



# **BUILDING INDUSTRY TECHNOLOGY ACADEMY**

A program promoted by the  
California Homebuilding Foundation



## **UNIT EIGHT:**

### **PROJECT #1**



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## **YEAR ONE**

### **UNIT EIGHT: PROJECT #1**

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### Lesson #1: Blueprint Reading/Bill of Materials

#### Objectives

##### Students will be able to...

- Identify blueprints, blue lines, and CAD prints.
- Obtain the information they need from a working drawing.
- Develop a bill-of-materials.

#### Common Core Standards

LS 11-12.6  
RSIT 11-12.2  
RLST 11-12.2  
Problem Solving and Critical Thinking 5.1  
Leadership and Teamwork 9.1 & 9.7  
Health and Safety 6.2 & 6.10  
Responsibility and Flexibility 7.4  
Technical Knowledge and Skills 10.0, 10.1, 10.2  
Cabinetmaking and Wood Products Pathway A1.4, A1.7, A3.1, A4.1, A4.3, A4.4, A4.7,  
& A6.1  
Residential and Commercial Pathway D 2.1, D3.1 & D3.2 D 3.3

#### Materials

Box Working Drawing  
Bill-of-Materials  
Working Drawing PowerPoint  
<https://documentcloud.adobe.com/link/track?uri=urn%3Aaaid%3Aascds%3AUS%3Aa9fc3d58-1990-4af2-af49-58193ebf2fcd>

#### Lesson Sequence

- Hand out copies of the *Box Working Drawing* and the *Bill-of-Materials*. Use the *Working Drawing PowerPoint* and have your students follow along on their prints while you point out some of the key components of a working drawing to them.
- Be sure to cover the (1) there are usually three-views of the object to be built in a

working drawing; top, front, and right side. (2) Point out the different lines used on the drawing, such as dimension lines and object lines and point out any details or notes that the drawings contain.

- Answer any questions or clarifications students may have (50 minutes)

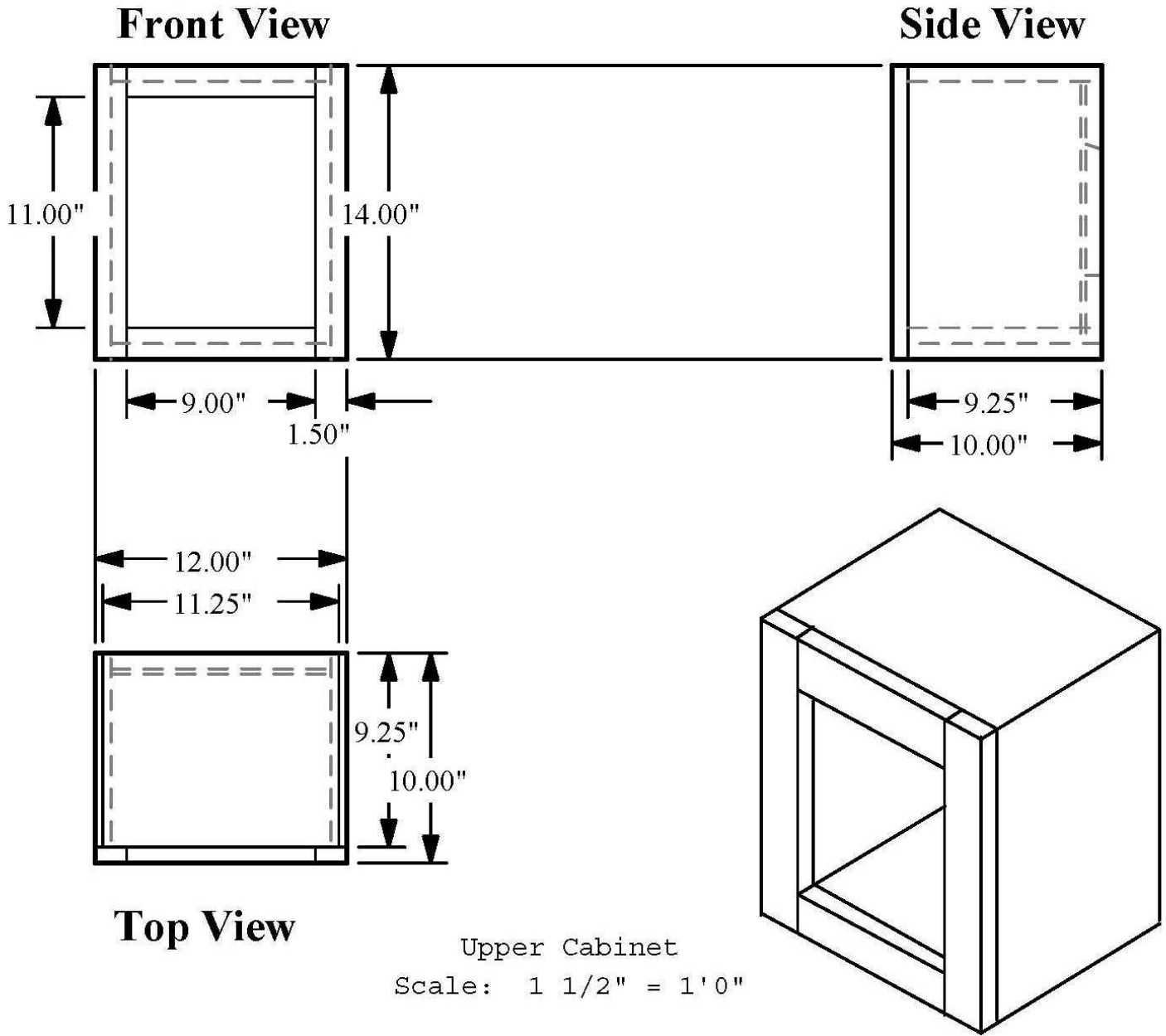
### Assessment

Check for understanding through questioning.

### Accommodations/Modifications

Visuals  
Partner Students Up as Needed  
One on One Support

**Box Working Drawing**



Upper Cabinet  
Scale: 1 1/2" = 1'0"

## Project #1: Bill of Materials

Part #	Description	Material Type	Dimensions (calculate footage)		Footage (bd/ft, lin/ft, sq/ft)	Quantity Of Parts	Unit Cost	Total Cost
				=				\$-
				=				-
				=				-
				=				-
				=				-
				=				-
				=				-
				=				-
				=				-
				=				-
To calculate board feet with all measurements in inches:					$\frac{T \times W \times L}{144}$		Total	
					144		Cost:	\$-

## Lesson #2: Blueprint reading

### Objectives

**Students will be able to...**

- Identify blueprints, blue lines, and CAD prints.
- Obtain the information they need from a working drawing.
- Develop a bill-of-materials.

### Common Core Standards

LS 11-12.6  
RSIT 11-12.2  
RLST 11-12.2  
Problem Solving and Critical Thinking 5.1  
Leadership and Teamwork 9.1 & 9.7  
Health and Safety 6.2 & 6.10  
Responsibility and Flexibility 7.4  
Technical Knowledge and Skills 10.0, 10.1, 10.2  
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& A6.1  
Residential and Commercial Pathway D 2.1, D3.1 & D3.2 D 3.3

### Materials

Box Working Drawing  
Bill-Of-Materials  
Clean Up Job Volunteers  
Safety Glasses

### Lesson Sequence

- Finish *the Bill of Materials* then have the students get out their copies of the *Box Working Drawing*, and staple the two sheets together, and hang onto them. After using them to construct their project, the students will turn them in with the project for 25% of their total project grade. (15-20 minutes)
- Review the *clean-up jobs* that students can volunteer to complete at the end of each

period in the shop. Possibly provide extra credit to these volunteers. (5-10 minutes)

- Have students put on a pair of safety glasses and bring their bill of materials packet into the shop. For the rest of the period, demonstrate how to transfer the project pieces onto the pine board. Since most of the projects included with this curriculum are maximized to fit a 2, 3, or 4 foot piece of 1x12, be sure to stress to your students that unless they lay out their project the way you have demonstrated, they won't be able to fit all of the pieces on their board. (15-20 minutes)

### Assessment

Monitor student learning while students work on their Bill of Material. Ask clarifying questions to students so they can demonstrate their understanding.

Check for understanding during demonstration in the shop.

### Accommodations/Modifications

One on One Support  
Provide Additional Visuals  
Scaffold Instructions



## **Clean-up Jobs and Job Descriptions**

**Shop foremen (2):** Makes sure that everyone is helping and that those with specific jobs are doing them. Reports to Instructor before class is released.

**Safety glasses (2):** Counts safety glasses before going in to shop, makes sure same number is back in case before final bell, reports any missing, or broken pairs to foremen and/or instructor.

**Tools (2):** Makes sure all tools that are out, get back into the tool room.

**Tool Room (2):** Makes sure that all tools brought into the tool room are put away in the correct place. Makes sure all tools are accounted for and cleans/straightens tool room if necessary. Reports any discrepancies or problems to foremen and/or teacher.

**Machinery (2):** Makes sure machines are cleaned off and cleaned out if necessary. Reports anything that is not right (broken, out of adjustment, etc.) to foremen and/or instructor.

**Work benches (2):** Makes sure all tools, materials, etc. are cleaned off of benches. Then sweeps them down.

**Floor (sweeping) (2-4):** Makes sure the entire shop is swept, and all sawdust is picked up and place in the trash or proper receptacle.

**Shop Volunteers – Sign Ups**

<b>Job:</b>	<b>Student #1</b>	<b>Student #2</b>
Shop foreman		
Safety glasses		
Tools		
Tool room		
Machinery		
Work benches		
Floor sweeping		
Floor Sweeping		

## Lesson #3: Project #1 (10-12 Day project)

### Objectives

#### Students will be able to...

- Build a three-dimensional object based on two-dimensional drawings.

### Common Core Standards

LS 11-12.6  
RSIT 11-12.2  
RLST 11-12.2  
Problem Solving and Critical Thinking 5.1  
Leadership and Teamwork 9.1 & 9.7  
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### Materials

Box Working Drawing  
Bill-of-Materials  
Safety Glasses  
Palm Sander, Orbit Sander, Belt Sander  
Project Progress Self Evaluation (for Halfway through the project)

### Lesson Sequence

#### Day 1

- Before you take your students into the shop, have them choose a “building buddy.” Building buddies are especially important on this first project, because of the student’s inexperience with the machines. Building buddies add an extra brain and set of eyes to each student. This helps reduce potential problems and/or accidents in the shop. (5 minutes)
- Remind your students of some of the shop and machine rules/safety rules. Reiterate

shop clean-up responsibilities and/or duties for the volunteers and the class in general. Have your students get out their bill of materials packets, grab a pair of safety glasses and meet at a designated workbench in the shop. At the workbench, have pre-cut slabs of pine waiting to be assigned to students. Using a large black marker, mark the back face of each board with the full name and period number of each student as you hand it to them. Once they have their board in their possession, they can begin the project. As you give your students their piece of pine, tell them where they will store their projects/project pieces. (10 minutes)

- Have a palm sander, random orbit sander, and belt sander on display. Discuss the proper operation and safety of each of the sanders.
- When done with the hand-held sanders, take your students over to the floor-mounted disc sander, and finish your discussion with this machine.
  - ✓ The highest injury rates for any of the machines in the shop belong to the disc sanders and the band saws, because the disc sander and the band saw are heavily used but not highly respected.
  - ✓ (The table saw for instance, is very powerful; it makes a lot of noise and is genuinely 'scary' to a beginning student. Out of respect (driven by fear) the table saw is not as widely used, and when students do use it, they show it a great deal of respect; i.e., they are very careful when using it. On the other hand, the disc sanders and the band saws are not as powerful, do not make all that much noise, and are generally not that 'scary.' This results in a lack of respect for the machines by students.) (10 minutes)
- Answer any questions students have and then release students to begin working on their projects. (20-25 minutes)

### **Day 2-7**

- Students should work on project in the shop. Support students as needed

### **Day 8**

- Pass out the *Project Progress Self Evaluation* worksheet to touch base on where students are in completing the project.

### **Day 8-10 or 12**

- Continue working on project. Use Project progress self-evaluation worksheet to get a feeling for where students are in completing the project and adjust timing accordingly.

## **Assessment**

Check for understanding. Monitor student progress on projects each day. Ask students clarifying questions and answer any questions students may have.

**Accommodations/Modifications**

Strategic Partnering  
Check for Understanding  
Provide Visual Examples of The Project  
One on One Support

## Project Progress Self Evaluation

1. What I have learned from this project so far is...

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2. What I would still like to learn from this project is.

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3. Safety practices that I have been observing...

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4. What I have learned that I should be doing, from this point on, to ensure an excellent outcome of this project...

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### Lesson #4: Wrapping up Project #1

#### Objectives

Students will be able to...

- Build a three-dimensional object based on two-dimensional drawings.

#### Common Core Standards

LS 11-12.6

RSIT 11-12.2

RLST 11-12.2

Problem Solving and Critical Thinking 5.1

Leadership and Teamwork 9.1 & 9.7

Health and Safety 6.2 & 6.10

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& A6.1

Residential and Commercial Pathway D 2.1, D3.1 & D3.2 D 3.3

#### Materials

Completed Project

Project Self-Evaluation Worksheet

#### Lesson Sequence

- Have students put their *completed projects* out for display. Ask students to walk around the room and observe their classmates' projects. Ask any questions to their classmates as needed about their projects (20 minutes).
- Have students complete the *project self-evaluation worksheet*. (20 minutes).
- Complete any unfinished work (10 minutes).

**Assessment**

Use students project self-evaluation worksheet as a tool to evaluate student's projects.  
Grade student's final project. Meet with any students one on one if needed.

**Accommodations/Modifications**

Check for Understanding  
One on One Support  
Extra Time If Needed



### Project Self-Evaluation

1. What I have learned from this project...

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2. Safety practices that I observed on this project...

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3. What I like and don't like about the structure/appearance of my project...

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4. What I could have done differently during this project...

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5. Skills I learned from this project...

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6. How much time did you put into this project?

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7. If you had to make five of these projects, how you manage your time differently?

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8. The grade that I would give myself on this project is a(n) \_\_\_\_\_.