



# **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 21<sup>st</sup> Century.

---



# Table of Contents

<b>YEAR ONE SCOPE AND SEQUENCE</b> .....	<b>iii</b>
UNIT 1: ORIENTATION AND SAFETY .....	
UNIT 2: MEASUREMENT .....	
UNIT 3: SCALE .....	
UNIT 4: MATERIALS, FASTENERS AND TOOLS .....	
UNIT 5: POWER TOOLS -TABLE SAW .....	
UNIT 6: POWER TOOLS -BAND SAW .....	
UNIT 7: POWER TOOLS -MITER SAW.....	
UNIT 8: MACHINE PROJECT ONE.....	
UNIT 9: POWER TOOLS -DRILL, ROUTER, SANDER .....	
UNIT 10: MACHINE PROJECT #2 .....	
UNIT 11: JIG SAW AND SCROLL SAW .....	
UNIT 12: PNEUMATICS: NAILERS, STAPLERS AND COMPRESSORS.....	
UNIT 13: SCHEMATICS/BLEUPRINTS AND VISUALIZATION .....	
UNIT 14: CONSTRUCTION COMPANY ORGANIZATION AND OPERATIONS .....	
UNIT 15: MACHINE PROJECT #3 .....	
<b>GLOSSARY</b> .....	<b>G-1</b>
<b>APPENDIX</b> .....	<b>A-1</b>



# **YEAR 1: Scope and Sequence**

## **UNIT 1: Orientation and Safety**

**Estimated Number of Class Periods: 9**

**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 make generalizations 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**

**Estimated Number of Class Periods: 10**

**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**

**Estimated Number of Class Periods: 11**

**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 similar to 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: Materials, Fasteners and Tools**

**Estimated Number of Class Periods: 24**

### **Learning Objectives:**

- Identify tree species and recognize a hard or soft wood based on the physical properties of the tree.
- Correctly identify and spell the 12 primary physiological tree terms.
- Identify the three basic steps involved in turning a tree into lumber.
- Support their opinion on past and current Forestry practices.
- Take notes using the Cornell Notes format.
- Formulate and express an opinion using support from what they have read and seen.
- 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**

**Estimated Number of Class Periods: 6**

### **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.
- Recognize machine design factors that lead to "Lefty's" having a higher incidence of accidents than "Righty's."



## **UNIT 6: Power Tool – Band Saw**

**Estimated # of Class Periods: 4**

**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**

**Estimated # of Class Periods: 3**

**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: Machine Project # 1**

**Estimated # of Class Periods: 15**

**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 9: Drill Router Sander**

**Estimated # of Class Periods: 12**

**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.
- Identify Aluminum Oxide and Garnet sandpaper, and describe their attributes/differences.



## **UNIT 10: Machine Project #2**

**Estimated # of Class Periods: 12**

**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**

**Estimated Number of Class Periods: 5**

**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**

**Estimated Number of Class Periods: 8**

**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**

**Estimated Number of Class Periods: 4**

**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**

**Estimated Number of Class Periods: 5**

**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: Scale Model House**

**Estimated # of Class Periods: 25**

**Learning Objectives:**

- 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.
- Convert Fractions to Decimals
- Calculate Board Footage
- Estimate the cost of a given project, based on a shop print/drawing.