Build a Full Height Wall

Description
Standard wall sections are an important feature in residential house construction, and their components must conform to building code specifications. In this lesson, students will build a wall section that meets code requirements.

Wall sections created in this Activity Plan could also be used later for wiring and plumbing.

Lesson Outcomes
The student will be able to:
- Identify the parts of a wall
- Extract information from drawings
- Lay out a wall according to specifications
- Place and fasten wall components in the correct location
- Demonstrate safe use of hand and power tools

Assumptions
Students are familiar with:
- Extracting information from drawings
- The use of basic measurement and layout tools
- The safe use of the compound mitre saw and portable circular saw

Students will have completed:
- Build a Wall Mockup (mini-wall) activity plan
- Lay Out a Full Height Wall activity plan

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.

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.
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.

Estimated Time

2–4 hours

The time for this activity will depend on the familiarity of students with tools and the scope of the project (e.g., size of wall, access to tools—number of saws available, etc.—and numbers of students).

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 being built.

Facilities

Technology education shop facility required. Secure space to work outside is advantageous.

Tools

- Tape measures
- Hammers
- Combination or speed squares
- Level
- Nail bar (nail puller)
- Aprons
- Hard hats, eye protection, and hearing protection
- Mitre saw
- Portable circular saw
- Extension cord (if necessary)
Materials

- 2 × 4"s or 2 × 6"s for wall plates and studs
- Sheathing (optional): OSB, plywood
- 3" common nails – for nailing studs
- 2" common nails – for nailing sheathing if required (if reusing materials, it is recommended to use screws for ease of removal)

Resources

Graphic/photo of finished exterior wall, crosssection of finished exterior wall

Drawings of wall should be provided (e.g., Figure 1). Wall to be built will depend on project and space available.

![Typical wall section showing plates and stud placement](image)

Figure 1—Typical wall section showing plates and stud placement
Activity

1. Review terminology and safe practices.

2. Determine the length of the wall plates and stud spacing to match the project material list. (Use the material list generated in Activity Plan: Lay Out a Full Height Wall.)

3. Cut the top and bottom plates to length and tack together in order to facilitate the layout of stud locations.

4. Lay out the top and base plates by marking the correct location of studs using a tape measure and combination square (or speed square). Mark the location of each stud by marking an X on the correct side of a measured pencil line. Note that the second stud must be located 16” from the outside of the first stud to the centre of the second stud. All remaining studs will be located 16” OC.

When laying out walls a tape measure is hooked on the end of plates (or on floors, or the rim joists). Layout of both 16” OC or 24” OC is started by running the tape measure along the plate. Marks are then made ⅜” short of the 16” marks on the tape (15¼”, 31¼”, 47¼”, etc.). An X is then placed to the right of each mark indicating on which side the stud or joist is placed. The end result will be studs on the joist being 16” OC. This same process is used for 24” OC (i.e., 23¼”, 47¼”, 71¼”).

Figure 2—Typical layout of stud location on top and bottom plates

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5. Cut all studs to length using a mitre saw or portable circular saw.
6. Fasten the studs to the wall plates by nailing 3” common nails through the top and bottom plates.

Figure 3—A typical three-stud corner for a wall; this corner arrangement allows for placement of insulation to the corner and also allows for proper installation of drywall material to the corner. This construction feature may be utilized depending on the project that students are working on.

Figure 4—Typical positioning and nailing of plates and studs
7. Square the wall by measuring diagonally and apply sheathing. The wall is only checked for square if sheathing is to be applied before being lifted into place.

![Figure 5](image)

**Figure 5**—Method of checking for square with diagonal measurements; A and B must be equal to be square.

8. Stand the wall upright, check the wall for plumb and square, and brace it with extra material.

![Figure 6](image)

**Figure 6**—Typical temporary bracing of a wall section after checking for square and for plumb
Evaluation Guidelines

- Layout is correct (e.g., stud spacing, opening positioning).
- Components are cut to correct length.
- All framing components are flush.
- The wall section is braced plumb and straight (if positioned on floor).
- Safe work practices are followed.
- A tidy workplace is maintained. Scrap materials are removed and tools and materials are stored properly.