Unit 3: Layout Design and Planning

Content Area: **Applied Technology**
Course(s):
Time Period: **Marking Period 1**
Length: **2-3 days**
Status: **Published**

Brief Summary of Unit

Students will further develop their understanding of the importance of accurate planning. They will develop advanced skills for creating well-drawn, accurate plans. They will learn to read plans that are more complex than those they have previously encountered. They will learn new and develop previously learned skills related to creating a bill of materials, estimating board feet, making accurate measurements, drawing up a plan, adapting existing designs to fit their specific needs, and transferring the information to a piece of wood. They will learn how to draw clear accurate lines to serve as guides for cutting and shaping operations. They will learn that how parts are placed on the material often dictates how it can be cut out. They will understand the importance of giving a little extra thought to the layout process to prevent unforeseen problems. Students will learn that a layout that is neat well thought out and orderly will conserve valuable materials, benefit the environment, reduce costs and time in the long run, and result in quality end products**.**

Standards

HS-ETS1-2	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
LA.RST.11-12.2	Determine the central ideas, themes, or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.
LA.RST.11-12.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LA.RST.11-12.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LA.11-12.CCSS.ELA-Literacy.CCRA.RL.1	Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
TECH.8.1.12	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.2.12	Technology Education, Engineering, Design, and Computational Thinking - Programming: All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.

Transfer

- • Getting the maximum yield out of a piece of lumber is an economical and ecologically sound practice.
- • In a working drawing symbols are standardized in order to improve understanding and

communication, every line has a specific meaning and accuracy is essential when developing a working drawing.

- • Wood is affected by atmospheric moisture.
- • No amount of skill replaces a well-executed plan, all modern marvels began with a plan and proper layout will save time and money.

Essential Questions

- • How is a working drawing a language in and of itself?
- • What is a working drawing and what do we do with it?

Essential Understandings

- • Are a plan of procedure and a bill of material the same thing?
- • How does the layout of parts on the wood determine how the parts can be cut out?
- • If you are building only one item, do you still need to develop a plan?
- • What is meant by “multiple cuts” or “repetitive cuts”?
- • What is meant by hydroscopic
- • What is meant by the term “Square”?
- • What part does the grain of the wood play in the layout process?
- • What constitutes a plan?

Students Will Know

- • how to use layout tools to transfer the plans to the wood.
- • how to construct a template.
- • how to develop a plan and a working drawing.
- • how to layout project parts to produce the greatest yield from the material.
- • how to properly use a framing square to square-up a board.
- • how to take measurements with common measuring tools.
- • key terms and vocabulary.

Students Will Be Skilled At

- • getting the maximum yield out of a piece of lumber is an economical and ecologically sound practice.
- • accuracy is essential when developing a working drawing.
- • proper layout will save time, money and materials.
- • the layout process is an important step in the planning portion of the project.
- • Understanding all modern marvels began with a plan.

- • knowing that no amount of skill replaces a well-executed plan.
- • symbols used in working drawings are standardized in order to improve understanding and communication.
- • wood is affected by atmospheric moisture.

Evidence/Performance Tasks

- • develop a plan of procedure for a project.
- • find a plan for a given project and adapt it for their specific use.
- • Layout the parts of a project using common layout tools.
- • make clear accurate measurements and make accurate lines to serve as guidelines for sawing stock.
- • Students will create a working drawing for a given project using a basic CADD program.
- • using a spreadsheet on the computer, create a bill of materials along with an estimated completed cost for a project.
- • answer the essential questions.
- • demonstrate the ability to self-assess and seek out needed resources.
- • Layout their project parts in a safe and efficient manner.

Learning Plan

- • Allow students to work independently to layout their parts on the stock.
- • Demonstrate laying out parts on a board emphasizing grain direction, multiple cut parts and same size parts.
- • Distribute various size boards and have students measure them with a tape measure to the nearest 1/16th of an inch. Record the measurements and determine the board feet of each piece.
- • Divide students into groups, distribute sample project parts and have each group layout the parts. Have the students explain to the class why they chose that specific layout. Compare the decisions of all groups.
- • Have students create a bill of materials and a plan of procedure for a project.
- • Have students read and discuss relevant material in woodworking textbook
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- • Present lesson on developing plans along with instruction for using a basic CADD program on the computer.
- • Demonstrate the correct procedure for squaring a board using a framing square
- • Introduce vocabulary.
- • Present lesson on layout and using layout tools
- • Preview the essential questions and connect to learning throughout the unit.
- • Quiz on planning and layout techniques
- • Writing prompt/s as homework.

Materials

- drawing paper ,
- Internet .
- layout tools ,
- measuring tools ,
- Text book Modern Cabinet Making Goodheart-Wilcox ,

Suggested Strategies for Modifications

- • additional time on task
- • assessment based on individual development in the area of study
- • audio tape of instruction
- • cooperative learning groups
- • handouts of notes, procedures, processes, diagrams, etc.
- • images and visual aids
- • preferential seating
- • reading material modified to student level
- • revised techniques, use of tools and media in hands-on activity
- • testing materials appropriate to student level
- • alternative outcome options
- • one-to-one instruction and assistance
- • study partners