



BUILDING INDUSTRY TECHNOLOGY ACADEMY

A program promoted by the
California Homebuilding Foundation

YEAR TWO

Study of Modern Craftsmanship and Infrastructure

The Study of Ancient Civilization Infrastructure and Craftsmanship course is designed to gain an in-depth understanding of the history behind construction, materials, and trades in the industry. Students will use Primary Sources and become Construction Historians as they reconstruct the advancement of the trades, materials, and tools that are now being used in residential and commercial construction. The course covers a more advanced knowledge of safety, use of hand and power tools, blueprint reading, geometry, and estimating. 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. Upon completion of this course, students will be able to perform the duties of an entry-level building construction technician with the knowledge of Construction Codes and general and trade-specific terminology.

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YEAR 2: 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 and Orientation

2 class periods

Learning Objectives:

- Understand student expectations for the school year and what they will learn throughout the year.
- Identify general shop safety practices/expectations and demonstrate knowledge of a safe attitude.

UNIT 2: History of Architecture & Building Codes

8 class periods

Learning Objectives:

- Summarize the architecture features through Stone Ages to Neo-Classical Time.
- Identify style of windows, doors, and roofs
- Identify styles of homes
- Transform a current architectural style to another by changing key elements
- Trace the history of building codes
- Describe the ICC, IBC, IRC, and CBS
- Identify the three dominant model codes of the past century

Project #1: Cutting Board

13 class periods

Learning Objectives:

- Identify types of angles and lines
- Understand the angle relationships in parallel lines
- Identify types of triangles
- Identify angles formed by transversals
- Apply geometry math concepts-angles, lines, triangles, and angles formed by transversals into real world projects.
- Build a cutting board.

PROJECT #2: HEXAGON SERVING TRAY

12 class periods

Learning Objectives:

- Identify regular/irregular polygons
- Identify interior and exterior angles of a polygon
- Construct a regular hexagon shape
- Apply math skills to build a hexagon serving tray
- Work cooperatively with others
- Build Problem solving skills
- Produce a hexagon serving tray product

PROJECT #3: BUILDING A RAMP

12 class periods

Learning Objectives:

- Determine the distance between two points on a coordinate plane using the Pythagorean theorem.
- Analyze given information, formulating a plan or strategy, determine a solution, justifying the solution, and evaluate the problem-solving process and the reasonableness of the solution.
- Apply mathematics to problems arising in everyday life, society, and the workplace
- Work cooperatively with others
- Build problem solving skills

PROJECT #4: BUILDING STAIRS

12 class periods

Learning Objectives:

- Determine the distance between two points on a coordinate plane using the Pythagorean theorem
- Analyze given information, formulating a plan or strategy, determine a solution, justifying the solution, and evaluate the problem-solving process and the reasonableness of the solution.
- Apply mathematics to problems arising in everyday life, society, and the workplace
- Work cooperatively with others
- Build problem solving skills

PROJECT #5: BUILDING CABINETS

15 class periods

Learning Objectives:

- Draft a design of a kitchen
- Develop a bill of materials
- Follow order of construction instructions
- Build a three-dimensional object based on two-dimensional drawings
- Calculate the measurements in making a raised panel door
- Build a raised panel door
- Calculate the measurements in order to build a drawer for a specific cabinet

UNIT 3: HIGH PERFORMANCE WALLS & ATTICS

6 class periods

Learning Objectives:

- Identify components of an exterior wall and an Attic assembly and describe the role each component plays in limiting heat transfer.
- Identify common insulation and air sealing materials and installation methods for High Performance Walls and Attics.
- Understand and demonstrate techniques for creating a High-Performance Wall and Attic assembly.

PROJECT #6: Building a Shed

Lesson #1: Floor Framing - 20 class periods

Learning Objectives:

- Use decimals in the accurate keeping of an accounting ledger
- Calculate area
- Use the Pythagorean theorem to establish/check layout and framing a square
- Develop a bill of materials using linear measurement, perimeter, and area to estimate material quantities
- Calculate material takeoffs for floor frames
- Layout and construct a scale model floor frame using blueprints
- Identify and describe the components of a residential floor frame
- Describe the layout and installation procedures for floor frame systems
- Assemble a floor frame using the correct materials in the correct order
- Describe joist restraints and subfloor sheathing installation

Lesson #2: Wall Framing - 15 class periods

Learning Objectives:

- Use decimals in the accurate keeping of an accounting ledger
- Calculate the amount of material required for a wall frame
- Use the Pythagorean theorem to establish/check layout and framing for square
- Develop a bill of materials using linear measurement, perimeter, and area to estimate materials quantities
- Calculate material takeoffs for floor frames
- Layout and construct a scale model wall using blueprints
- Identify the parts of a wall
- Describe how to mark the positions of framing members that make up wall openings
- Describe how rough opening framing members are dimensioned
- Describe the special framing configurations put in place where one wall joins another at right angles
- Describe how to avoid weakening key support structures
- Build a wall frame with window and door rough opening
- Sheathe a wall frame
- Calculate the correct size for a window header

Lesson #3: Roof Framing - 20 class periods

Learning Objectives:

- List and describe various types of roofs
- Identify the parts of a common rafter
- Understand how pitch and slope affect the installation of various roofing materials
- Layout and cut the install common rafters, cut and install ridge board
- Frame gable ends
- Build a scale model of a truss
- Layout a rafter either using the step-off method or rafter tables and cut it accurately
- Use basic geometry (Pythagorean theorem) to calculate rafter lengths
- Use a framing square, speed square, and rafter tables to order to layout a common rafter
- Describe compression and tension forces on roof frame
- Assess roof framing adherence to code, cleanliness, and accuracy (compared to the prints and to scale)

Lesson #4: Electrical - 20 class periods

Learning Objectives:

- Understand the progress of using electricity in housing
- Develop and apply basic skills in electrical wiring work
- Find at least three codes in the NEC that govern electrical construction
- Students practice calculating current, resistance, and voltage
- Give the power equation, calculate the power consumed in circuit or load
- Name and identify electrical symbols while reading electrical plans
- Layout and install a circuit from blueprints
- Identify the tools and equipment used by electricians today
- Define terms related to electrical safety
- Identify electrical wiring tools and materials
- Demonstrate safe working procedures in a construction and shop environment
- Work cooperatively as a team member
- Identify electrical hazards and how to avoid or minimize them in the workplace

Lesson #5: Plumbing - 10 class periods

Learning Objectives:

- Understanding the history of plumbing
- Use plumbing tools and identify them
- Apply plumbing safety
- Install a toilet
- Calculate volume
- Install a sink
- Work with a team by communicating effectively, collaborating, and problem solving

Lesson #6: Drywall - 10 class periods

Learning Objectives:

- Understand the drywall industry overview
- Calculate an estimation of how much drywall is needed for a floor plan
- Install drywall
- Match texture and patch drywall