industry. Each student should be given an opportunity to actively participate in the use of shop tools.

Required Tools

Safety

Safety Glasses
Hearing Protection
Safety Footwear
Coveralls

Hand Tools

Drywall Saw
Utility Knife
Drywall Tape
Drywall Lifter
Measuring Tape
Plaster Hawk
Drywall Hammer
Outside Corner Tool
Taping Knives
Putty Knife
Finishing Knife
Plastering Trowels
Wall Board Lifter
Hand Sander
Stud Finder
Drywall Square
Level
Drywall Corner Tool
Pole Sander

Power Tools

Drywall Gun

Required Materials

13mm (1/2”) Drywall 1200mm x 3200mm (4’ x 12’) Sheets
41mm (1 5/8”) Drywall Screws
Mesh and Paper Drywall Tape
Plaster

Assessment and Evaluation

The teacher will formally evaluate the completed drywall and plastering. Students will be assessed based on how well their drywall installation meets the standard practice. Students will be graded on the quality of the drywall installation and the plastering, the

effort they put into the project, their attendance throughout the module, and their ability to work as a team to complete the project on time without sacrificing quality. Teachers should be aware that both members of the group would probably get different grades even though it is a group project. Students will also be graded on their use of acceptable shop practices and their proper use of shop etiquette and shop clean up. This practical portion will be worth 60% of the grade for this module.

Learning Resources

Feirer and Feirer. 2004. Carpentry and Building Construction, Sixth Edition. New York, New York. Glencoe/Mcgraw-Hill.

Wagner and Smith. 2003. Modern Carpentry. Tinley Park, Illinois. The Goodheart-Willcox Company, Inc.

http://www.hometime.com/Howto/projects/drywall.htm

Visit from a plasterer.

Teacher Resource Kit

The Teacher Resource Kit for Topic 2 includes the following technical drawings:

1. Learning Resource Sheet #LRS-M8-T2-Drawing 1

2. Learning Resource Sheet #LRS-M8-T2-Drawing 2

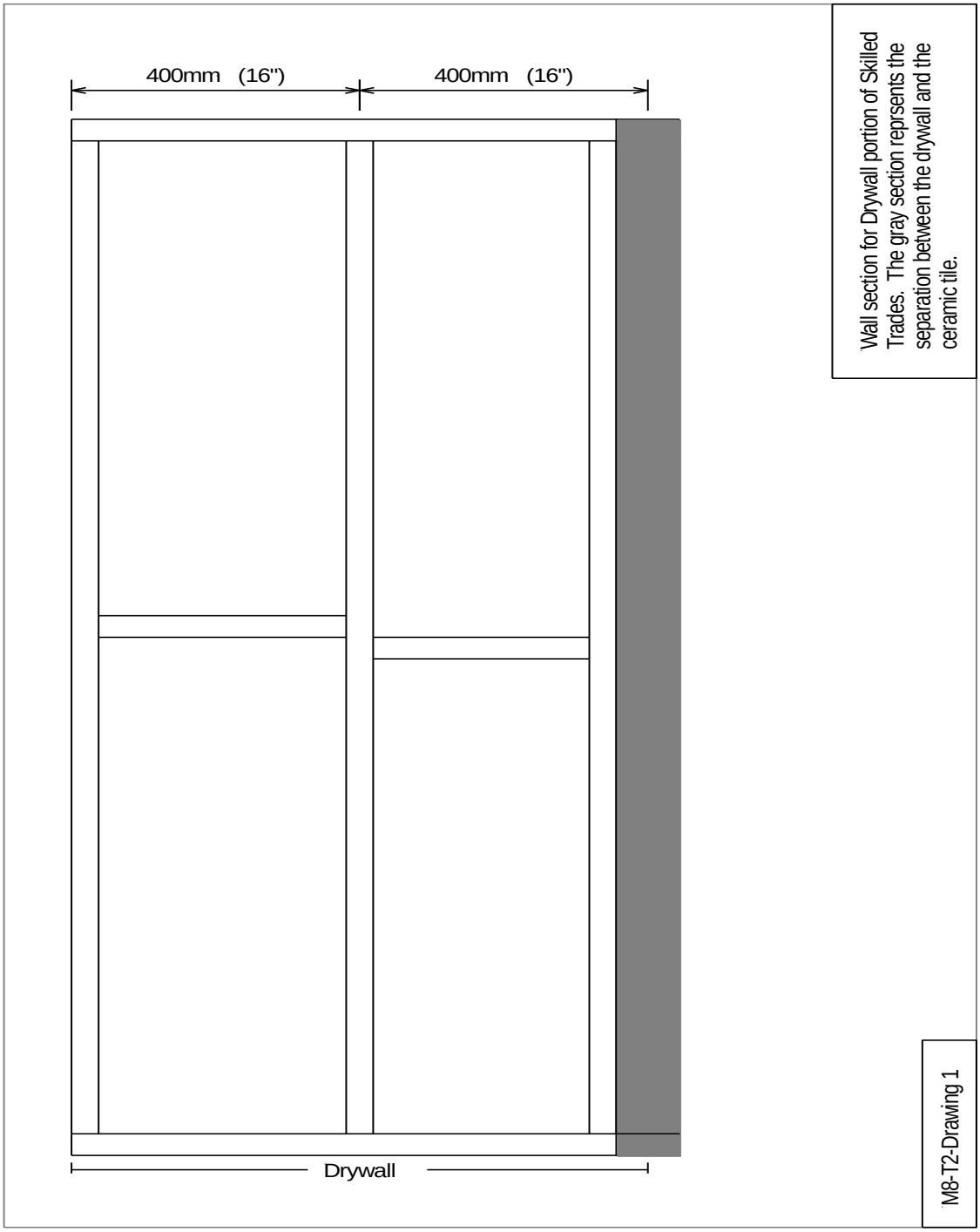
Student Materials Pack

The Student Material Pack for Topic 2 includes the following attached documents:

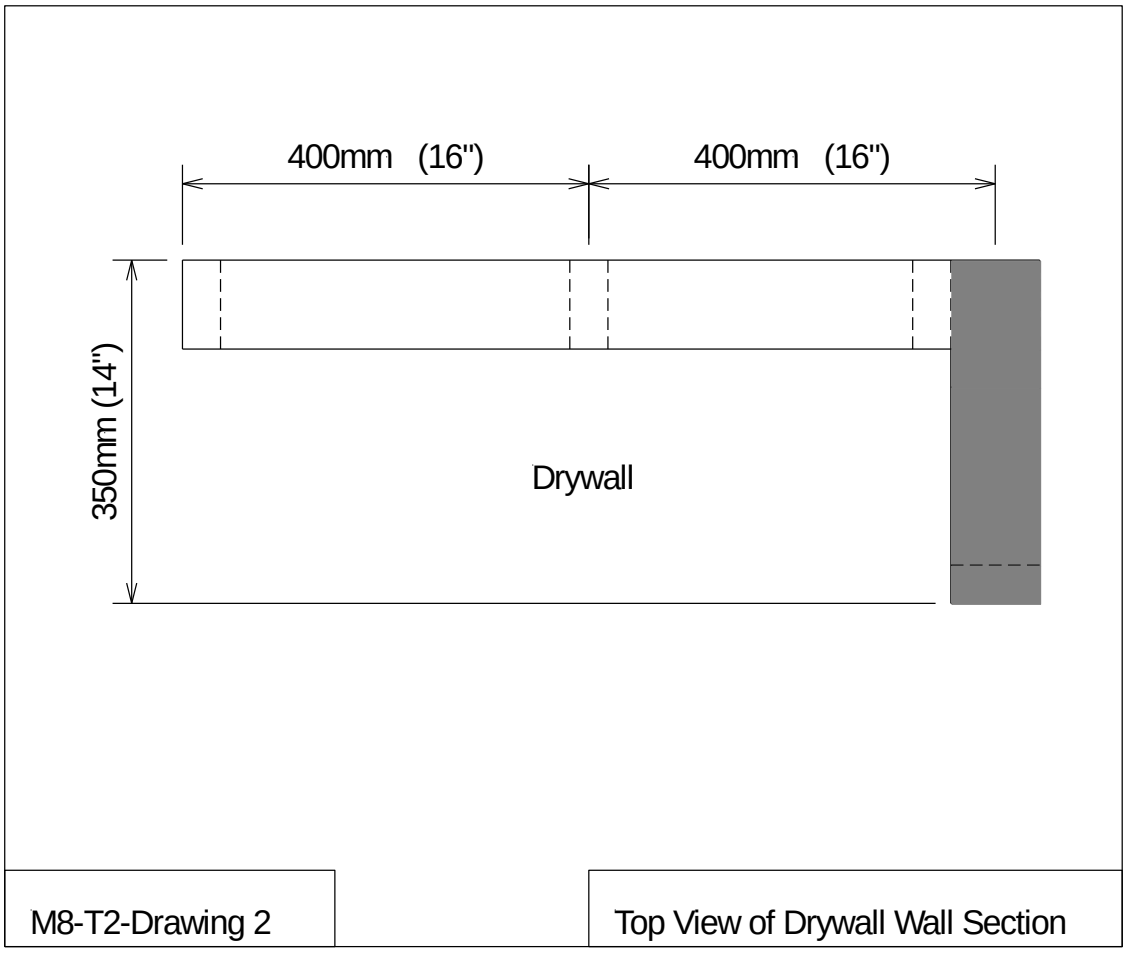
1. Drywall Tool Kit

2. Drywall Materials Kit

Drywall Wall
Learning Resource Sheet #LRS-M8-T2-Drawing 1



Top View of Drywall Wall
Learning Resource Sheet #LRS-M8-T2-Drawing 2



Topic 3: Reflection and Disassembly

Suggested Duration: 1 hour
Suggested Format: Fabrication Lab/Computer Lab

Following the completion of this activity, students will be able to:

2.3.2 Develop strategies for managing individual and team activities [4.401][5.401][5.402][5.403]

2.3.3 Maintain a work log (portfolio) for personal and professional assessment [1.405]

Teacher Required Resources

Skilled Trades 1201 Teacher's Resource Guide

Student Required Resources

Skilled Trades 1201 Student Reference Textbooks
Student Materials Pack

Teacher Preparation

1. Check materials stock to ensure that all necessary materials are available for next group of students.

2. Check all tools to ensure they are in working order and have been properly maintained.

3. Grade all practical projects before disassembly begins.

Introduction

- State the purpose of this activity and the expected learning outcomes.

- Emphasize how the completion of the drywall allows for the other trades to move in and start the next phase of the project. (Painting)

- Point out to the students how the accuracy of the project just completed will affect the finished project.

Presentation

Teacher explains to students the importance of evaluating the completed activity. Students need to realize that plastering is difficult and will only get better with time. It takes years of practice for tradespersons to hone their skills and become experts at what they do. Students need to understand the importance of reassessing their completed work and learning from the activity. Teacher explains the importance of the work log and the role it plays in real life situations.

Suggested Student Activity

Students will be responsible for the disassembly of their wall. This involves removing the drywall from the wall and properly disposing of it and removing all drywall screws from the frame. They are also responsible for cleaning up the drywall area. Students are given a "Reflection Activity" (Assignment #ASG-M8-T3-1 Reflection Activity) to complete. Each group member must complete his or her own reflection sheet to be submitted and evaluated. Students must also complete their work log (Assignment #ASG-M8-T3-2 Work Log) and get it initialed (in this case, graded) by their teacher.

Assessment and Evaluation

Students must submit their "Reflection Activity" and their "Work Log" to be evaluated. This will account for 10% of their overall grade in this module.

Student Materials Pack

The Student Material Pack for Topic 3 should include:

a. Assignment #ASG-M8-T3-1 Reflection Activity.

b. Assignment #ASG-M8-T3-2 Work Log.

Reflection
Assignment #ASG-M8-T3-1

Read each of the following questions and provide a written response to each.

1. If doing the drywall/plastering project again what would you do differently?

2. What advantages are there to using drywall screws and screw guns instead of hammer and nails?

3. How could you have divided your duties differently to make the project go more smoothly?

4. Discuss the advantages of working inside in a shop as opposed to outside on a typical jobsite. Give at least three advantages and disadvantages of each.

5. Finalize your work plan (completed in Topic 2) to be submitted for grading.

Work Log
Assignment #ASG-M8-T3-2

Record of Workplace Skills (LOG) **Name:** _____ Module**:** _____		
Workplace Skills Required For Successful Completion of Lather Module	Date	Initials of Instructor
Blueprint Reading and Sketching		
Read basic drawings and diagrams		
Sketch drawings and diagrams		
Interpret specifications		
Cutting Drywall		
Layout drywall		
Cut drywall to fit wall specifications		
Install drywall		
Plastering		
Apply compound to screw heads		
Apply joint tape to corners		
Sand where needed		
Apply more compound where needed		
Sand and apply finish coat		
Test (check for imperfections)		

Module 9

Painter/Decorator

Module 9

Painter/Decorator

Module Overview

This module will introduce students to the principles of painting and decorating as they apply to residential construction. Students will learn proper preparation techniques, masking techniques, cutting in techniques, and various methods of painting. They will learn about the color schemes available and how to mix paints to get a desired color. They will create a work plan for the proper preparation and painting of a predetermined area. They will employ the safe construction practices covered in the earlier safety section and will emulate safe building and workplace guidelines. Students will learn the value of teamwork and the importance of planning ahead to achieve proper results. The work plan and pricing will give them real life experience with building projects.

Specific Curriculum Outcomes and Suggested Timelines

Module 9 will cover all the specific curriculum outcomes (SCOs) from the Painter/Decorator Topic in the Skilled Trades 1201 curriculum guide. The time allocated in each module is recommended but can be adjusted if the teachers sees fit. However, it should be noted that the entire module is only allocated 7 hours and this needs to be adhered to.

Topic 1: Theory of Painter-Decorating (2 hours)

- 3.10.1 Research and demonstrate safe practices for the handling of painting materials and various hand tools used in the preparation and painting of a surface [2.401][2.402][2.405][3.401][5.402]
- 3.10.3 Describe methods for cleaning and preparing surfaces to receive paint or other coverings [1.405]
- 3.10.4 Describe the variety of finishes available for application to prepared surfaces [1.405]
- 3.10.5 Create a work plan for the preparation and finishing of the interior/ exterior surfaces of the project [1.402][1.405][4.402][4.403]

Topic 2: Painter-Decorator Fabrication (4 hours)

- 3.10.2 Demonstrate safe practices in the use of hand and power tools commonly used in the application and finishing of a plaster surface [1.405]
- 3.10.6 Prepare, tape and plaster drywall joints and corners [1.401][1.402][1.403][1.404][1.405][2.401][2.402][5.402]
- 3.10.7 Prepare surfaces for paint or coverings [1.401][1.402][1.403][1.404] [1.405][2.401][2.402][5.402]
- 3.10.8 Apply finishes using proper techniques [1.401][1.402][1.403][1.404] [1.405][2.401][2.402][5.402]

Topic 3: Reflection (1 hour)

- 2.3.2 Develop strategies for managing individual and team activities [4.401][5.401][5.402][5.403]
- 2.3.3 Maintain a work log (portfolio) for personal and professional assessment [1.405]

Topic 1: Theory of Painter-Decorating

Suggested Duration: 2 hours
Suggested Format: Computer Lab

Following the completion of this activity, students will be able to:

- 3.10.1 Research and demonstrate safe practices for the handling of painting materials and various hand tools used in the preparation and painting of a surface [2.401][2.402][2.405][3.401][5.402]
- 3.10.3 Describe methods for cleaning and preparing surfaces to receive paint or other coverings [1.405]
- 3.10.4 Describe the variety of finishes available for application to prepared surfaces [1.405]
- 3.10.5 Create a work plan for the preparation and finishing of the interior/ exterior surfaces of the project [1.402][1.405][4.402][4.403]

Teacher Required Resources

Skilled Trades 1201 Teacher's Resource Guide

Student Required Resources

Skilled Trades 1201 Student Reference Textbooks
Student Materials Pack

Teacher Preparation

1. Review the theory of proper painting techniques and the new tools, materials, and painting techniques used in today's construction industry. This review can be done by referring to the resources listed below.

   Wagner and Smith. 2003. Modern Carpentry. Tinley Park, Illinois. The Goodheart-Willcox Company, Inc.

   Feirer and Feirer. 2004. Carpentry and Building Construction, Sixth Edition. New York, New York. Glencoe/Mcgraw-Hill.

2. Prepare copies of assignment sheets located in resource guide at the end of this unit. Appropriate assignments are #ASG-M3-T1-1, #ASG-M3-T1-2, and #ASG-

M3-T1-3. These can either be copied and passed out in paper format or placed in a folder electronically on a shared resource for students to access.

Introduction

- State the purpose of this activity and the expected learning outcomes.
- State how this activity relates to the other activities in this module.
- Summarize what will be covered in this lesson and the related student activity.

Presentation

Discuss with students the importance of the theoretical aspect of training for any trade. Students need to be aware of the fact that there is a substantial knowledge base needed in the painting trade as it relates to types of paint, painting techniques, and the proper application of paint. Students need to be informed of the value (grade) placed on the completion of the theoretical portion of the module. It is important that students are aware of the fact that the theoretical portion is compulsory and must be completed before the practical portion of the activity can be engaged. Students will be given 2 hours to complete these activities and if they feel that they are at risk of not finishing then they should supplement class time with homework or after school work arranged with the teacher. Of utmost importance is the necessity that students be aware of the absolute limit of 7 hours as it impacts every other group and every other module. There can be **no extension** to the time allocated for the module.

Assessment and Evaluation

The teacher will formally evaluate the completed assignments as completed by each individual in each group. Teachers can choose whether to make the group responsible for one copy of all assigned work **or** a separate copy of all assignments from each individual in the group. These theoretical assignments will be valued at 30% of the module.

Learning Resources

Feirer and Feirer. 2004. Carpentry and Building Construction, Sixth Edition. New York, New York. Glencoe/Mcgraw-Hill.

Wagner and Smith. 2003. Modern Carpentry. Tinley Park, Illinois. The Goodheart-Willcox Company, Inc.

Student Materials Pack

The Student Material Pack for Topic 1 includes the following attached documents:

1. Assignment #ASG-M9-T1-1, “Theory of Painting”.
2. Assignment #ASG-M9-T1-2, “Painting Tools and Materials”
3. Assignment #ASG-M9-T1-3, “Materials Pricing Activity”

Theory of Painting
Assignment #ASG-M9-T1-1

Answer the following questions using the textbook "Carpentry and Building Construction". The answers can be typed as a document or presented using a PowerPoint presentation.

Exterior and Interior Finishes

1. What is primer? Explain what purpose it serves.
2. What three ingredients does every paint contain?
3. Explain the difference between Oil Based paint and Latex paint.
4. Using Table 41-A explain how different colors of paint reflect light and what affect this has on a house.
5. What steps are involved in prepping exterior walls for paint? Explain.
6. Briefly describe the 8 steps involved in painting the exterior of a house.
7. Explain how to clean up after using water and oil-based paints.
8. List the steps involved in prepping a room to be painted.
9. What is the proper procedure for rolling on paint? What is the disadvantage of overlapping a dry edge?
10. What is the general rule for painting trim work? Explain
11. Describe the proper procedure for painting a door.

Painting Tools and Materials
Learning Resource Sheet #LRS-M9-T1-2

In a sentence or two briefly describe each of the following tools used in painting and their uses.

Tools and Materials used in painting.

1. Drop Cloths
2. Brushes
3. Rollers
4. Caulking Gun
5. Extension Handle
6. Step Ladder
7. Paint Mixing Paddle
8. Rubber Gloves
9. Baseboard Guard
10. Masking Tape
11. Solvents

Materials Pricing Activity
Learning Resource Sheet #LRS-M9-T1-3

Using the information provided on Page 850 of the resource book," Carpentry and Building Construction" complete the following activity.

Calculate the amount of paint needed for a room that measures 14' x 16'. The ceilings are 8' high, and it has three doors and three windows. Include 1 coat of primer and two coats of finish paint for walls, ceilings, doors and windows. Use the space below for your calculations.

Topic 2: Painter-Decorator Fabrication

Suggested Duration: 4 hours
Suggested Format: Fabrication Lab

Following the completion of this activity, students will be able to:

- 3.10.2 Demonstrate safe practices in the use of hand and power tools commonly used in the application and finishing of a plaster surface [1.405]
- 3.10.6 Prepare, tape and plaster drywall joints and corners [1.401][1.402][1.403][1.404][1.405][2.401][2.402][5.402]
- 3.10.7 Prepare surfaces for paint or coverings [1.401][1.402][1.403][1.404] [1.405][2.401][2.402][5.402]
- 3.10.8 Apply finishes using proper techniques [1.401][1.402][1.403][1.404] [1.405][2.401][2.402][5.402]

Teacher Required Resources

Skilled Trades 1201 Teacher's Resource Guide

Student Required Resources

Skilled Trades 1201 Student Reference Textbooks
Student Materials Pack

Teacher Preparation

1. Purchase material needed to complete the painting module. This would include primer, paint, tape, drop cloths, and paper coverall for the students. This material should be stored safely in an area easily accessible to students.

2. Compile a tool kit necessary for students to use for this activity. This tools kit would preferably be a Rubbermaid container that includes all the rollers, brushes, trays, containers, and tape necessary to complete the painting module. A labeling system on the tool box would also be effective for orderly storage of tools.

3. Ensure all tools are in proper and safe working order. Checking all tools prior to assigning them to students also reinforces the idea of safety to students.

Introduction

- State the purpose of this activity and the expected learning outcomes.
- State how this activity relates to the other activities in this module.
- Summarize what will be covered in this lesson and the related student activity.

Presentation

Students are provided with a brief description of their activity for this module. They will be given an assigned area to paint. They will need to plan all preparations and then proceed with the painting activity. They must also ensure that they have time allocated to do a proper clean-up at the end of each class. They are reminded of all safe shop and tool operation practices and are given a quick overview of the tools and operations they will be completing during this activity. Potential hazards are also pointed out as a point of emphasis.

Suggested Student Activity

This module will involve students preparing and painting a predetermined section of your area. This could include painting parts of your fabrication lab, offices, adjacent computer lab, or the shed that was built in the Carpentry modules. Students may also be involves in the priming of products such as wood siding or trim work used in the building of the shed. Students will be required to develop a work plan for their specific area. This will involve determining the proper primer, masking areas that need to be masked, and then applying their primer material. After the area has been primed students will then apply the proper paint specific to the area they are painting. For example interior latex paint for inside rooms and an exterior grade paint for outside. Students will also choose their painting colors with the idea of good color matching and the appropriate paints for specific areas. Students will also be responsible for all clean-up of the brushes, rollers, containers, and trays used during the painting activity.

Required Tools

Safety

Safety Glasses
Hearing Protection
Safety Footwear
Coveralls

Hand Tools

Paint Roller Handles for 4 and 10 inch Rollers
Paint Trays
Drop Cloths
Wallpaper Tray

Power Tools

Power Sprayer

Required Materials

Paint
Primer
Painters Tape
Wall Paper
Stir Sticks
Paint Can Opener
Hand Towels

Assessment and Evaluation

The teacher will formally evaluate the completed painted section. Students will be assessed based on how well their painting meets the specifications. Students will be graded on the quality of the painting, the effort they put into the project, their attendance throughout the module, and their ability to work as a team to complete the project on time without sacrificing quality. Teachers should be aware that both members of the group will probably get different grades even though it is a group project. Students will also be graded on their use of acceptable shop practices and their proper use of shop etiquette and shop clean-up. This practical portion will be worth 60% of the grade for this module.

Learning Resources

Feirer and Feirer. 2004. Carpentry and Building Construction, Sixth Edition. New York, New York. Glencoe/Mcgraw-Hill.

Wagner and Smith. 2003. Modern Carpentry. Tinley Park, Illinois. The Goodheart-Willcox Company, Inc.

Visit from a painter.

Student Materials Pack

The Student Material Pack for Topic 2 includes the following attached documents:

1. Painting Kit

2. Painting Materials

Topic 3: Reflection

Suggested Duration: 1 hour
Suggested Format: Fabrication Lab/Computer Lab

Following the completion of this activity, students will be able to:

2.3.2 Develop strategies for managing individual and team activities [4.401][5.401][5.402][5.403]

2.3.3 Maintain a work log (portfolio) for personal and professional assessment [1.405]

Teacher Required Resources

Skilled Trades 1201 Teacher's Resource Guide

Student Required Resources

Skilled Trades 1201 Student Reference Textbooks
Student Materials Pack

Teacher Preparation

1. Check materials stock to ensure that all necessary materials are available for next group of students.

2. Check all tools to ensure they are in working order and have been properly maintained.

Introduction

- State the purpose of this activity and the expected learning outcomes.

- Emphasize how the completion of the painting allows for the other trades to move in and start the next phase of the project. (cabinets, floor coverings, etc)

- Point out to the students how the accuracy of the project just completed will affect the finished project.

Presentation

Teacher explains to students the importance of evaluating the completed activity. They will be required to evaluate their completed painted and assess the quality of the painted area. Any flaws they see should be assessed and they should work out solutions to the problem so it doesn't happen again. Students need to understand the importance of reassessing their completed work and learning from the activity. Teacher explains the importance of the work log and the role it plays in real life situations.

Suggested Student Activity

Students must check their tool kit and materials kit and inform the teacher of an deficiencies in either kit (Roller sleeves may be worn out or brushed may need to be replaced, etc.). This will allow the teacher time to replenish the kit prior to the next module. Students are given a "Reflection Activity" (Assignment #ASG-M10-T3-1 Reflection Activity) to complete. Each group member must complete his or her own reflection sheet to be submitted and evaluated. Students must also complete their work log (Assignment #ASG-M10-T3-2 Work Log) and get it initialed (in this case, graded) by their teacher.

Assessment and Evaluation

Students must submit their "Reflection Activity" and their "Work Log" to be evaluated. This will account for 10% of their overall grade in this module.

Student Materials Pack

The Student Material Pack for Topic 3 should include:

a. Assignment #ASG-M10-T3-1 Reflection Activity.

b. Assignment #ASG-M10-T3-2 Work Log.

Reflection
Assignment #ASG-M9-T3-1

Read each of the following questions and provide a written response to each.

1. If doing the painter/decorator project again what would you do differently?

2. What are the advantages of using a power pressure sprayer as opposed to using brushers and rollers?

3. How could you have divided your duties differently to make the project go more smoothly?

4. Discuss the advantages of working inside in a shop as opposed to outside on a typical jobsite. Give at least three advantages and disadvantages of each.

5. Finalize your work plan (completed in Topic 2) to be submitted for grading.

Work Log
Assignment #ASG-M9-T3-2

Record of Workplace Skills (LOG) **Name:** _____ Module**: _____**		
Workplace Skills Required For Successful Completion of Painter/Decorator	Date	Initials of Instructor
Surface Preparation		
Use of drop cloths		
Repair nail heads		
Seal knots		
Repair caulking		
Priming		
Properly stirred primer		
Apply primer using brush and roller		
Clean-up tools and area		
Painting		
Mask or cut-in appropriate areas		
Properly stirred paint		
Apply paint using brush and roller		
Properly cleaned and sealed paint cans		
Clean-up tools and area		

Module 10

Masonry: Ceramic Wall Tile Installation

Module 10

Masonry: Ceramic Wall Tile Installation

Module Overview

This module will introduce students to the principles of residential ceramic tile. Students will learn about ceramic tile terminology, measuring, installation techniques, proper building techniques and proper building practices. They will draw on knowledge gained in Unit 2 in relation to reading blueprints and technical drawings. They will have to interpret a technical drawing, develop a work plan, select proper tiles and layout and cut their tiles, install and then grout their tiles. They will employ the safe cutting and construction practices covered in the earlier safety section and will emulate safe building and workplace guidelines. Students will learn the value of teamwork and the importance of planning ahead to achieve proper results. The work plan and pricing will give them real life experience with building projects.

Specific Curriculum Outcomes and Suggested Timelines

Module 10 will cover all the specific curriculum outcomes (SCOs) from the Masonry: Ceramic Wall Tile Installation Topic in the Skilled Trades 1201 curriculum guide. The time allocated in each module is recommended but can be adjusted if the teachers sees fit. However, it should be noted that the entire module is only allocated 7 hours and this needs to be adhered to.

Topic 1: Theory of Ceramic Wall Tile Installation (2 hours)

- 3.11.2 Describe methods for preparing walls for installation of ceramic tile [1.402]
- 3.11.3 Describe various materials used for installation of ceramic tile on a wall [1.401][1.402][2.401] [3.401]
- 3.11.4 Describe proper ways of installing backing material [1.402][1.405]

Topic 2: Ceramic Wall Tile Fabrication (4 hours)

- 3.11.1 Demonstrate safe practices for use of standard hand, portable power, and stationary power tools for ceramic tile installation [2.401][2.402][2.405][3.401][5.402]
- 3.11.5 Given the nominal size, develop a work plan for the installation of ceramic tile simulating a bathtub installation [1.402][1.405][4.402][4.403]
- 3.11.6 Layout the proper tile spacing for tile installation on a bathroom wall [1.402][1.405][4.402][4.403]
- 3.11.7 Install ceramic tile on a wall using industry standards and practices [1.401][1.402][1.403][1.404] [1.405][2.401][2.402][5.402]
- 3.11.8 Grout ceramic tile using industry standards and practices [1.401][1.402][1.403][1.404][1.405][2.401][2.402][5.402]

Topic 3: Reflection (1 hour)

- 2.3.2 Develop strategies for managing individual and team activities [4.401][5.401][5.402][5.403]
- 2.3.3 Maintain a work log (portfolio) for personal and professional assessment [1.405]

Topic 1: Theory of Ceramic Wall Tile Installation

Suggested Duration: 2 hours
Suggested Format: Computer Lab

Following the completion of this activity, students will be able to:

- 3.11.2 Describe methods for preparing walls for installation of ceramic tile [1.402]
- 3.11.3 Describe various materials used for installation of ceramic tile on a wall [1.401][1.402][2.401] [3.401]
- 3.11.4 Describe proper ways of installing backing material [1.402][1.405

Teacher Required Resources

Skilled Trades 1201 Teacher's Resource Guide

Student Required Resources

Skilled Trades 1201 Student Reference Textbooks
Student Materials Pack

Teacher Preparation

1. Review the theory of ceramic tile installation and the new tools, materials, and building techniques used in today's construction industry. This review can be done by referring to the resources listed below.

   Wagner and Smith. 2003. Modern Carpentry. Tinley Park, Illinois. The Goodheart-Willcox Company, Inc.

   Feirer and Feirer. 2004. Carpentry and Building Construction, Sixth Edition. New York, New York. Glencoe/Mcgraw-Hill.

   http://www.hometime.com/Howto/projects/ctile.htm

2. Prepare copies of assignment sheets located in resource guide at the end of this unit. Appropriate assignments are #ASG-M10-T1-1, #ASG-M10-T1-2, and #ASG-M10-T1-3. These can either be copied and passed out in paper format or placed in a folder electronically on a shared resource for students to access.

Introduction

- State the purpose of this activity and the expected learning outcomes.
- State how this activity relates to the other activities in this module.
- Summarize what will be covered in this lesson and the related student activity.

Presentation

Discuss with students the importance of the theoretical aspect of training for any trade. Being able to do a proper symmetrical layout requires a good understanding of math and if that knowledge is missing then the activities that follow will be more difficult. Students also need to be able to calculate how much material will be needed in order to complete the task. Students need to be informed of the value (grade) placed on the completion of the theoretical portion of the module. It is important that students are aware of the fact that the theoretical portion is compulsory and must be completed before the practical portion of the activity can be engaged. Students will be given 2 hours to complete these activities and if they feel that they are at risk of not finishing then they should supplement class time with homework or after school work arranged with the teacher. Of utmost importance is the necessity that students be aware of the absolute limit of 7 hours as it impacts every other group and every other module. There can be **no extension** to the time allocated for the module.

Assessment and Evaluation

The teacher will formally evaluate the completed assignments as completed by each individual in each group. Teachers can choose whether to make the group responsible for one copy of all assigned work **or** a separate copy of all assignments from each individual in the group. These theoretical assignments will be valued at 30% of the module.

Learning Resources

Feirer and Feirer. 2004. Carpentry and Building Construction, Sixth Edition. New York, New York. Glencoe/Mcgraw-Hill.

Wagner and Smith. 2003. Modern Carpentry. Tinley Park, Illinois. The Goodheart-Willcox Company, Inc.

http://www.hometime.com/Howto/projects/ctile.htm

Student Materials Pack

The Student Material Pack for Topic 1 includes the following attached documents:

1. Assignment #ASG-M10-T1-1, “Theory of Ceramic Wall Tile Installation”.
2. Assignment #ASG-M10-T1-2, “Ceramic Tile Layout”
3. Assignment #ASG-M10-T1-3, “Materials Pricing Activity”

Theory of Ceramic Wall Tile Installation
Assignment #ASG-M10-T1-1

Using the reference books provided and sources available on the web complete the following questions.

1. Explain the differences between thinset adhesive and organic mastics.

2. Give the use for each of the following tools:
   - Tile Cutter
   - Tile Nipper
   - Notched trowel
   - Grout Float
   - Rod Saw
   - Grind Stone

3. What are the advantages of using concrete backerboard? Explain.

4. What are the advantages of using a mortar bed? Explain

5. What is a jury stick? Explain its use.

6. Explain how to layout and set wall tile.

7. What is back buttering? Where is it used?

8. Explain the difference between sanded and non-sanded grout. What is the best application for each?

9. Where should you use caulking when using ceramic tile?

Ceramic Tile Layout
Assignment #ASG-M10-T1-2

Using the space below sketch a diagram of a wall section with the proper layout for the symmetrical installation of 150mm x 150mm (6” x6”) ceramic wall tile. Wall section should represent a 300mm (5’) long bathtub.

Materials Pricing Activity
Assignment # ASG-M10-T1-3

Using the information provided below and a rough sketch that you will draw, determine the number of tiles, the amount of mortar (adhesive), and grout needed to complete the project. Be sure to make allowances for breakage and defective material. Finally, calculate the cost of the material using flyers, online quotes, or by calling a local building supplies company.

Typical bathtub size: 60” x 27” x 15”

You will be tiling three sides of the bathtub with 6” x 8” tile. These tiles should extend up the wall at least 72”. You should also include a row of trim tiles around the top of the tiled sections. Your grout lines will be 1/8”.

Topic 2: Ceramic Wall Tile Fabrication

Suggested Duration: 4 hours
Suggested Format: Fabrication Lab

Following the completion of this activity, students will be able to:

- 3.11.1 Demonstrate safe practices for use of standard hand, portable power, and stationary power tools for ceramic tile installation [2.401][2.402][2.405][3.401][5.402]
- 3.11.5 Given the nominal size, develop a work plan for the installation of ceramic tile simulating a bathtub installation [1.402][1.405][4.402][4.403]
- 3.11.6 Layout the proper tile spacing for tile installation on a bathroom wall [1.402][1.405][4.402][4.403]
- 3.11.7 Install ceramic tile on a wall using industry standards and practices [1.401][1.402][1.403][1.404] [1.405][2.401][2.402][5.402]
- 3.11.8 Grout ceramic tile using industry standards and practices [1.401][1.402][1.403][1.404][1.405][2.401][2.402][5.402]

Teacher Required Resources

Skilled Trades 1201 Teacher's Resource Guide

Student Required Resources

Skilled Trades 1201 Student Reference Textbooks
Student Materials Pack

Teacher Preparation

1. Purchase materials necessary for the construction of a studded wall section (Learning Resource Sheet #LRS-M10-T2-Drawing 1 and Learning Resource Sheet #LRS-M10-T2-Drawing 2) to allow for the installation of ceramic tile. This wall section would ideally integrate with the electrical wiring and drywall wall units as well.

2. Purchase material needed to complete the ceramic tile installation. This would include tile, adhesive, spacers, grout and grout sealer. This material should be stored safely in an area easily accessible to students.

3. Compile a tool kit necessary for students to use for this activity. This tools kit would preferably be a Rubbermaid container large enough to hold the tools

needed to complete the Ceramic Tile module. A labeling system on the tool kit would also be effective for orderly storage of tools.

4. Ensure all tools are in proper and safe working order. Checking all tools prior to assigning them to students also reinforces the idea of safety to students.

Introduction

- State the purpose of this activity and the expected learning outcomes.
- State how this activity relates to the other activities in this module.
- Summarize what will be covered in this lesson and the related student activity.

Presentation

Students are provided with a brief description of their activity for this module. They are given a quick demo on how to do a symmetrical wall layout and are reminded of the need for accurate measurements and accurate cutting. They are reminded of all safe shop and tool operation practices and are given a quick overview of the tools and operations they will be completing during this activity. Potential hazards are also pointed out as a point of emphasis.

Suggested Student Activity

The ceramic tile module involves students creating a work plan for the installation of ceramic tile simulating the installation of tile around a bathtub. Students will do a symmetrical wall layout, measure and cut their tiles, prepare wall for installation, apply tile adhesive, install ceramic tile and then grout and caulk their completed tiles. This will be done on a studded wall with three sides to simulate the three sides of a bathtub. The drywall will be attached above and below the tiles are only to make removal of the tile easier and more efficient. Throughout this entire process the students will be exhibiting safe work practices and be employing work practices used in the construction industry. Each student should be given an opportunity to actively participate in the use of shop tools.

Required Tools

Safety

Safety Glasses
Hearing Protection
Safety Footwear
Coveralls

Hand Tools

Steel Tape
Try Square
Miter Square
Framing Square
2 Foot Level
Plumb Bob
Framing Hammer
Drill bits
Screw Diver Bits
6mm (1/4") Notched Trowel
Rubber Grout Float
Grout Mixing Paddle
Tile Nibbler

Power Tools

Compound Miter Saw
Drill
Tile Cutter
Hole Saw

Required Materials

150mm x 150mm (6" x 6") Ceramic Tile
3mm (1/8") Tile Spacers
Tile Adhesive
Non-Sanded Grout

Assessment and Evaluation

The teacher will formally evaluate the completed ceramic tile wall. Students will be assessed based on how well their ceramic tile wall meets the specifications for a proper symmetrical layout and installation. Students will be graded on the quality of the tile installation and grouting, the effort they put into the project, their attendance throughout the module, and their ability to work as a team to complete the project on time without sacrificing quality. Teachers should be aware that both members of the group would probably get different grades even though it is a group project. Students will also be graded on their use of acceptable shop practices and their proper use of shop etiquette and shop clean up. This practical portion will be worth 60% of the grade for this module.

Learning Resources

Feirer and Feirer. 2004. Carpentry and Building Construction, Sixth Edition. New York, New York. Glencoe/Mcgraw-Hill.

Wagner and Smith. 2003. Modern Carpentry. Tinley Park, Illinois. The Goodheart-Willcox Company, Inc.

Teacher Resource Kit

The Teacher Resource Kit for Topic 2 includes the following technical drawings:

1. Learning Resource Sheet #LRS-M10-T2-Drawing 1

2. Learning Resource Sheet #LRS-M10-T2-Drawing 2

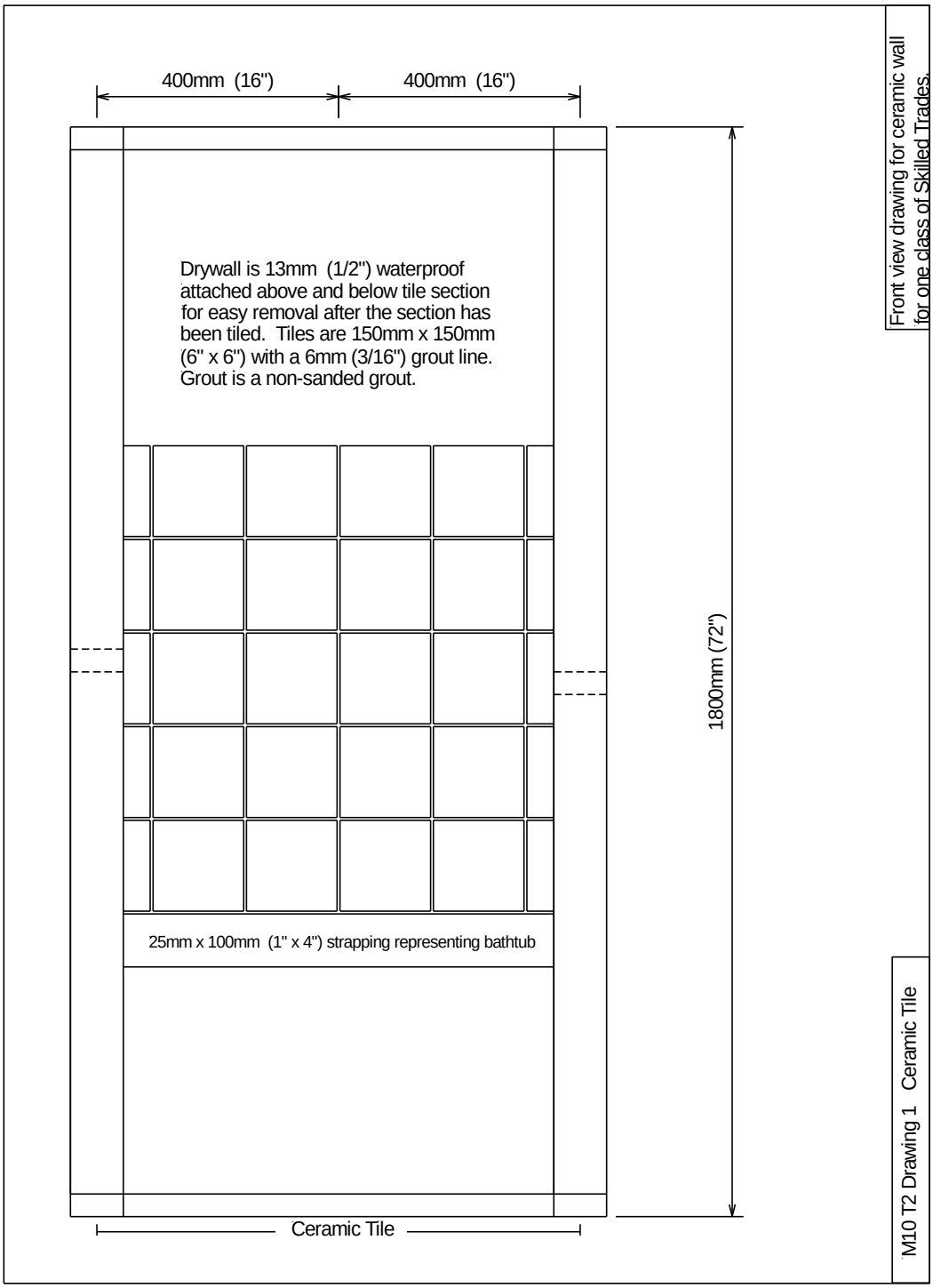
Student Materials Pack

The Student Material Pack for Topic 2 includes the following attached documents:

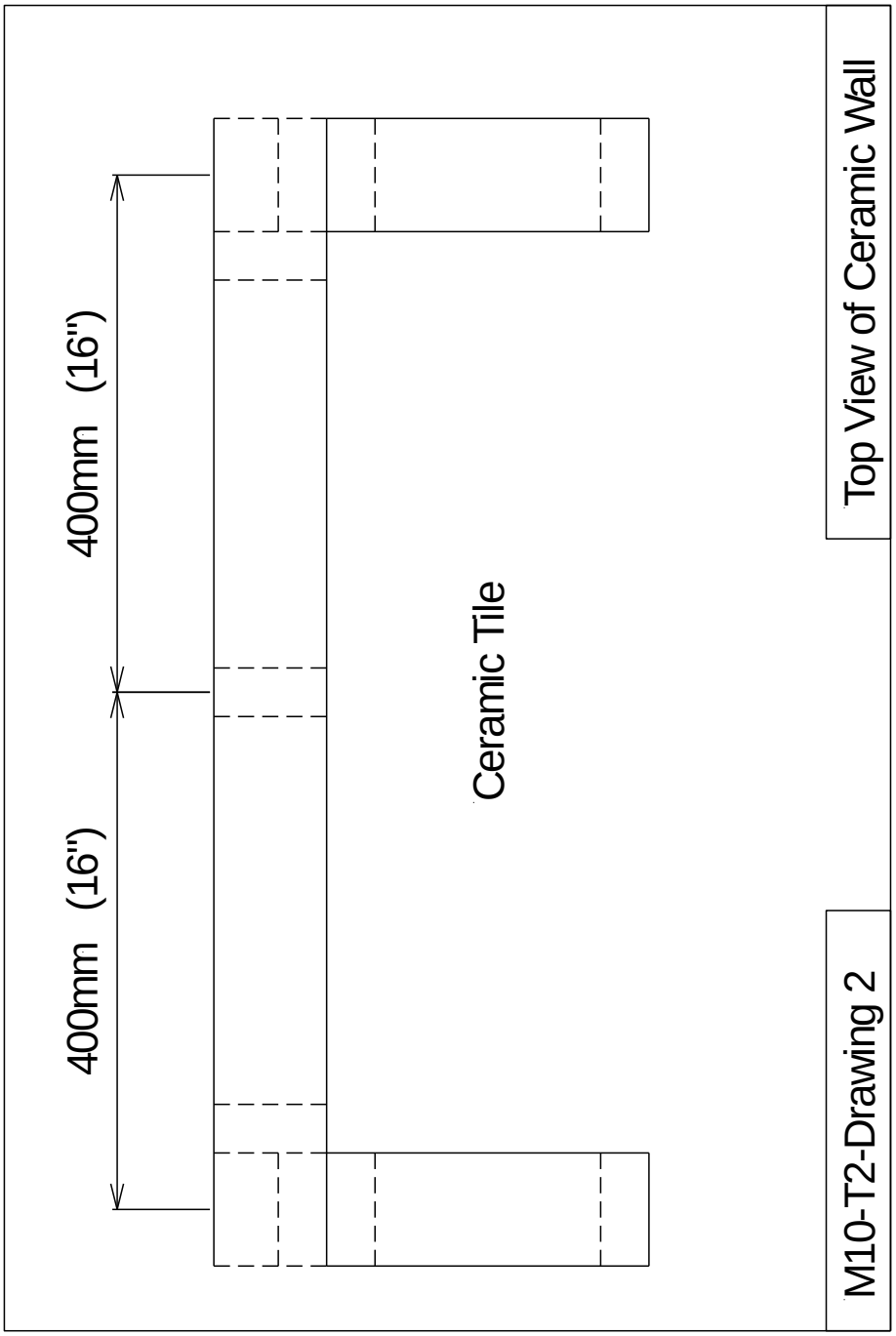
1. Ceramic Tile Tool Kit

2. Ceramic Tile, Adhesive, Spacers

Ceramic Tile Wall
Learning Resource Sheet #LRS-M10-T2-Drawing 1



Top View of Ceramic Tile Wall
Learning Resource Sheet #LRS-M10-T2-Drawing 2



Topic 3: Reflection

Suggested Duration: 1 hour
Suggested Format: Fabrication Lab/Computer Lab

Following the completion of this activity, students will be able to:

2.3.2 Develop strategies for managing individual and team activities [4.401][5.401][5.402][5.403]

2.3.3 Maintain a work log (portfolio) for personal and professional assessment [1.405]

Teacher Required Resources

Skilled Trades 1201 Teacher's Resource Guide

Student Required Resources

Skilled Trades 1201 Student Reference Textbooks
Student Materials Pack

Teacher Preparation

1. Check materials stock to ensure that all necessary materials are available for next group of students.

2. Check all tools to ensure they are in working order and have been properly maintained.

Introduction

- State the purpose of this activity and the expected learning outcomes.

- Emphasize how the completion of the ceramic tile allows for the other trades to move in and start the next phase of the project. (painting)

- Point out to the students how the accuracy of the project just completed will affect the finished project.

Presentation

Teacher explains to students the importance of evaluating the completed activity. Students can look closely at their completed tile and see where there is room for improvement and discuss ways they could fix their mistakes if doing it again. Students need to understand the importance of reassessing their completed work and learning from the activity. Teacher explains the importance of the work log and the role it plays in real life situations.

Suggested Student Activity

Students are responsible for the removal of drywall and ceramic tile and the proper cleanup of their station. Care must be taken during the dismantling of the tile because broken tile can have very sharp edges and can cause serious cuts. Students are given a "Reflection Activity" (Assignment #ASG-M10-T3-1 Reflection Activity) to complete. Each group member must complete his or her own reflection sheet to be submitted and evaluated. Students must also complete their work log (Assignment #ASG-M10-T3-2 Work Log) and get it initialed (in this case, graded) by their teacher.

Assessment and Evaluation

Students must submit their "Reflection Activity" and their "Work Log" to be evaluated. This will account for 10% of their overall grade in this module.

Student Materials Pack

The Student Material Pack for Topic 3 includes the following attached documents:

a. Assignment #ASG-M10-T3-1 Reflection Activity.

b. Assignment #ASG-M10-T3-2 Work Log.

Reflection
Assignment #ASG-M10-T3-1

Read each of the following questions and provide a written response to each.

1. If doing the ceramic tile project again what would you do differently?

2. What are the advantages of installing ceramic tile in a bathroom? What are the disadvantages?

3. How could you have divided your duties differently to make the project go more smoothly?

4. Discuss the advantages of working inside in a shop as opposed to outside on a typical jobsite. Give at least three advantages and disadvantages of each.

5. Collate your blueprints and your work plan (completed in Topic 2) to be submitted for grading.

Work Log
Assignment #ASG-M10-T3-2

Record of Workplace Skills (LOG) **Name:** _____ Module**:** _____		
Workplace Skills Required For Successful Completion of Ceramic Tile Module	Date	Initials of Instructor
Blueprint Reading and Sketching		
Read basic drawings and diagrams		
Sketch drawings and diagrams		
Interpret specifications		
Cutting Ceramic tile		
Layout ceramic tile		
Cut ceramic tile to fit wall specifications		
Wall Preparations		
Layout wall using symmetrical layout		
Apply tile adhesive		
Install tile		
Grouting Tile		
Prepare tile for grouting		
Mix non-sanded grout		
Apply non-sanded grout		
Clean-up grout		
Apply waterproof caulking in corners		
Apply grout sealer		

Module 11

Masonry: Ceramic Floor Tile Installation

Module 11

Masonry: Ceramic Floor Tile Installation

Module Overview

This module will introduce students to the principles of residential ceramic tile. Students will learn about ceramic tile terminology, measuring, installation techniques, proper building techniques and proper building practices. They will draw on knowledge gained in Unit 2 in relation to reading blueprints and technical drawings. They will have to interpret a technical drawing, develop a work plan, select proper tiles and layout and cut their tiles, install and then grout their tiles. They will employ the safe cutting and construction practices covered in the earlier safety section and will emulate safe building and workplace guidelines. Students will learn the value of teamwork and the importance of planning ahead to achieve proper results. The work plan and pricing will give them real life experience with building projects.

Specific Curriculum Outcomes and Suggested Timelines

Module 11 will cover all the specific curriculum outcomes (SCOs) from the Masonry: Ceramic Floor Tile Installation Topic in the Skilled Trades 1201 curriculum guide. The time allocated in each module is recommended but can be adjusted if the teachers sees fit. However, it should be noted that the entire module is only allocated 7 hours and this needs to be adhered to.

Topic 1: Theory of Ceramic Floor Tile Installation (2 hours)

- 3.12.2 Describe methods for preparing floors for installation of ceramic tile [1.402]
- 3.12.3 Describe various materials used for installation of ceramic tile on a floor [1.401][1.402][2.401] [3.401]

Topic 2: Ceramic Floor Tile Fabrication (4 hours)

- 3.12.1 Demonstrate safe practices for use of standard hand, portable power, and stationary power tools for ceramic tile installation [2.401][2.402][2.405][3.401][5.402]
- 3.12.4 Given the nominal size, develop a work plan for the installation of ceramic tile simulating a floor installation [1.402][1.405][4.402][4.403]
- 3.12.5 Layout the proper tile spacing for tile installation on a floor area [1.402][1.405][4.402][4.403]
- 3.12.6 Install ceramic tile using industry standards and practices on a floor area [1.401][1.402][1.403][1.404] [1.405][2.401][2.402][5.402]
- 3.12.7 Grout ceramic tile using industry standards and practices [1.401][1.402][1.403][1.404][1.405][2.401][2.402][5.402]

Topic 3: Reflection (1 hour)

- 2.3.2 Develop strategies for managing individual and team activities [4.401][5.401][5.402][5.403]
- 2.3.3 Maintain a work log (portfolio) for personal and professional assessment [1.405]

Topic 1: Theory of Ceramic Floor Tile Installation

Suggested Duration: 2 hours
Suggested Format: Computer Lab

Following the completion of this activity, students will be able to:

3.12.2 Describe methods for preparing floors for installation of ceramic tile [1.402]

3.12.3 Describe various materials used for installation of ceramic tile on a floor [1.401][1.402][2.401] [3.401]

Teacher Required Resources

Skilled Trades 1201 Teacher's Resource Guide

Student Required Resources

Skilled Trades 1201 Student Reference Textbooks
Student Materials Pack

Teacher Preparation

1. Review the theory of ceramic tile installation and the new tools, materials, and building techniques used in today's construction industry. This review can be done by referring to the resources listed below.

   Wagner and Smith. 2003. Modern Carpentry. Tinley Park, Illinois. The Goodheart-Willcox Company, Inc.

   Feirer and Feirer. 2004. Carpentry and Building Construction, Sixth Edition. New York, New York. Glencoe/Mcgraw-Hill.

   http://www.hometime.com/Howto/projects/ctile.htm

2. Prepare copies of assignment sheets located in resource guide at the end of this unit. Appropriate assignments are #ASG-M11-T1-1, #ASG-M11-T1-2, and #ASG-M11-T1-3. These can either be copied and passed out in paper format or placed in a folder electronically on a shared resource for students to access.

Introduction

- State the purpose of this activity and the expected learning outcomes.
- State how this activity relates to the other activities in this module.
- Summarize what will be covered in this lesson and the related student activity.

Presentation

Discuss with students the importance of the theoretical aspect of training for any trade. Being able to do a proper symmetrical layout requires a good understanding of math and if that knowledge is missing then the activities that follow will be more difficult. Students also need to be able to calculate how much material will be needed in order to complete the task. Students need to be informed of the value (grade) placed on the completion of the theoretical portion of the module. It is important that students are aware of the fact that the theoretical portion is compulsory and must be completed before the practical portion of the activity can be engaged. Students will be given 2 hours to complete these activities and if they feel that they are at risk of not finishing then they should supplement class time with homework or after school work arranged with the teacher. Of utmost importance is the necessity that students be aware of the absolute limit of 7 hours as it impacts every other group and every other module. There can be **no extension** to the time allocated for the module.

Assessment and Evaluation

The teacher will formally evaluate the completed assignments as completed by each individual in each group. Teachers can choose whether to make the group responsible for one copy of all assigned work **or** a separate copy of all assignments from each individual in the group. These theoretical assignments will be valued at 30% of the module.

Learning Resources

Feirer and Feirer. 2004. Carpentry and Building Construction, Sixth Edition. New York, New York. Glencoe/Mcgraw-Hill.

Wagner and Smith. 2003. Modern Carpentry. Tinley Park, Illinois. The Goodheart-Willcox Company, Inc.

http://www.hometime.com/Howto/projects/ctile.htm

Student Materials Pack

The Student Material Pack for Topic 1 includes the following attached documents:

1. Assignment #ASG-M11-T1-1, “Theory of Ceramic Floor Tile Installation”.
2. Assignment #ASG-M11-T1-2, “Ceramic Tile Layout”
3. Assignment #ASG-M11-T1-3, “Materials Pricing Activity”

Theory of Ceramic Floor Tile Installation
Assignment #ASG-M11-T1-1

http://www.hometime.com/Howto/projects/ctile/tile_6.htm
http://www.easy2diy.com/cm/easy/diy_ht_3d_index.asp?page_id=35750428

1. What is the difference between glazed tile and unglazed tile? Why are glazed tile better for flooring?

2. Describe the composition of concrete backerboard. What feature makes it so good for use in bathrooms?

3. Fully explain how to cut concrete backerboard. Describe how you would attach backerboard to an existing plywood floor.

4. What do professional tile setters often use for underlayment? Why would this not be recommended for do-it-yourself tile installers?

5. Fully describe the process of laying out reference lines for installing floor tile. Use pictures to aid in you description.

6. Describe the proper method of spreading floor adhesive using a notched trowel.

7. How do you set the tiles into the mortar or adhesive? What percentage of coverage would be ideal?

8. How do you ensure that all tiles are evenly spaced and uniform across the surface? Explain.

9. What is back buttering? Where would you use it?

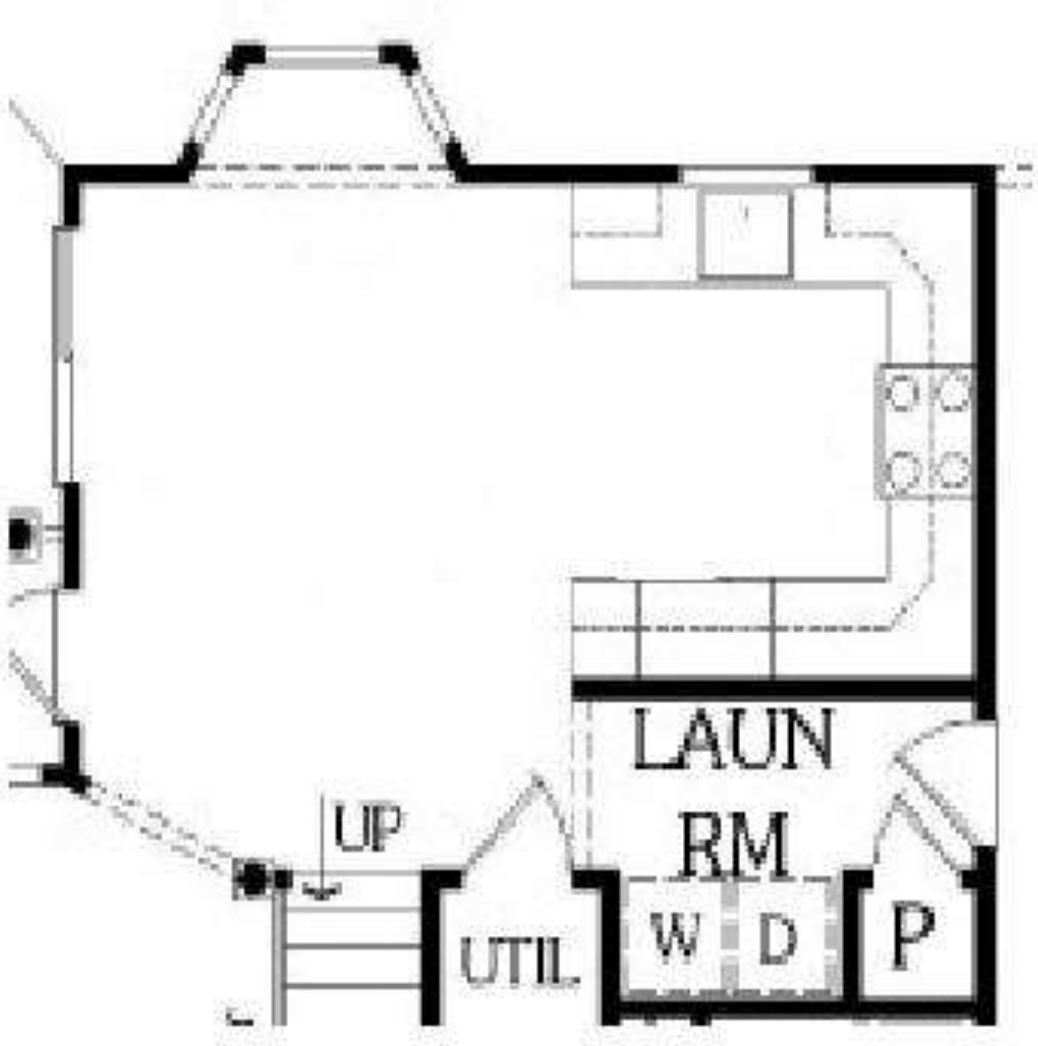
10. What is the difference between sanded and un-sanded grout? Which would you use for floor tiling?

11. Fully explain how to apply grout being sure to reference all tools used in the process.

12. What is the purpose of sealing the grout after it has dried?

Ceramic Floor Tile Layout
Assignment #ASG-M11-T1-2

Using the diagram below sketch a good layout for installing ceramic tile. Be sure to follow the proper layout procedures and keep everything symmetrical. You need to design the floor using 12" tiles and ¼" grout lines.



Materials Pricing Activity
Assignment # ASG-M11-T1-3

Using the information provided below and a rough sketch that you will draw, determine the number of tiles, the amount of mortar (adhesive), and grout needed to complete the project. Be sure to make allowances for breakage and defective material. Finally, calculate the cost of the material using flyers, online quotes, or by calling a local building supplies company.

Typical kitchen size: 14’ x 20’

You will be tiling the entire floor with 12” x 12” tile. Your grout lines will be 1/4”.

A good online resource to help is listed below.

http://www.ceramic-tile-floor.info/tileinstallation.htm

Topic 2: Ceramic Floor Tile Fabrication

Suggested Duration: 4 hours
Suggested Format: Fabrication Lab

Following the completion of this activity, students will be able to:

- 3.12.1 Demonstrate safe practices for use of standard hand, portable power, and stationary power tools for ceramic tile installation [2.401][2.402][2.405][3.401][5.402]
- 3.12.4 Given the nominal size, develop a work plan for the installation of ceramic tile simulating a floor installation [1.402][1.405][4.402][4.403]
- 3.12.5 Layout the proper tile spacing for tile installation on a floor area [1.402][1.405][4.402][4.403]
- 3.12.6 Install ceramic tile using industry standards and practices on a floor area [1.401][1.402][1.403][1.404] [1.405][2.401][2.402][5.402]
- 3.12.7 Grout ceramic tile using industry standards and practices [1.401][1.402][1.403][1.404][1.405][2.401][2.402][5.402]

Teacher Required Resources

Skilled Trades 1201 Teacher's Resource Guide

Student Required Resources

Skilled Trades 1201 Student Reference Textbooks
Student Materials Pack

Teacher Preparation

1. Purchase materials necessary for the construction of a sample floor section (Learning Resource Sheet #LRS-M11-T2-Drawing 1) to allow for the installation of ceramic tile.

2. Purchase material needed to complete the ceramic tile installation. This would include tile, adhesive, spacers, grout and grout sealer. This material should be stored safely in an area easily accessible to students.

3. Compile a tool kit necessary for students to use for this activity. This tools kit would preferably be a Rubbermaid container large enough to hold the tools needed to complete the Ceramic Tile module. A labeling system on the tool kit would also be effective for orderly storage of tools.

4. Ensure all tools are in proper and safe working order. Checking all tools prior to assigning them to students also reinforces the idea of safety to students.

Introduction

- State the purpose of this activity and the expected learning outcomes.
- State how this activity relates to the other activities in this module.
- Summarize what will be covered in this lesson and the related student activity.

Presentation

Students are provided with a brief description of their activity for this module. They are given a quick demo on how to do a symmetrical floor layout and are reminded of the need for accurate measurements and accurate cutting. They are reminded of all safe shop and tool operation practices and are given a quick overview of the tools and operations they will be completing during this activity. Potential hazards are also pointed out as a point of emphasis.

Suggested Student Activity

The ceramic tile module involves students creating a work plan for the installation of ceramic tile simulating the installation of tile on a floor (kitchen, bathroom, etc). Students will do a symmetrical floor layout, measure and cut their tiles, prepare floor for installation, apply tile adhesive, install ceramic tile and then grout and caulk their completed tiles. This will be done on a floor section that can be easily stored at the end of class. Throughout this entire process the students will be exhibiting safe work practices and be employing work practices used in the construction industry. Each student should be given an opportunity to actively participate in the use of shop tools.

Required Tools

Safety

Safety Glasses
Hearing Protection
Safety Footwear
Coveralls

Hand Tools

Steel Tape
Try Square
Miter Square
Framing Square
2 Foot Level
Plumb Bob
Framing Hammer
Drill bits
Screw Diver Bits
6mm (1/4") Notched Trowel
Rubber Grout Float
Grout Mixing Paddle
Tile Nibbler

Power Tools

Compound Miter Saw
Drill
Tile Cutter (manual)
Tile Cutter (electric)
Hole Saw

Required Materials

300mm x 300mm (12" x 12") Ceramic Tile
6mm (1/4") Tile Spacers
Tile Adhesive
Sanded Grout

Assessment and Evaluation

The teacher will formally evaluate the completed ceramic tile floor. Students will be assessed based on how well their ceramic tile floor meets the specifications for a proper symmetrical layout and installation. Students will be graded on the quality of the tile installation and grouting, the effort they put into the project, their attendance throughout the module, and their ability to work as a team to complete the project on time without sacrificing quality. Teachers should be aware that both members of the group would probably get different grades even though it is a group project. Students will also be graded on their use of acceptable shop practices and their proper use of shop etiquette and shop clean up. This practical portion will be worth 60% of the grade for this module.

Learning Resources

Feirer and Feirer. 2004. Carpentry and Building Construction, Sixth Edition. New York, New York. Glencoe/Mcgraw-Hill.

Wagner and Smith. 2003. Modern Carpentry. Tinley Park, Illinois. The Goodheart-Willcox Company, Inc.

Teacher Resource Kit

The Teacher Resource Kit for Topic 2 includes the following technical drawings:

1. Learning Resource Sheet #LRS-M11-T2-Drawing 1

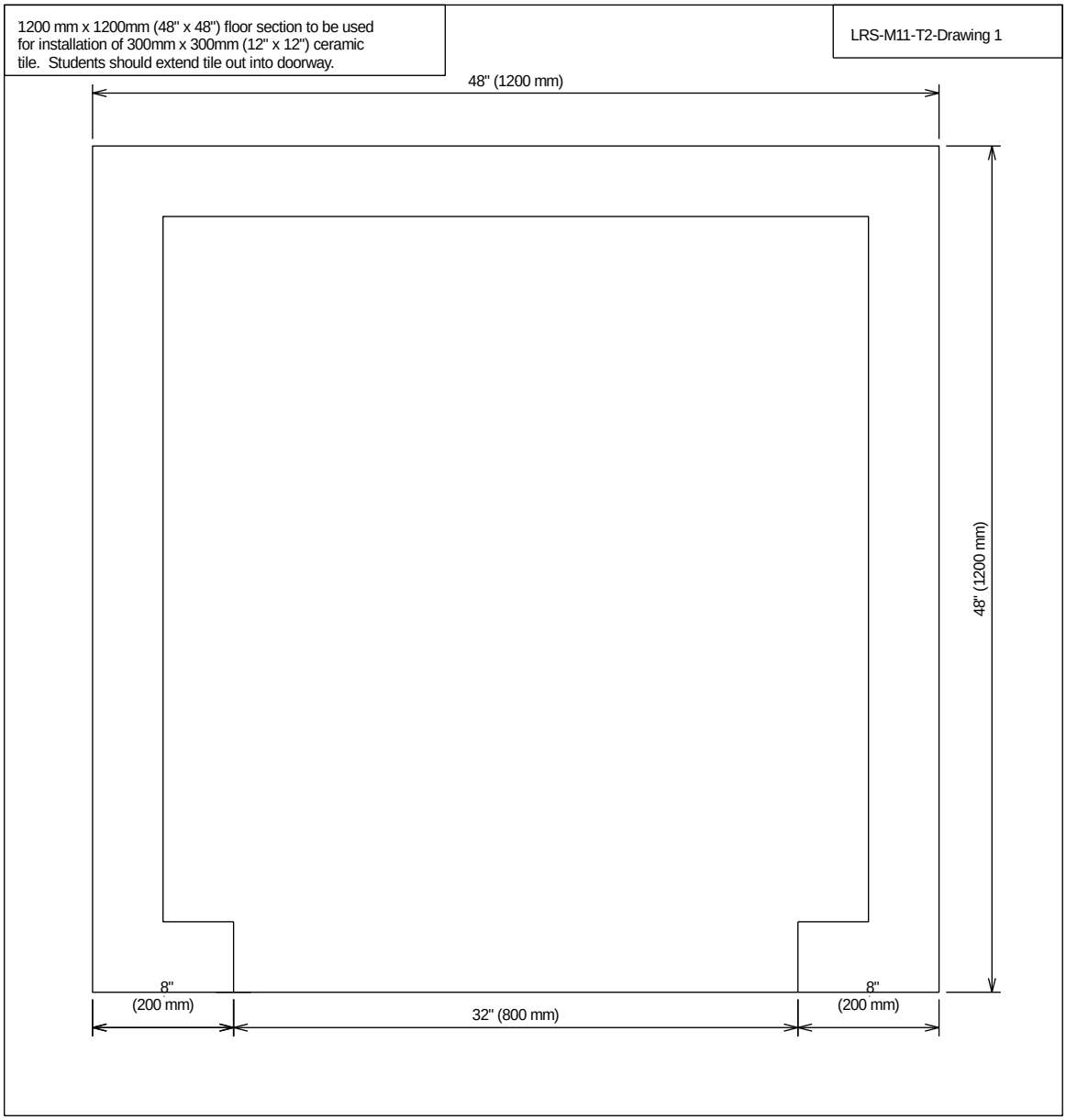
Student Materials Pack

The Student Material Pack for Topic 2 includes the following attached documents:

1. Ceramic Tile Tool Kit

2. Ceramic Tile, Adhesive, Spacers

Ceramic Tile Floor
Learning Resource Sheet #LRS-M11-T2-Drawing 1



Topic 3: Reflection

Suggested Duration: 1 hour
Suggested Format: Fabrication Lab/Computer Lab

Following the completion of this activity, students will be able to:

2.3.2 Develop strategies for managing individual and team activities [4.401][5.401][5.402][5.403]

2.3.3 Maintain a work log (portfolio) for personal and professional assessment [1.405]

Teacher Required Resources

Skilled Trades 1201 Teacher's Resource Guide

Student Required Resources

Skilled Trades 1201 Student Reference Textbooks
Student Materials Pack

Teacher Preparation

1. Check materials stock to ensure that all necessary materials are available for next group of students.

2. Check all tools to ensure they are in working order and have been properly maintained.

Introduction

- State the purpose of this activity and the expected learning outcomes.

- Emphasize how the completion of the ceramic tile allows for the other trades to move in and start the next phase of the project. (painting)

- Point out to the students how the accuracy of the project just completed will affect the finished project.

Presentation

Teacher explains to students the importance of evaluating the completed activity. Students can look closely at their completed tile and see where there is room for improvement and discuss ways they could fix their mistakes if doing it again. Students need to understand the importance of reassessing their completed work and learning from the activity. Teacher explains the importance of the work log and the role it plays in real life situations.

Suggested Student Activity

Students are responsible for the removal of plywood and ceramic tile and the proper cleanup of their station. Care must be taken during the dismantling of the tile because broken tile can have very sharp edges and can cause serious cuts. Students are given a "Reflection Activity" (Assignment #ASG-M11-T3-1 Reflection Activity) to complete. Each group member must complete his or her own reflection sheet to be submitted and evaluated. Students must also complete their work log (Assignment #ASG-M11-T3-2 Work Log) and get it initialed (in this case, graded) by their teacher.

Assessment and Evaluation

Students must submit their "Reflection Activity" and their "Work Log" to be evaluated. This will account for 10% of their overall grade in this module.

Student Materials Pack

The Student Material Pack for Topic 3 includes the following attached documents:

2. Assignment #ASG-M11-T3-1 Reflection Activity.

3. Assignment #ASG-M11-T3-2 Work Log.

Reflection
Assignment #ASG-M11-T3-1

Read each of the following questions and provide a written response to each.

1. If doing the ceramic tile project again what would you do differently?

2. What are the advantages of installing ceramic tile in a bathroom/kitchen? What are the disadvantages?

3. How could you have divided your duties differently to make the project go more smoothly?

4. Discuss the advantages of working inside in a shop as opposed to outside on a typical jobsite. Give at least three advantages and disadvantages of each.

5. Collate your blueprints and your work plan (completed in Topic 2) to be submitted for grading.

Work Log
Assignment #ASG-M11-T3-2

Record of Workplace Skills (LOG) **Name:** _____ Module**:** _____		
Workplace Skills Required For Successful Completion of Ceramic Tile Module	Date	Initials of Instructor
Blueprint Reading and Sketching		
Read basic drawings and diagrams		
Sketch drawings and diagrams		
Interpret specifications		
Cutting Ceramic tile		
Layout ceramic tile		
Cut ceramic tile to fit floor specifications		
Wall Preparations		
Layout floor using symmetrical layout		
Apply tile adhesive		
Install tile		
Grouting Tile		
Prepare tile for grouting		
Mix non-sanded grout		
Apply non-sanded grout		
Clean-up grout		
Apply grout sealer		

Work Logs and Reflection Activities

Reflection
Assignment #ASG-M1-T3-1

Read each of the following questions and provide a written response to each.

1. If doing the floor project again what would you do differently?

2. What are the advantages provided by using power tools as opposed to non-power tools years ago?

3. How could you have divided your duties differently to make the project go more smoothly?

4. Discuss the advantages of working inside in a shop as opposed to outside on a typical jobsite. Give at least three advantages and disadvantages of each.

5. Collate your blueprints and your work plan (completed in Topic 2) to be submitted for grading.

Work Log
Assignment #ASG-M1-T3-2

Record of Workplace Skills (LOG) **Name:** _____ Module**:** _____		
Workplace Skills Required For Successful Completion of Carpentry Module	Date	Initials of Instructor
Blueprint Reading and Sketching		
Read basic drawings and diagrams		
Sketch drawings and diagrams		
Interpret specifications		
Floor Framing		
Select proper lumber		
Measure and layout material		
Cut material to proper lengths		
Prepare and install floor framing		
Prepare and install floor covering		
Wall Framing		
Select proper lumber		
Measure and layout material		
Cut material to proper lengths		
Frame exterior walls		
Install wall sheathing		
Erect exterior walls		
Install top plate		
Roof Truss Construction		
Select proper lumber		
Measure and layout material		
Cut material to proper lengths		
Assemble roof truss		
Attach roof truss		
Install roof sheathing		

Reflection
Assignment #ASG-M2-T3-1

Read each of the following questions and provide a written response to each.

1. If doing the wall project again what would you do differently?

2. What are the advantages provided by using power tools as opposed to non-power tools years ago?

3. How could you have divided your duties differently to make the project go more smoothly?

4. Discuss the advantages of working inside in a shop as opposed to outside on a typical jobsite. Give at least three advantages and disadvantages of each.

5. Collate your blueprints and your work plan (completed in Topic 2) to be submitted for grading.

Work Log
Assignment #ASG-M2-T3-2

Record of Workplace Skills (LOG) **Name:** _____ Module**:** _____		
Workplace Skills Required For Successful Completion of Carpentry Module	Date	Initials of Instructor
Blueprint Reading and Sketching		
Read basic drawings and diagrams		
Sketch drawings and diagrams		
Interpret specifications		
Floor Framing		
Select proper lumber		
Measure and layout material		
Cut material to proper lengths		
Prepare and install floor framing		
Prepare and install floor covering		
Wall Framing		
Select proper lumber		
Measure and layout material		
Cut material to proper lengths		
Frame exterior walls		
Install wall sheathing		
Erect exterior walls		
Install top plate		
Roof Truss Construction		
Select proper lumber		
Measure and layout material		
Cut material to proper lengths		
Assemble roof truss		
Attach roof truss		
Install roof sheathing		

Reflection
Assignment #ASG-M3-T3-1

Read each of the following questions and provide a written response to each.

1. If doing the roof truss project again what would you do differently?

2. What are the advantages of buying trusses from a truss company as opposed to making your own?

3. How could you have divided your duties differently to make the project go more smoothly?

4. Discuss the advantages of working inside in a shop as opposed to outside on a typical jobsite. Give at least three advantages and disadvantages of each.

5. Collate your blueprints and your work plan (completed in Topic 2) to be submitted for grading.

Work Log
Assignment #ASG-M3-T3-2

Record of Workplace Skills (LOG) **Name:** _____ Module**:** **_____**		
Workplace Skills Required For Successful Completion of Carpentry Module	Date	Initials of Instructor
Blueprint Reading and Sketching		
Read basic drawings and diagrams		
Sketch drawings and diagrams		
Interpret specifications		
Floor Framing		
Select proper lumber		
Measure and layout material		
Cut material to proper lengths		
Prepare and install floor framing		
Prepare and install floor covering		
Wall Framing		
Select proper lumber		
Measure and layout material		
Cut material to proper lengths		
Frame exterior walls		
Install wall sheathing		
Erect exterior walls		
Install top plate		
Roof Truss Construction		
Select proper lumber		
Measure and layout material		
Cut material to proper lengths		
Assemble roof truss		
Attach roof truss		
Install roof sheathing		

Reflection
Assignment #ASG-M4-T3-1

Read each of the following questions and provide a written response to each.

1. If doing the residential electrical wiring project again what would you do differently?

2. What are the advantages of wiring at the workbench as opposed to running the wires in an actual wall?

3. How could you have divided your duties differently to make the project go more smoothly?

4. Discuss the advantages of working inside in a shop as opposed to working on a typical jobsite. Give at least three advantages and disadvantages of each.

5. Finalize your work plan (completed in Topic 2) to be submitted for grading.

Work Log
Assignment #ASG-M4-T3-2

Record of Workplace Skills (LOG) **Name:** _____ Module**: _____**		
Workplace Skills Required For Successful Completion of Residential Electrical Wiring Module	Date	Initials of Instructor
Blueprint Reading and Sketching		
Read basic drawings and diagrams		
Sketch drawings and diagrams		
Interpret specifications		
Electrical Wiring		
Select proper wire		
Measure and cut wire		
Select proper electrical boxes		
Select proper electrical components		
Feed wire through boxes		
Strip wire		
Attach electrical components		
Properly install marettes		
Testing Circuits		
Properly hook circuits to power supply		
Properly use multimeter		

Reflection
Assignment #ASG-M5-T3-1

Read each of the following questions and provide a written response to each.

1. If doing the residential electrical construction project again what would you do differently?

2. What are the advantages of wiring circuits in properly studded walls?

3. How could you have divided your duties differently to make the project go more smoothly?

4. Discuss the advantages of working inside in a shop as opposed to working on a typical jobsite. Give at least three advantages and disadvantages of each.

5. Finalize your work plan (completed in Topic 2) to be submitted for grading.

Work Log
Assignment #ASG-M5-T3-2

Record of Workplace Skills (LOG) **Name:** _____ Module**:** _____		
Workplace Skills Required For Successful Completion of Residential Electrical Wiring Module	Date	Initials of Instructor
Blueprint Reading and Sketching		
Read basic drawings and diagrams		
Sketch drawings and diagrams		
Interpret specifications		
Electrical Wiring		
Select proper wire		
Measure and cut wire		
Select proper electrical boxes		
Select proper electrical components		
Drill necessary holes to feed wire		
Feed wire through studs		
Feed wire through boxes		
Strip wire		
Attach electrical components		
Properly install marettes		
Testing Circuits		
Properly hook circuits to power supply		
Properly use multimeter		

Reflection
Assignment #ASG-M6-T3-1

Read each of the following questions and provide a written response to each.

1. If doing the toilet installation project again what would you do differently?

2. What are the advantages of using a certified plumber as opposed to doing it yourself?

3. How could you have divided your duties differently to make the project go more smoothly?

4. Discuss the advantages of working inside in a shop as opposed to a typical jobsite. Give at least three advantages and disadvantages of each.

5. Finalize your work plan (completed in Topic 2) to be submitted for grading.

Work Log
Assignment #ASG-M6-T3-2

Record of Workplace Skills (LOG) **Name:** _____ Module**: _____**		
Workplace Skills Required For Successful Completion of Residential Plumbing Module	Date	Initials of Instructor
Blueprint Reading and Sketching		
Read basic drawings and diagrams		
Sketch drawings and diagrams		
Interpret specifications		
Residential Plumbing		
Layout floor for flange		
Drill hole and cut flange hole		
Install flange		
Attach toilet bowl		
Attach flush box		
Install Pex supply line		
Install shut-off and water supply (using Teflon tape)		
Install elbow		
Install sanitary-t		
Measure, cut and install abs pipe		
Check all connections		
Test		

Reflection
Assignment #ASG-M7-T3-1

Read each of the following questions and provide a written response to each.

1. If doing the sink installation project again what would you do differently?

2. What are the advantages of using Pex pipe instead of the traditional copper tubing?

3. How could you have divided your duties differently to make the project go more smoothly?

4. Discuss the advantages of working inside in a shop as opposed to outside on a typical jobsite. Give at least three advantages and disadvantages of each.

5. Finalize your work plan (completed in Topic 2) to be submitted for grading.

Work Log
Assignment #ASG-M7-T3-2

Record of Workplace Skills (LOG) **Name:** _____ Module**:** **_____**		
Workplace Skills Required For Successful Completion of Residential Plumbing Module	Date	Initials of Instructor
Blueprint Reading and Sketching		
Read basic drawings and diagrams		
Sketch drawings and diagrams		
Interpret specifications		
Residential Plumbing		
Layout vanity top for sink		
Drill hole and cut sink hole		
Install sink		
Install drain kit using plumbers putty		
Install faucets		
Install Pex supply lines (hot and cold)		
Install shut-offs and water supply (use Teflon tape)		
Install p-trap		
Install sanitary-t		
Measure, cut and install abs pipe		
Check all connections		
Test		

Reflection
Assignment #ASG-M8-T3-1

Read each of the following questions and provide a written response to each.

1. If doing the drywall/plastering project again what would you do differently?

2. What advantages are there to using drywall screws and screw guns instead of hammer and nails?

3. How could you have divided your duties differently to make the project go more smoothly?

4. Discuss the advantages of working inside in a shop as opposed to outside on a typical jobsite. Give at least three advantages and disadvantages of each.

5. Finalize your work plan (completed in Topic 2) to be submitted for grading.

Work Log
Assignment #ASG-M8-T3-2

Record of Workplace Skills (LOG) **Name:** _____ Module**:** **_____**		
Workplace Skills Required For Successful Completion of Lather Module	Date	Initials of Instructor
Blueprint Reading and Sketching		
Read basic drawings and diagrams		
Sketch drawings and diagrams		
Interpret specifications		
Cutting Drywall		
Layout drywall		
Cut drywall to fit wall specifications		
Install drywall		
Plastering		
Apply compound to screw heads		
Apply joint tape to corners		
Sand where needed		
Apply more compound where needed		
Sand and apply finish coat		
Test (check for imperfections)		

Reflection
Assignment #ASG-M9-T3-1

Read each of the following questions and provide a written response to each.

1. If doing the painter/decorator project again what would you do differently?

2. What are the advantages of using a power pressure sprayer as opposed to using brushers and rollers?

3. How could you have divided your duties differently to make the project go more smoothly?

4. Discuss the advantages of working inside in a shop as opposed to outside on a typical jobsite. Give at least three advantages and disadvantages of each.

5. Finalize your work plan (completed in Topic 2) to be submitted for grading.

Work Log
Assignment #ASG-M9-T3-2

Record of Workplace Skills (LOG) **Name:** _____ Module**:** **_____**		
Workplace Skills Required For Successful Completion of Painter/Decorator	Date	Initials of Instructor
Surface Preparation		
Use of drop cloths		
Repair nail heads		
Seal knots		
Repair caulking		
Priming		
Properly stirred primer		
Apply primer using brush and roller		
Clean-up tools and area		
Painting		
Mask or cut-in appropriate areas		
Properly stirred paint		
Apply paint using brush and roller		
Properly cleaned and sealed paint cans		
Clean-up tools and area		

Reflection
Assignment #ASG-M10-T3-1

Read each of the following questions and provide a written response to each.

1. If doing the ceramic tile project again what would you do differently?

2. What are the advantages of installing ceramic tile in a bathroom? What are the disadvantages?

3. How could you have divided your duties differently to make the project go more smoothly?

4. Discuss the advantages of working inside in a shop as opposed to outside on a typical jobsite. Give at least three advantages and disadvantages of each.

5. Collate your blueprints and your work plan (completed in Topic 2) to be submitted for grading.

Work Log
Assignment #ASG-M10-T3-2

Record of Workplace Skills (LOG) **Name:** _____ Module**:** _____		
Workplace Skills Required For Successful Completion of Ceramic Tile Module	Date	Initials of Instructor
Blueprint Reading and Sketching		
Read basic drawings and diagrams		
Sketch drawings and diagrams		
Interpret specifications		
Cutting Ceramic tile		
Layout ceramic tile		
Cut ceramic tile to fit wall specifications		
Wall Preparations		
Layout wall using symmetrical layout		
Apply tile adhesive		
Install tile		
Grouting Tile		
Prepare tile for grouting		
Mix non-sanded grout		
Apply non-sanded grout		
Clean-up grout		
Apply waterproof caulking in corners		
Apply grout sealer		

Reflection
Assignment #ASG-M11-T3-1

Read each of the following questions and provide a written response to each.

1. If doing the ceramic tile project again what would you do differently?

2. What are the advantages of installing ceramic tile in a bathroom/kitchen? What are the disadvantages?

3. How could you have divided your duties differently to make the project go more smoothly?

4. Discuss the advantages of working inside in a shop as opposed to outside on a typical jobsite. Give at least three advantages and disadvantages of each.

5. Collate your blueprints and your work plan (completed in Topic 2) to be submitted for grading.

Work Log
Assignment #ASG-M11-T3-2

Record of Workplace Skills (LOG) **Name:** _____ Module**:** _____		
Workplace Skills Required For Successful Completion of Ceramic Tile Module	Date	Initials of Instructor
Blueprint Reading and Sketching		
Read basic drawings and diagrams		
Sketch drawings and diagrams		
Interpret specifications		
Cutting Ceramic tile		
Layout ceramic tile		
Cut ceramic tile to fit floor specifications		
Wall Preparations		
Layout floor using symmetrical layout		
Apply tile adhesive		
Install tile		
Grouting Tile		
Prepare tile for grouting		
Mix non-sanded grout		
Apply non-sanded grout		
Clean-up grout		
Apply grout sealer		