# Lay Out a Full Height Wall

## Description

Building codes require that framed walls conform to specifications, and carpenters need to meet those requirements. An understanding of the basic structure and components of a wall system is essential for anyone involved in the building trades. In this Activity Plan, students will:

* Be introduced to the common terminology used in residential wall construction
* Transfer the details of a drawing into the actual layout of a full-sized wall by calculating the necessary materials and completing a material list sheet

This activity is the first stage of the actual construction of a garden shed, playhouse, or other framed structure. The actual structure will depend upon the class composition, time available for the project, and space availability.

## Lesson Outcomes

The student will be able to:

* Identify the components of a wall
* Identify the purpose of each wall component
* Extract information from drawings
* Generate a simple material list necessary to build a wall

## Terminology

**Base plate (also called *floor plate*, *sole plate*, or *bottom plate*)**: a horizontal structural member to which the wall studs are through nailed and which forms the base of the wall when assembled.

**Cripple stud**: a short stud located between the top of the header and the bottom of the top plate over a door or window. It also refers to the short studs located between the window frame and the floor plate below.

**Exterior sheathing**: sheets of material fastened to the exterior of a framed wall; typically made of plywood or oriented strand board (OSB).

**Exterior wall**: a framed wall used on the outside of a structure that contains insulation and is typically framed with 2 × 6" material.

**Flush**: a term used in construction to indicate that two meeting surfaces are aligned on the same plane.

**Interior wall**: a framed wall used on the inside of a structure that does not contain insulation and is typically framed with 2 × 4" material.



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**Jack stud**: the stud located on each side of a door or window opening that runs from the top of the bottom plate to the underside of the header.

**King stud**: the full-length stud located on each side of a window or door opening.

**Level**: a term used in construction to refer to a horizontal surface.

**On centre (OC)**: this term implies that the measurement from the centre of one stud or joist to the centre of the next identical component will be exactly the distance specified.

**Plumb**: a term used in construction to refer to a vertical surface.

**Square**: a term used in construction to refer to a 90° angle.

**Top plate**: a horizontal structural member to which the wall studs are through nailed and which forms the top of the wall when assembled.

**Wall stud**: a vertical member in light frame wall construction usually spaced at 16" or 24" centre to centre.

Standard corner post

O.C.

stud

King stud

Double top plate

Top plate Headers

Cripple stud

Let-in ribbon

Window rough opening

Jack or trimmer stud

Door rough opening

Jack stud

King stud

Cut-in

Cut-in

Rough

Cripple

Partition

Bottom or

Energy-

bracing bracing

sill

stud

assembly

sole plate

efficient

kicker Cut-in

bracing kicker

corner

**Figure 1—**Typical wall framing components

## Extension Terminology

**Building code**: a set of rules that list the structural requirements for buildings and other structures. The purpose of building codes is to ensure that builders meet necessary building bylaws and health requirements.

**Gluelam (glued-laminated timber)**: a structural timber product manufactured by gluing together individual pieces of dimension lumber under controlled conditions.

**Insulation**: any material added to a building structure for thermal, acoustic (sound), or fire protection. Typically, the term refers to fibreglass material used to thermally insulate walls.

**Membrane**: breather membranes (commonly known as *housewrap*) are engineered for the purposes of providing protection to buildings and their occupants from external climatic conditions and from the effects of condensation.

**Metal studs**: steel framing is often used in place of wood in commercial construction. The advantages over wood are that steel studs are always straight, don’t warp, shrink, or split, and store easily. They cost more than wood studs.

**Rainscreen**: the weather-facing surface of an exterior wall positioned to provide a space in front of it and the surface of the structural wall. Rainscreen protects the interior from water seepage.

**Vapour barrier**: any material used for damp-proofing (typically a plastic sheet) that resists movement of moisture through walls, ceiling, and floors of buildings.

## Estimated Time

1½–2 hours

## Recommended Number of Students

20, based on the *British Columbia Technology Educators’ Best Practice Guide*. The ideal is 16. Groups of 3–4 students for each wall section are recommended, but this would depend on the project size and scope.

## Facilities

This specific activity can be facilitated in a classroom setting, as it involves the introduction of terminology and the calculation of materials needed for the upcoming construction project.

## Tools

* Calculators (optional)

## Materials

* Blank material list sheets
* Sample materials, including the following:
  1. 2 × 4"s or 2 × 6"s for plates and studs
  2. 2 × 6" or 2 × 8"s (optional) for lintels
  3. Sheathing (OSB, plywood)
  4. 3" common nails for studs
  5. 2" common nails for sheathing (If the structure is to be dismantled, wood screws are recommended for ease of takedown.)

## Optional

Alternative materials used in frame construction (metal studs, gluelam beams)

## Resources

A graphic/photo of a finished exterior wall, i.e., a crosssection of a framed wall.

Copies of the drawings of the actual project being built. This could be a garden shed, playhouse, or other framed structure.

16"

oc oc

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|  |  |  | Stud |  |  | Top plate  Studs  Sole plate |  |  | Stud |  |  |  |
|  | | | | | | | | | | | | |
|  | | | | | | | | | | | | |

16"

oc

16" oc

**Figure 2—**Typical stud frame spacing of a wall

# Activity

1. Review terminology and safe practices.
2. Provide students with an overview of wall components. This discussion should include an overview of the following:
   * The purpose of a wall
   * The typical components that form a wall
   * The specific requirements of materials, sizing, correct spacing, and fastening devices used to build an exterior wall
   * The specific requirements of materials, sizing, correct spacing, and fastening devices used to build an interior wall
3. Determine the size of the wall project required and provide each group of students with drawings showing the size and correct location of various components, including plates and studs.
4. Determine the length of the wall plates, stud spacing, and size and positioning of openings in the wall. (It is recommended that this first wall not contain openings if a second wall is to be built.) Typically this wall should have stud spacing with 16" centres (Figure 2).
5. Students should generate a material list for the wall to be constructed. This list should include the number and size of plates, number and length of studs, and size of nail fasteners required.
6. If time permits, students can also calculate the amount of insulation that would be required to insulate the wall. They could also calculate the number of sheets of wall sheathing that would be required.

## Evaluation Guidelines

The student is able to:

* + Identify the main components of a wall
  + Describe the purpose of those components
  + Generate an accurate material list for a simple stud wall structure
  + Calculate the required amount of insulation and the required amount of exterior sheathing (optional)

## Extension Activities

It is recommended that the instructor spend some time discussing:

* + - The importance of building codes and how they are used within the construction industry
    - Some of the important factors that are found specifically in the BC building code, such as rainscreen technology, membrane, and vapour barrier, and how these materials and technologies specifically relate to our climate
    - Alternate materials now being used in construction (metal studs and glued laminated lumber)