



BUILDING INDUSTRY TECHNOLOGY ACADEMY

A program promoted by the
California Homebuilding Foundation

YEAR ONE

Foundation of Residential and Commercial Construction

The Residential and Commercial Construction course is designed to teach basic skills for the construction trades through a course rich in connections to construction projects that will generate interest in the math and increase students' likelihood of success. The course covers basic construction math; measurement and scale, blueprint reading, safety, procedural use of hand and power tools. Students acquire these skills through the use of technology and real-world problem solving. Integrated throughout the course are foundation standards, which include communication, ethics, interpersonal /team skills, critical thinking and other employment skills, needed for the 21st Century.

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YEAR 1: Scope and Sequence

Lessons are designed for a 50-minute class period. Depending on student progress towards mastery of learning objectives, lessons may need to be extended or shortened. This is up to teacher discretion.

UNIT 1: Safety

8 class periods

Learning Objectives:

- Identify general shop safety practices/expectations.
- Demonstrate knowledge of a safe attitude.
- Answer questions concerning occupational safety based on graphic information.
- Recognize the different types and components of graphs.
- Use various strategies in the interpretation of information presented visually.
- Use data analysis/statistics to generalize about occupational safety in differing fields.
- Recognize terms that are commonly used in the analysis of data and statistics.
- Identify the key factors that facilitate effective group/team operation.

UNIT 2: Measurement

9 class periods

Learning Objectives:

- Identify the five major math disciplines used in the construction industry.
- Identify and correctly spell measurement terminology
- Use both standard and metric units in determining given lengths using a tape measure.
- Identify proper, improper fractions and mixed numbers.
- Convert improper fractions and mixed numbers back and forth.
- Identify the LCD and borrow from whole numbers in the addition and subtraction of fractions.
- Convert fractions into decimals.
- Add any two mixed numbers using only a tape measure.

Unit 3: Scale

7 class periods

Learning Objectives:

- Define the meanings of the words scale, ratio, proportion, and scale factor
- Measure given lengths in given scales using an architect's rule/scale
- Read a scale drawing.
- Find a scaling factor when scaling an object.
- Apply measurement procedures in context and then translating those measurements to a scale drawing.
- Understand that a scale drawing is two-dimensional drawing that accurately represents an object and is mathematically like the object.
- Use google sketch up (cad), build a three-dimensional object based on two-dimensional drawings.
- Build to scale a model tiny house that includes the floor, walls, windows and door

UNIT 4: Wood, Fasteners, and Tools

23 class periods

Learning Objectives:

- Identify tree species and recognize a hard or soft wood based on the physical properties of the tree.
- Identify the three basic steps involved in turning a tree into lumber.
- Take notes using the Cornell Notes format.
- Explain the history/development of glues, nails, and screws; their attributes and applications.
- Identify 5 types of nails/brads 1) common nail, 2) sinker, 3) finish nail, 4) brad (nail), and the 5) pin.
- Identify the major woodworking hand tools and their proper function/use.
- Demonstrate the proper use of the major woodworking hand tools.
- Obtain and apply information found in working drawings to a given project

UNIT 5: Power Tool – Table Saw

4 class periods

Learning Objectives:

- Identify each of the major components of the Table Saw, and their purpose.
- Describe the uses of the Table Saw.
- Demonstrate the safe operation of the Table Saw.
- Identify each of the major components of the Radial-Arm Saw and their purpose.
- Describe the use and operation of the Radial-Arm Saw.
- Demonstrate the safe operation of the Radial-Arm Saw.

UNIT 6: Power Tool – Band Saw

3 class periods

Learning Objectives:

- Identify each of the major components of the Band Saw and their purpose.
- Describe the use and operation of the Band Saw.
- Demonstrate the safe operation of the Band Saw.

UNIT 7: Power Tool – Miter Saw

3 class periods

Learning Objectives:

- Identify each of the major components of the Miter saw, and their purpose.
- Describe the uses of the Miter saw.
- Demonstrate the safe operation of the Miter Saws.

UNIT 8: Project # 1

13 Class periods

Learning Objectives:

- Identify blueprints, blue lines, and CAD prints
- Obtain the information they need from a schematic or working drawing.
- Develop a bill-of-materials.
- Build a three-dimensional object based on two-dimensional drawings.

UNIT 9: Power Tools-Drill, Router, & Sander

8 class periods

Learning Objectives:

- Identify the Router, Disc and Palm Sanders, the cordless Driver/Drill, and their major components.
- Demonstrate the safe operation of each tool.
- Identify/describe the six primary drill bits (Twist, Auger, Forstner, Spade/Butterfly, Hole Saw, and Self-Feed) used in the construction industry, and their uses.
- Identify the three basic router bits (Mortising [straight], Round-Over, (Rabbeting) used in the shop.

UNIT 10: Project #2

12 class periods

Learning Objectives:

- Identify blueprints, bluelines, and CAD prints
- Obtain the information they need from a schematic or working drawing.
- Develop a bill-of-materials.
- Build a three-dimensional object based on two-dimensional drawings.

UNIT 11: Jig Saw and Scroll Saw

3 class periods

Learning Objectives:

- Identify the components on the Jigsaw and the Scroll Saw.
- Demonstrate the safe operation of each tool.

UNIT 12: Pneumatics: Nailers, Staplers, and Compressors

8 class periods

Learning Objectives:

- Identify the major components of both the pneumatic nailer and stapler.
- Demonstrate the safe operation of each tool.
- Identify/describe the different types of nailers and staplers and their use.
- Identify several (min.3) uses for each type of tool.
- Demonstrate basic compressor operations and safety.

UNIT 13: Schematics/Blueprints and Visualization

6 class periods

Learning Objectives:

- Identify the five components of a set of residential blueprints. (Plans, Elevations, Sections, Details and Specifications)
- Describe the differences between the five components of residential blueprints.
- Draw a 3D object in 3 different elevations

UNIT 14: Construction Company Organization and Operations

7 class periods

Learning Objectives:

- Identify the basic organization of a corporation, its officers, and their responsibilities.
- Work effectively as part of a team/company.
- Identify the three basic types of companies

UNIT 15: Building Energy Efficiency Basics

15 class periods

Learning Objectives:

- Identify different types and sources of energy.
- Describe the relationship between potential and kinetic energy.
- Determine the approximate energy used by various tools or systems.
- Understand heat transfer in a building assembly.
- Identify ways to improve an assembly to limit heat transfer.
- Describe ways to maintain indoor comfort.
- Identify three main types and general locations of climate-hot, cold, and moderate.
- Recall number of climate zones by memory or ability to locate in reference documents.
- Describe how the physical location of a building can impact energy use.

UNIT 16: Tiny House Project

45 class periods

Learning Objectives:

- Layout and construct a scale model floor frame using blueprints.
- Assemble a floor frame using the correct materials in the correct order.
- Assemble wall framing using the correct materials in the correct order.
- Layout and construct model home walls from blueprints.
- Name and identify the primary members of both conventionally stacked and trussed roofs.
- Layout and construct a conventional roof for a 1" scale model home from blueprints.
- Layout, and construct a conventionally stacked roof in 1" scale from blueprints.