

Carpenter Level 1

Carpenter

Unit: A1 Orientation I: Structure and Scope of Carpenter

Level: One

Duration: 7 hours

Theory: 7 hours

Practical: 0 hours

Overview:

This unit profiles the trade's historical and modern significance, core tasks and skill requirements, as well as its job-ladders and long-term career options. It includes information about learning styles/strategies, stressing their application to apprenticeship and journey-level trade education. The unit also introduces the concept of skills stewardship, stressing the obligation that apprentices incur to help convey what their own journeypersons teach them to those who in turn following them into the trade. A sound grasp of the roles, workplace relationships and possibilities introduced in this unit is part of 'learning to learn' in Manitoba's apprenticeship system. Senior apprentices are later offered information about learning to teach in this system.

Objectives and Content:

Percent of Unit Mark (%)

- | | |
|--|----------------|
| 1. Describe structure and scope of the modern Carpenter trade. | 40% |
| a. Historical background, including apprentice experience | |
| b. Structure/scope of the trade | |
| • International and national characteristics | |
| • Characteristics and practice of the trade in Manitoba | |
| • Trade organizations | |
| c. Opportunities and career ladders | |
| • Generalists and specialists | |
| • Lead hands and other immediate supervisors | |
| • Geographic mobility | |
| • Job hierarchies and innovations | |
|
2. Describe the Manitoba Carpenter Apprenticeship Program. |
40% |
| a. Concept and significance of skills stewardship. | |
| • To the trade | |
| • To apprentices | |
| • To journeypersons | |
| • To employers | |
| • To the community | |
| b. Practical Training (on-the-job) | |
| • Roles/responsibilities of employer and journeyperson(s) | |
| • Roles/responsibilities of Apprenticeship Training Coordinator (ATC) | |
| • Roles/responsibilities of apprentice(s) | |
| • Roles/responsibilities of instructors (including related-area instructors) | |

- c. Technical Training (offsite)
- d. Attendance requirements
- e. Progression requirements
- f. Reporting of grades
- g. Trade regulation and its significance
- h. Policies (e.g. re: personal conduct, missed units, fees, harassment, etc.)
 - Apprenticeship branch
 - Training provider(s)

3. Describe special challenges and opportunities re: apprenticeship training. 15%

- a. Adapting personal learning goals to program contexts
 - Characteristics and domains (types) of adult learning
 - Description/recognition of learning and teaching styles
 - Work culture (incl. work-crew hierarchy), interpersonal skills, and trade-learning
 - Integrating technical training and practical training content
 - Possibilities and perils of peer-learning
 - Budgeting and other necessary personal arrangements
 - Handling common varieties of stress at work and in school
- b. On-the-job challenges/opportunities
 - Description/recognition of jobsite teaching styles/roles
 - Communicating with journeypersons and employers
 - Coverage/documentation of formally prescribed tasks and subtasks
 - Personal record of achievements/needs: the trade learning journal option
 - Getting help and fixing mistakes
- c. In-school opportunities/challenges
 - Personal arrangements that support in-school progress
 - self-assessing potential impacts of previous school experience on current learning (favourable/unfavourable); resources
 - Techniques for note-taking, record-keeping, and review
 - Relations with instructors (including related-area instructors)
 - College resources (library, support services, etc.)
 - Missed-units – policies re supplementals, re-tests, make-up assignments, etc.

4. Accommodation for apprentices with disabilities. 5%

- a. Technical training
 - Requirements
 - Roles and responsibilities
 - Services and information required by persons with disabilities
- b. On-the-job
 - Requirements
 - Roles and responsibilities
 - Services and information required by persons with disabilities

Carpenter

Unit: A2 Trade Safety Awareness

Level: One

Duration: 14 hours

Theory: 14 hours

Practical: 0 hours

Overview:

Safe working procedures and conditions, injury prevention, and the preservation of health are of primary importance to industry in Canada. These responsibilities are shared and require the joint efforts of government, employers, and employees. It is imperative that all parties become aware of circumstances that may lead to injury or harm. Safe learning experiences and environments can be created by controlling the variables and behaviours that may contribute to incidents or injury. It is generally recognized that safety-conscious attitudes and work practices contribute to a healthy, safe, and accident-free working environment. It is imperative to apply and be familiar with the Workplace Safety and Health Act and Regulations. As well, it's essential to determine workplace hazards and take measures to protect oneself, co-workers, the public, and the environment. Safety education is an integral part of Carpenter apprenticeship training both in school and on-the-job. Unit content is supplemented throughout Technical Training by trade-specific information about Insulator safety hazards and precautions presented in the appropriate contexts of discussion and study.

Percent of Unit Mark (%)

Objectives and Content:

- | | |
|---|------------|
| 1. Identify safety and health requirements. | 20% |
| a. Overview of The Workplace Safety and Health Act | |
| • Rights and responsibilities of employees under the Act | |
| • Rights and responsibilities of employers under the Act | |
| • Rights and responsibilities of supervisors under the Act | |
| b. Fourteen (14) regulations | |
| c. Codes of practice | |
| d. Guidelines | |
| e. Right to refuse | |
| • Explanation of right to refuse process | |
| • Rights and responsibilities of employees | |
| • Rights and responsibilities of employers | |
| • Rights and responsibilities of supervisors under the Act | |
| | |
| 2. Identify personal protective equipment (PPE) and procedures. | 15% |
| a. Employer and employee responsibilities as related to personal protective equipment. | |
| b. Standards: CSA, ANSI (U.S.A. standards), etc. | |
| c. Work protective clothing and danger if it fits poorly. | |
| d. Gloves – Importance of proper glove selection (when handling chemicals, cold items, slivers, etc.) | |

- e. Headwear – appropriate protective headwear when required and the approved type of headwear.
- f. Eye protection – comparison and distinction of everyday eyeglasses, industrial safety glasses and safety goggles
- g. Foot protection – when required according to safety standards
- h. Hearing protection
 - Hazards of various noise levels (hearing protection must be worn)
 - Laws
 - Types of hearing protection
- i. Respiratory protection – types, overview of proper selection
- j. Fall protection – Manitoba requirements standards guidelines
 - CSA
 - ANSI (U.S.A. standards), etc.
- k. Ladders and scaffolding
- l. Safety principles for working with or around industrial trucks site-specific (forklifts, pallet trucks, etc.)

3. Identify electrical safety. 10%

- a. Effects of electric current on the human body
- b. Three factors that affect the severity of an electric shock
- c. Effects of electrical arc and blast of the human body and on equipment
- d. Hazards/precautions in working with energized equipment

4. Identify fire safety. 10%

- a. Types of fires
- b. Types of fire-fighting equipment
- c. Classification of fire extinguishers (A, B,C)
- d. Location of fire extinguishers and exits
- e. Fire alarms and drills

5. Identify ergonomics. 5%

- a. Definition of ergonomics and conditions that may affect the body
 - Working postures
 - Repetition
 - Force
 - Lifting
 - Tools
 - Identify tool and safety equipment
 - Causes of hand tool accidents
 - Equipment

6. Hazard of confined space entry. 15%

- a. Identification of a confined space
- b. Hazards of a confined space
 - physical
 - biological
- c. Working in a confined space
- d. Emergency response plan
- e. Self-contained breathing apparatus (SCBA)
- f. Trenching and excavation working environments

7. Identify first aid/CPR. 5%

- a. Overview of first aid regulation

- b. Obligations of employers regarding first aid
 - Who is certified to provide first aid?
 - What to do while waiting for help?
 - Where is first aid kit?
- c. Describe basic first aid requirements and techniques
 - Scope and limits of first aid intervention
 - Specific interventions (cuts, burns, abrasions, fractures, suffocation, shock, electrical shock, etc.)
 - What is it?
 - Interface with other services and agencies (eg. Workers Compensation claims)
- d. Describe basic CPR requirements and techniques
 - How do you get certified?
 - Scope and limits of CPR intervention (include varieties of CPR certification)

8. Identify the safety requirements as they apply to WHMIS with emphasis on: 10%

- a. WHMIS is a system
- b. Provincial regulation under the Safety and Health Act
 - Each province has a WHMIS regulation
- c. Federal Hazardous Products Act
- d. WHMIS generic training:
 - WHMIS defined and the format used to convey information about hazardous materials in the workplace
 - Information found on supplier and workplace labeling using WHMIS
 - Hazardous materials in accordance with WHMIS
 - Compliance with government safety standards and regulations
- e. Description of WHMIS (include varieties of WHMIS Certification)
 - Typology of WHMIS labels, symbols, and classifications
 - Scope and use of Materials Safety Data Sheets (MSDS)

9. Identifying and controlling hazards. 10%

- a. Basic control measures (injury prevention)
- b. Safe work procedures
- c. Explanation on the importance of industrial housekeeping
- d. Employer responsibilities
- e. How and where to store materials
- f. Safety measures related to walkways, stairs and floor openings
- g. Explanation of how to protect the worker and others when working in traffic paths

Carpenter

Unit: A3 Tools and Equipment

Level: One

Duration: 165 hours

Theory: 45 hours

Practical: 120 hours

Overview:

Upon completion of this unit the apprentice will demonstrate knowledge of: hand, power, gas, diesel, pneumatic, stationary, powder-actuated, measuring and layout tools and equipment, and material handling and their applications, maintenance and procedures for use.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Define terminology associated with tools and equipment.	5%
2. Identify hazards and describe safe work practices pertaining to tools and equipment.	5%
3. Interpret regulations and specifications pertaining to tools and equipment. a. Certification b. Training	2%
4. Identify types of hand, power, gas, diesel, pneumatic, stationary, powder-actuated, measuring and layout tools and equipment, and describe their applications and procedures for use.	15%
5. Identify types of material handling and describe their applications and procedures for use. a. Aerial work platforms b. Forklifts c. Telehandlers d. Skidsteers	5%
6. Describe the procedures used to inspect, maintain and store hand, power, gas, diesel, pneumatic, stationary, powder-actuated, measuring and layout tools and equipment, and material handling equipment.	5%
7. Identify the factors to consider when selecting tools and equipment. a. Safety and training requirements b. Condition of tool or equipment (damaged, worn, defective)	3%

8. **Demonstrate use of hand, power, gas, diesel, pneumatic, stationary, powder-actuated, measuring and layout tools and equipment, and material handling equipment.** **60%**

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Unit: A4 Site Layout I

Level: One

Duration: 14 hours

Theory: 7 hours

Practical: 7 hours

Overview:

Upon completion of this unit the apprentice will demonstrate knowledge of site layout tools and equipment and their applications and procedures for use, as well as the procedures used to determine elevations using site layout equipment, to lay out building lines, and the associated calculations.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Define terminology associated with site layout and the layout of building lines.	10%
2. Identify hazards and describe safe work practices pertaining to site layout and the layout of building lines.	5%
3. Interpret codes, regulations, applicable covenants and information found on drawings and specifications pertaining to site layout and the layout of building lines.	10%
4. Identify tools and equipment used to perform site layout and the layout of building lines and describe their applications and procedures for use.	5%
a. String lines	
b. Levels	
• Builders'	
• Laser	
c. Plumb bobs	
d. Tape measure	
5. Explain surveying theory as it pertains to site layout.	10%
6. Describe the procedures used to perform site layout	10%
a. 3-4-5 method (Pythagorean Theorem)	
b. Diagonal	
c. Establish offsets	
d. Determine locations of building and other structures	
e. Lay out building lines	
7. Perform calculations pertaining to site layout and layout of building lines.	10%

8. Use site layout equipment to determine elevations and lay out building lines.

40%

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Unit: A6 Wood and Wood Products

Level: One

Duration: 10 hours

Theory: 10 hours

Practical: 0 hours

Overview:

Upon completion of this unit the apprentice will demonstrate knowledge of wood and wood products, their characteristics and applications, and of the procedures used to handle and store wood and wood products.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Define terminology associated with wood and wood products.	10%
2. Identify hazards and describe safe work practices pertaining to handling wood and wood products.	4%
3. Interpret codes, regulations and information found on drawings and specifications pertaining to wood and wood products.	1%
4. Identify types of wood and describe their characteristics and applications.	20%
a. Hardwoods	
b. Softwoods	
5. Identify types of wood products and describe their characteristics and applications.	25%
a. Lumber	
b. Panels	
c. Engineered products	
• Lumber	
• Structural insulated panels (SIP)	
6. Identify wood defects.	5%
7. Describe wood processing.	20%
a. Sawing	
b. Seasoning/drying	
c. Dressing/planning	
d. Grading	
e. Treating	

8. Describe the procedures used to select, handle and store wood products.

15%

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Unit: A7 Non-wood Products

Level: One

Duration: 7 hours

Theory: 7 hours

Practical: 0 hours

Overview:

Upon completion of this unit the apprentice will demonstrate knowledge of non-wood products, their characteristics and applications, and of the procedures used to handle and store non-wood products.

Objectives and Content:	Percent of Unit Mark (%)
1. Define terminology associated with non-wood products.	10%
2. Identify hazards and describe safe work practices pertaining to handling non-wood products.	5%
3. Interpret codes, regulations and information found on drawings and specifications pertaining to non-wood products.	5%
4. Identify tools and equipment used with non-wood products and describe their applications and procedures for use.	5%
5. Identify types of non-wood products and describe their characteristics and applications.	60%
a. Composite	
b. Metal	
c. Plastic	
d. Glass	
e. Foam	
f. Ceramic	
g. Cementitious board	
h. Masonry	
i. Gypsum	
6. Describe the procedures used to select, handle and store non-wood products.	15%

Carpenter

Unit: B1 Trade Math

Level: One

Duration: 30 hours

Theory: 30 hours

Practical: 0 hours

Overview:

Upon completion of this unit the apprentice will demonstrate knowledge of the required skills to perform construction-related mathematical and geometrical operations.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Perform basic operations. <ul style="list-style-type: none">a. Additionb. Subtractionc. Multiplicationd. Division	20%
2. Perform linear measurement. <ul style="list-style-type: none">a. Imperial/metricb. Perimeter (rectangles, squares, circles)	25%
3. Calculate area/volume. <ul style="list-style-type: none">a. Geometrical shapesb. Board-foot measure (BFM)	30%
4. Calculate ratios/proportions. <ul style="list-style-type: none">a. Like-ratiosb. Mechanical advantagec. Percentagesd. Similar triangles	15%
5. Apply geometrical principles. <ul style="list-style-type: none">a. Bisecting angles/linesb. Ellipses/spring linec. Perpendicular parallel linesd. Pythagorean theoreme. Basic Trigonometry	10%

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Unit: B2 Trade Documents

Level: One

Duration: 21 hours

Theory: 21 hours

Practical: 0 hours

Overview:

Upon completion of this unit the apprentice will demonstrate knowledge of project drawings and specifications, basic sketching techniques, and of the procedures used to interpret and extract information from drawings and specifications.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Define terminology associated with project drawings and specifications.	5%
2. Interpret codes, regulations and specifications pertaining to project drawings, specifications and trade documentation. <ul style="list-style-type: none"> a. Federal b. Provincial/territorial c. Municipal 	20%
3. Identify types of specification documents and describe their applications. <ul style="list-style-type: none"> a. Code books b. Contract specifications c. Manufacturers' specifications d. Energy efficiency guides e. Safety manuals/instructions f. Operating manuals g. Permits 	30%
4. Identify types of drawings and describe their applications. <ul style="list-style-type: none"> a. Site/plot/civil b. Architectural c. Mechanical d. Structural e. Electrical f. Shop drawings g. Sketches 	10%
5. Identify drafting instruments and describe their applications and procedures for use.	2%

6. **Identify documentation related to modifications of drawings and specifications and describe their applications.** 5%
 - a. Change orders
 - b. Addendums
 - c. As-builts

7. **Identify drawing projections and views and describe their applications.** 5%

8. **Explain resolution protocols to follow when a conflict is identified within a set of project documents.** 5%
 - a. Precedence
 - b. Communication

9. **Describe the procedures used to interpret and extract information from drawings and specifications.** 15%
 - a. Alphabet/types of lines
 - b. Symbols and abbreviations
 - c. Projections
 - d. Views
 - e. Legend
 - f. Title block
 - g. General notes
 - h. Schedules
 - i. Scales
 - j. Grid lines
 - k. Two-dimensional information vs. three-dimensional space
 - l. Procedure to report conflict within a set of drawings

10. **Demonstrate basic sketching techniques.** 3%

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Unit: B3 Temporary Access Equipment and Structures

Level: One

Duration: 21 hours

Theory: 21 hours

Practical: 0 hours

Overview:

Upon completion of this unit the apprentice will demonstrate knowledge of temporary access equipment and structures including lifting, rigging, hoisting, and hoarding tools and equipment; their applications and procedures for use; the procedures to construct, install, secure and maintain stationary access equipment; to set up, operate and maintain mobile access equipment, and to erect, dismantle and modify scaffolding, lifting, rigging, hoisting, and hoarding tools and equipment.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Define terminology associated with temporary access equipment and structures.	4%
2. Identify hazards and describe safe work practices pertaining to temporary access equipment and structures.	10%
3. Interpret codes, regulations and information found on drawings and specifications pertaining to temporary access equipment, structures and hoarding.	5%
a. Lighting	
b. Ventilation	
c. Temperature	
d. Moisture	
4. Identify types of temporary access equipment and structures and their components, and describe their applications, limitations and procedures for use.	30%
a. Stationary access equipment	
• Ladders	
• Ramps	
• Temporary stairs	
b. Mobile access equipment	
• Elevating work platforms	
• Telescoping booms	
• Articulated booms	
c. Scaffolding	
• Wood	
• Metal	
• Welded frame	
• Tube-and-clamp	

- Systems
 - d. Specialty access equipment
 - Swing stages
 - Boatswain's chairs (bosun's chairs)
5. **Identify types of hoarding and describe their purpose and applications, and the associated equipment and materials used to construct hoarding.** 5%
 - a. Environmental
 - b. Containment
 6. **Identify types of lifting, rigging and hoisting equipment and accessories and describe their applications, limitations and procedures for use.** 10%
 7. **Identify the considerations and procedures used for installing, securing, dismantling, storing and maintaining temporary access structures.** 30%
 - a. Code and regulatory requirements
 - b. Site conditions
 - c. Manufacturers' specifications and instructions
 - a. Load characteristics
 - b. Equipment and accessories
 - c. Safety
 - d. Environmental factors
 - e. Anchor points/attachment locations
 - f. Sling angles
 - g. Machine capacity/load chart
 10. **Identify the methods of communication used during lifting, rigging and hoisting operations and describe their associated procedures.** 3%
 - a. Hand signals
 - b. Electronic communications
 - c. Audible/visual
 11. **Identify the considerations when modifying existing scaffold structures and describe the procedures used.** 3%
 - a. Manufacturers' specifications
 - b. Jurisdictional regulations
 - c. Location and type of support systems

Carpenter

Unit: C1 Concrete and Concrete Products

Level: One

Duration: 19 hours

Theory: 14 hours

Practical: 5 hours

Overview:

Upon completion of this unit the apprentice will demonstrate knowledge of concrete and concrete products, their characteristics and applications, of concrete reinforcement and embedded materials and their applications, of concrete tests and their associated procedures, and of the procedures used to place, finish and cure concrete.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Define terminology associated with concrete and concrete products.	4%
2. Identify hazards and describe safe work practices pertaining to concrete and concrete products.	5%
3. Interpret codes, regulations and information found on drawings and specifications pertaining to concrete and concrete products.	5%
4. Identify tools and equipment used to test, consolidate and finish concrete and describe their applications and procedures for use.	5%
5. Identify concrete products, structures and components, and describe their characteristics and applications.	10%
a. Cast-in-place	
b. Pre-cast	
6. Identify types of concrete reinforcement and describe their applications.	15%
a. Rebar and accessories	
b. Stirrups	
c. Collars	
d. Fibre	
e. Mesh	
f. Dowels	
7. Identify types of embedded materials and describe their applications.	20%
a. Anchor bolts	
b. Inserts	

- c. Weld plates
 - d. Angle iron
 - e. Temperature bars
 - f. Water stop
 - g. Form voids
 - h. Sleeves
 - i. Stud welding fasteners
 - j. Conduit
 - k. Isolation joint
-
- 8. **Describe the effects of water/cement ratio on concrete.** **1%**
 - 9. **Describe the effects of aggregate size on concrete.** **1%**
 - 10. **Identify additives/admixtures used in concrete and describe their purpose and applications.** **3%**
 - 11. **Identify types of concrete tests and describe their associated procedures.** **3%**
 - a. Slump
 - b. Air entrainment
 - c. Compression
 - d. temperature
 - 12. **Identify types of joints and describe their applications.** **5%**
 - a. Isolation
 - b. Expansion
 - c. Control
 - d. Construction
 - 13. **Describe the procedures used to place, consolidate and finish concrete and to facilitate the curing of concrete.** **10%**
 - 14. **Demonstrate the procedures to mix, place, consolidate and finish concrete and to facilitate the curing of concrete.** **10%**
 - 15. **Perform the slump/compression test.** **3%**

Carpenter

Unit: C2 Footings, Slab-on-Grade and Grade Beam Forms

Level: One

Duration: 21 hours

Theory: 7 hours

Practical: 14 hours

Overview:

Upon completion of this unit the apprentice will demonstrate knowledge of footings, slab-on-grade and grade beam forms, their characteristics and applications, and of the procedures used to construct and dismantle footings, slab-on-grade and grade beam forms.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Define terminology associated with footings, slab-on-grade and grade beam forms.	3%
2. Identify hazards and describe safe work practices pertaining to footings, slab-on-grade and grade beam forms.	3%
3. Interpret codes, regulations and information found on drawings and specifications pertaining to the construction of footings, slab-on-grade and grade beam forms.	3%
4. Identify tools and equipment used to construct footings, slab-on-grade and grade beam forms and describe their applications and procedures for use.	3%
5. Identify types of footings, slab-on-grade, grade beam forms, form materials and accessories and describe their characteristics and applications.	6%
6. Identify the steps involved and factors to consider in the preparation of a site for construction of footings, slab-on-grade and grade beam forms.	8%
7. Identify types of piles and piers and describe their characteristics and applications.	6%
8. Describe the procedures used to construct, dismantle and recondition footings, slab-on-grade and grade beam forms.	10%
9. Identify types of embedded materials and describe their characteristics and applications. <ul style="list-style-type: none"> a. Rebar b. Anchor bolts c. Mesh 	3%
10. Describe the procedures used to place embedded materials.	5%

- | | |
|---|------------|
| 11. Calculate materials needed to construct footings, slab-on-grade and grade beam forms, and calculate the volume of concrete required. | 10% |
| 12. Lay out and construct footings, slab-on-grade and grade beam forms. | 40% |

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Unit: C3 Wall Forms

Level: One

Duration: 21 hours

Theory: 7 hours

Practical: 14 hours

Overview:

Upon completion of this unit the apprentice will demonstrate knowledge of wall forms, their characteristics and applications, and of the procedures used to construct and dismantle wall forms.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Define terminology associated with wall forms.	5%
2. Identify hazards and describe safe work practices pertaining to wall forms.	3%
3. Interpret codes, regulations and information found on drawings and specifications pertaining to wall forms.	5%
4. Identify tools and equipment used with wall forms and describe their applications and procedures for use.	2%
5. Identify types of wall form systems, and describe their characteristics and applications.	10%
a. Loose forming/panel forming	
b. Proprietary forming	
c. Insulated concrete forms (ICF)	
6. Identify types of wall form system components, accessories and materials, and describe their purpose and applications.	10%
7. Describe the procedures used to construct, dismantle and recondition wall forms.	10%
8. Identify types of embedded materials and describe their characteristics and applications.	2%
9. Describe the procedures used to place embedded materials.	3%
10. Calculate materials needed to construct wall forms, and calculate the volume of concrete required.	10%

11. Demonstrate the procedures to lay out and construct a wall form.

40%