

# Construction Technology Applied Math

## The Wall

**Subject Area:** Construction Math

**Grade Levels:** 7- 12

**Date:** 10/2010

### Lesson Overview

Students will draw a simple wall without windows or doors. Next, students will use Publisher to recreate a wall with doors and windows to use with their model. Next, the students will create a small model and use an estimation to see if their amount of 2"x4"s will complete the project. Students will finish by completing a self-evaluation of the results of their estimation.

### **CTE California State Standards**

(1.2) Add, subtract, multiply, and divide rational numbers (integers, fractions, and terminating decimals) and take positive rational numbers to whole-number powers.

(1.3) Convert fractions to decimals and percents and use these representations in estimations, computations, and applications.

(2.1) Use estimation to verify the reasonableness of calculated results.

(2.2) Apply strategies and results from simpler problems to more complex problems.

(2.6) Express the solution clearly and logically by using the appropriate mathematical notation and terms and clear language; support solutions with evidence in both verbal and symbolic work.

(2.7) Indicate the relative advantages of exact and approximate solutions to problems and give answers to a specified degree of accuracy.

(2.8) Make precise calculations and check the validity of the results from the context of the problem.

(3.1) Evaluate the reasonableness of the solution in the context of the original situation.

(3.2) Note the method of deriving the solution and demonstrate a conceptual understanding of the derivation by solving similar problems.

(8.0) Students know, derive, and solve problems involving the perimeter, circumference, area, volume, lateral area, and surface area of common geometric figures.

(11.0) Students determine how changes in dimensions affect the perimeter, area, and volume of common geometric figures and solids.

### Materials Included in this Lesson

- Ruler Practice Sheets
- Estimation Worksheet
- Wall plan
- Ruler
- Hot glue guns
- Wood strips
- Small saws, pruning shears, or chisels

## Skills the Student will Learn

- fractions, decimals, percents
- cost estimating

## Student Deliverables

- Ruler worksheets
- Estimation worksheet
- 3-D model
- summary/self assessment

## Length of Lesson: 4 Days 2 hour classes each day

### Activity Day One

Ruler Lesson, break down fractions within each inch, adding fractions, standard conversions

#### Attachments:

Math Exercise 1

The Fractions between an Inch

### Activity Day Two

Students will follow teachers guide in drawing a simple wall (without doors and windows) with common studs, top and bottom plate. Students will then create a wall in publisher copying a pre-made plan.

#### Attachments:

Simple Wall

Wall with door and window

### Activity Day Three

Students will finish publisher drawing and using an estimation sheet to figure how much wood they will need.

#### Attachments:

Cost Estimation Worksheet

### Activity Day Four

Using publisher drawing as a pattern/stencils, students will glue together a wall. Students will create a model of the wall using 1/8 inch by 1/4 inch wood strips and hot glue guns. Students will also complete a self-assessment summary.

#### Attachments:

Rubric for Building a Wall Project

## Enrichment Suggestions

Change in cost with various green alternatives and possible advantages/disadvantages

Creating and scale plans like floor.

Extra fractions, decimals, percents work

Lumber board foot estimation

Complete an entire model house

Build life-size wall

## Student Resources

Green alternatives to 2x4 wood and design, steel studs, and online research.

## Lesson Plan Relevance To Externship

The externship opened my eyes to the world of steel framing and construction processes. Since we couldn't do steel framing in our classroom, we paired it down to model wood framing. The cost estimation and materials plan is a very important basic fundamental aspect of any construction job. This project will introduce students to framing and estimating costs and also working with fractions.

## Rubric for the Building a Wall Project

Student Deliverables	1 Fails to meet Expectations	2 Approaches Expectations	3 Meets Expectations	4 Exceeds Expectations
Ruler Worksheets	Attended class but did not turn in any of the assignments, was disruptive	Attended class and was an active participant but failed to complete 3 assignments successfully	Completed the 3 assignments to 80% accuracy, was an active participant	Completed the 3 assignments to 100% accuracy, was an active participant and helpful.
Cost Estimation	Attended class but did not turn in any of the assignment, was disruptive	Attended class and was an active participant but failed to complete assignment successfully	Completed the assignment to 80% accuracy, was an active participant	Completed the assignment to 100% accuracy, was an active participant and helpful.
Publisher Drawing	Attended class but did not turn in any of the assignment, was disruptive	Attended class and was an active participant but failed to complete assignment successfully	Completed the assignment to 80% accuracy, was an active participant	Completed the assignment to 100% accuracy, was an active participant and helpful.
3-D Model	Attended class but did not turn in any of the assignments, was disruptive	Attended class and was an active participant but failed to complete assignment successfully	Completed the assignment to 80% accuracy, was an active participant	Completed the assignment to 100% accuracy, was an active participant and helpful.
Self-Evaluation	Attended class but did not turn in any of the evaluation, was disruptive	Attended class and was an active participant but failed to complete evaluation with thoughtful responses	Completed the evaluation with thoughtful responses.	Completed the evaluation with very thoughtful responses and ideas to improve the assignment for future classes.