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The "Project ABLE" General Woodworking Curriculum. (Interim Product).
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Identifiers-*Project ABLE

A sample of student tasks and topic objectives which were developed for woodworking courses in Project ABLE are given. A larger collection of these were identified for grades 10, 11, and 12. Prior to this activity an analysis of selected occupations was made, and a frequency count of skills and knowledges was utilized to determine the necessary objectives relative to selected woodworking occupations. This basic course which has been developed covers one third of the occupational sample. Included are lists of course and topic objectives, 68 tasks for grade 10, and sample lessons. (EM)

INTERIM PRODUCT FROM

O.E. Project No. 5-0009

The "Project ABLE" General Woodworking Curriculum

Rationale

Occupational Cluster

Task Analysis

Course Objectives

Course Content

Sample Learning Units

DEVELOPMENT AND EVALUATION OF AN EXPERIMENTAL CURRICULUM
FOR THE NEW QUINCY (MASS.) VOCATIONAL-TECHNICAL SCHOOL

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

Enclosed is a sample of the tasks and course topic objectives developed for the Project ABLE General Woodworking area.

Tasks for the entire area (grades 10, 11, and 12) have been identified and course and topic objectives for these tasks have been developed. The tasks with their corresponding objectives are not listed in any particular sequence; the learning units, however, are being sequenced according to their positions on the learning hierarchy.

RATIONALE FOR GENERAL WOODWORKING

In recent years, many curriculum experts have advocated the need for defining and developing basic or core content courses. Project ABLE has identified a basic or core curriculum in the General Woodworking area at the grade ten level.

This identification was accomplished by describing all selected occupations in this area, listing all basic tasks and developing course and topic objectives for the tasks. A frequency count of objectives indentified the extent to which given skills and knowledges appeared in a number of selected occupations.

The results of the frequency count served as a basis for selecting those skills and knowledges to be included in the Basic Woodworking course. By definition, those skills and knowledges which are required by all or a large number of occupations in the area can be considered as "basic" or "core."

The objectives were arranged in order of frequency and the most frequently occurring objectives were placed first in the basic or core sequence. The exact number of objectives to be completed in grade ten was not specified, since it was only possible to make a rough estimate of the number of learning units an individual student could complete in one year.

At this writing, it appears that the Basic Woodworking course will cover the requirements of approximately one third or ten occupations in the sample. In addition, it will serve as a base for the higher-level or more complex occupations in the hierarchy. The transition form the basic course into more specific jobs in different families should be a smooth one. The completion of the basic course should also assist the student in deciding what career in woodworking he should pursue.

The entire course outline provides for exit levels at various points on the hierarchy. In effect, these points serve as goals for the individual student. After he satisfies the requirements of an exit level (represented by an occupation), he will know that he has met the basic entry requirements of the occupation and can progress to the next higher level.

GENERAL WOODWORKING

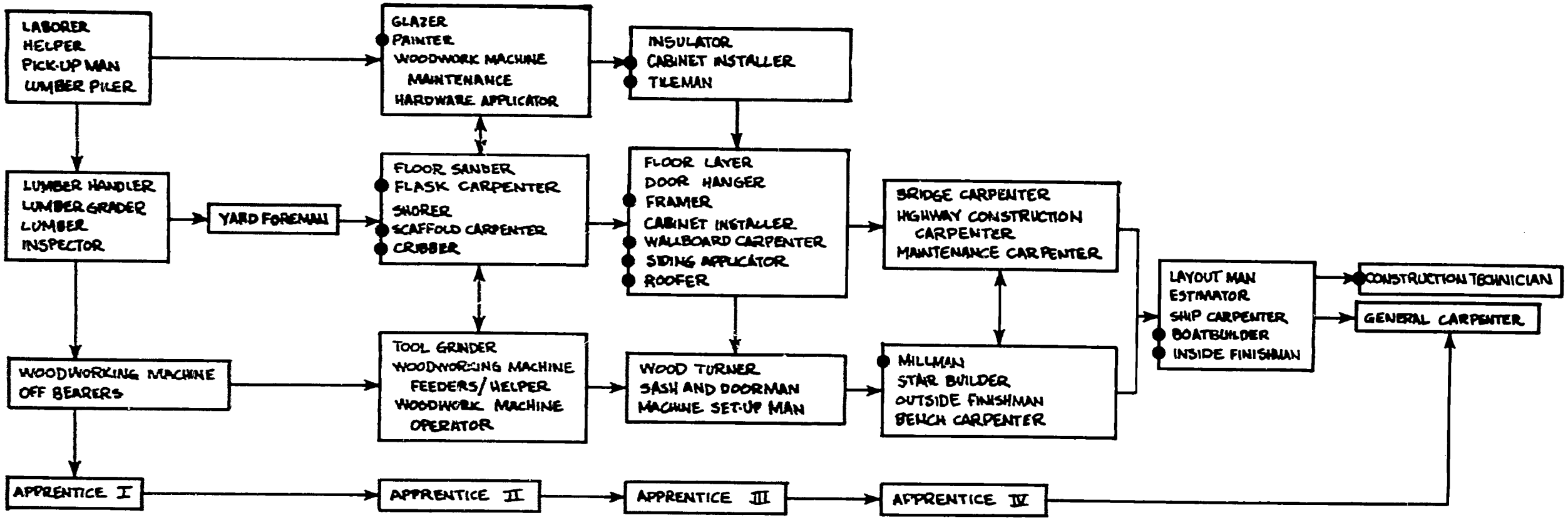
GENERAL WOODWORKING: CARPENTRY

Carpenters make up the largest group of craftsmen in the building trades. Great skill is required to work with the materials, tools, and methods developed for use in construction today.

Construction work includes not only residential, commercial, industrial, and public buildings but also roads, bridges, dams, tunnels, and similar structures, as well as ships and other transportation equipment. In urban areas, carpenters tend to specialize in a particular field of construction and sometimes in the particular type of work performed. Thus a carpenter working for a homebuilding firm, for example, may install only hardwood floors or acoustic panels or millwork, and so on.

Although the general (journeyman) carpenter is not specified as a job in this curriculum, some of the skills he must develop are represented in the specialized carpentry jobs selected. That is, apprenticeship training for carpentry would include cribbing, roofing, framing, tile setting, siding, finishing, and other types of work. Vocational-technical training in these skills would be credited against apprenticeship time, or a carpenter may qualify to work in this field by augmenting vocational-technical training with on-the-job training.

The outlook for employment for carpenters is directly related to the economic outlook for the construction industry in general. In addition, a new development in this field is businesses specializing in repair and remodeling of homes and other buildings. Many carpenters do maintenance work in factories, office buildings, and other large establishments or work in captive shops in non-construction firms or governmental agencies. Some are self-employed or supplement other employment by doing small jobs on their own time.



GENERAL WOODWORKING

CARPENTRY

● SELECTED JOBS

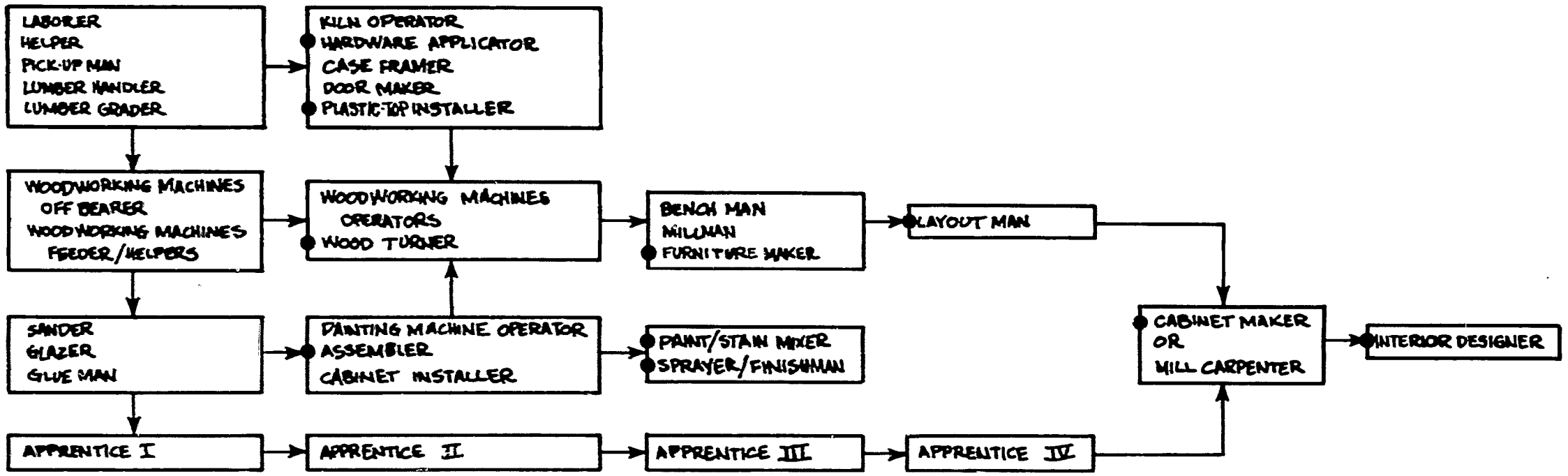
GENERAL WOODWORKING: MILL CARPENTRY

Furniture and cabinets have developed from crude, simple designs of years ago to the many beautiful styles available today. All of the cutting and carving of these furnishings used to be done by hand, but to meet today's demands for quantity, much of the work is now done by machine. Similarly, many cabinet units are now constructed in the mill or shop and then taken to the building site to be installed.

Whether doing production or custom work, the journeyman mill carpenter or cabinetmaker must be knowledgeable in wood characteristics, drafting and layout work, assembling and finishing operations. He must also be skilled in the operation and care of the hand and machine tools used in woodworking.

High school graduation or its equivalent is required for entering apprenticeship program for mill carpentry, and vocational-technical training in these skills will be credited as part of the time in apprenticeship. In this locality, however, apprenticeship opportunities are scarce and many of these craftsmen depend on on-the-job training to supplement their initial technical training.

Although prefabrication will have some effect on the employment outlook in this field, a skilled furniture or cabinetmaker can nearly always find work. Also, woodworking is rewarding not only as a vocation but to make things for personal or home use.



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GENERAL WOODWORKING

MILL CARPENTRY

● SELECTED JOBS

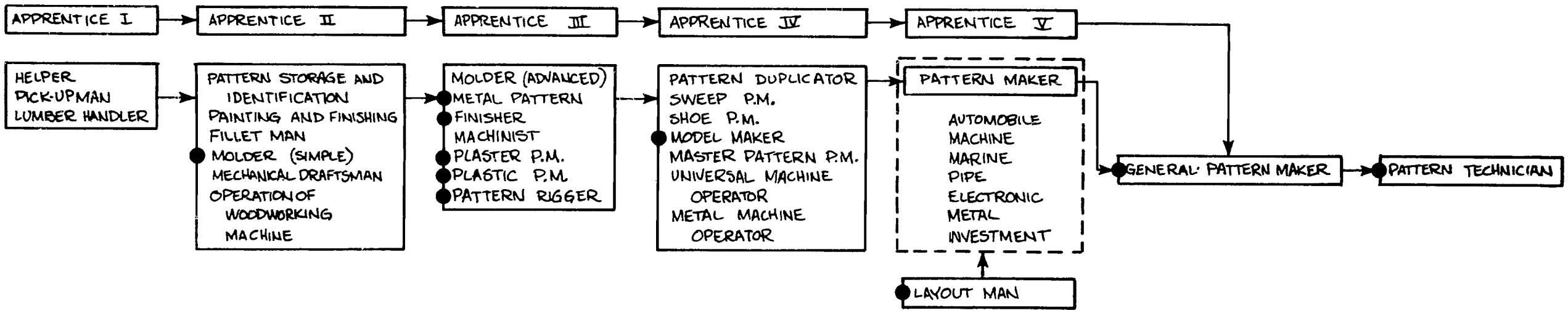
GENERAL WOODWORKING: PATTERNMAKING

The patternmaker is primarily engaged in the production, alteration, repair, and maintenance of patterns and core boxes. A pattern is a model of a product, part, or other object that is to be cast in metal. To make the casting mold, sand is rammed around a pattern mounted in a frame (flask); when removed, the pattern leaves a cavity into which molten metal is poured. Core boxes are used to make inserts which form interior cavities, or projections in a casting. Patterns may be made of wood, plaster, plastic, or metal; master patterns, which are used to make metal and plastic patterns, are usually wood.

The general patternmaker must be able to work with all patternmaking materials. Apprenticeship is the principal means of qualifying as a journeyman in this field, but vocational-technical training may be credited toward completion of the 5-year apprenticeship period. In some cases, on-the-job training may also be substituted for formal apprenticeship training.

A majority of patternmakers are employed in specially equipped foundry shops in plants which manufacture such products as machinery, transportation equipment, and fabricated metal products. Others work in independent foundries or in job shops that make patterns to order.

A highly skilled craftsman, the patternmaker usually earns more than other woodworkers or foundry workers. In addition, with his metalworking and woodworking skills, he can transfer to related jobs in other fields when foundry work is not available.



GENERAL WOODWORKING

PATTERNMAKING

● SELECTED JOBS

FREQUENCY CHART of JOB SKILLS

WOODWORKING FAMILY

	Reading Blueprints	Measuring to Nearest Inch	Computing Lumber Requirements	Using Spirit Level	Using Hammer	Using Six-Foot Rule	Computing Area	Using Tin Snips	Computing Costs	Sawing Lumber	Using Level	Measuring to Nearest 1/4"	Measuring Angles	Using Hand Drill	Using Straightedge	Using Jigsaw	Measuring to Nearest 1/16"	Using Scriber	Using Planes	Using Nailset	Using Square	Using Screwdrivers	Identifying Lumber	Layout	Using Knife	Using Chisels	Identifying Joinery	Computing Dimensions	Fitting Joints	Milling	Using Bit Brace	Using Auger	Using Mallet	Using Putty Knife	Sanding	Using Coping Saw	Applying Finish	Measuring to Nearest 1/32"	Operating Circular Saw	Operating Surface Planer	Operating Shaper	Operating Borer
Cribber	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓				✓		✓	✓	✓		✓		✓			✓		✓	✓		✓	✓						✓				
Roofer	✓				✓	✓	✓	✓	✓						✓		✓	✓									✓	✓		✓	✓		✓					✓				
Framer	✓		✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓			✓		✓	✓		✓	✓						✓				
Finishman (INSIDE)	✓		✓	✓	✓																																				
Finishman (OUTSIDE)	✓		✓	✓	✓	✓	✓		✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lather (Wallboard Carp.)	✓			✓	✓	✓	✓	✓	✓	✓	✓				✓		✓	✓			✓			✓			✓	✓														
Tile Applicator	✓			✓	✓	✓	✓	✓	✓		✓				✓			✓			✓			✓			✓	✓				✓	✓				✓				
Cabinet Installer	✓			✓	✓	✓			✓	✓	✓			✓	✓	✓		✓	✓	✓	✓	✓			✓	✓	✓	✓	✓		✓	✓		✓	✓	✓	✓	✓	✓			
Siding Applicator	✓		✓	✓	✓	✓	✓		✓	✓	✓				✓			✓	✓	✓	✓		✓			✓	✓	✓	✓		✓					✓		✓				
Floor Layer	✓		✓		✓	✓	✓		✓	✓					✓	✓		✓	✓	✓	✓		✓			✓	✓	✓	✓		✓	✓		✓	✓	✓	✓	✓	✓			
Millman	✓		✓			✓			✓	✓													✓					✓									✓	✓	✓	✓		
Sash and Door Carpenter	✓		✓		✓	✓			✓	✓										✓	✓		✓				✓	✓	✓	✓		✓	✓	✓			✓	✓	✓	✓		
Furniture Maker	✓		✓	✓	✓	✓				✓	✓				✓			✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Kitchen Cabinet Maker	✓		✓	✓	✓			✓	✓	✓				✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sprayer/Finisher							✓																			✓	✓		✓												
Wood Former	✓		✓		✓				✓					✓	✓			✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓		✓	✓			✓	✓	✓		✓
Formica (Plastic Top) Installer	✓			✓	✓	✓			✓	✓		✓	✓	✓	✓			✓	✓		✓			✓	✓	✓				✓	✓	✓	✓			✓	✓				
Wood Turner	✓		✓		✓				✓								✓				✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓			
Layout Man	✓		✓	✓	✓	✓	✓		✓		✓			✓	✓			✓	✓		✓		✓	✓	✓	✓		✓	✓	✓	✓	✓						✓		✓		
Hardware Applicator	✓			✓	✓	✓			✓	✓	✓			✓				✓			✓	✓			✓		✓		✓	✓	✓											
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Boat Builder	✓		✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Model Maker	✓		✓	✓	✓		✓		✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Mockup Man	✓		✓	✓	✓				✓	✓	✓			✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Pattern Rigger	✓		✓		✓	✓			✓		✓	✓		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Pattern Finisher	✓				✓																					✓	✓		✓												
Plaster Patternmaker	✓			✓	✓	✓			✓	✓		✓		✓	✓	✓				✓	✓		✓	✓	✓	✓		✓		✓	✓					✓		✓	✓			
Metal Patternmaker	✓						✓	✓				✓		✓	✓					✓	✓		✓			✓	✓	✓	✓	✓	✓		✓	✓	✓							✓

WOODWORKING FAMILY

	Operating Tenoner	Operating Mortiser	Operating Moulder	Operating Sander	Operating Jointer	Uses Glass Cutters	Making Stock Lists	Gluing	Uses Spray Equipment	Computing Materials Required	Using Layout Tools	Steaming	Uses Adhesive Tools	Cleaning Area	Operating Lathe	Applying Sealer	Arranging Assembly Sequence	Uses Scales	Measures to Nearest 1/64"	Using Gouges	Using Paddles	Mixing Plaster & Plastics	Using Templates	Using Shrink Rule	Using Micrometer	Using Vernier Calipers	Using Surface Gage	Measuring to Nearest .001"	Soldering	Using Files	Using Scrapers	Operating Saw Filer	Operating Band Saw	Operating Drill Press	Operating Router	Using Router Plane	Using Draw Knife	Using Spokeshave	Use of Files
Cribber										✓				✓		✓	✓	✓																					
Roofer							✓			✓	✓						✓	✓					✓									✓				✓			
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Finishman (INSIDE)				✓	✓		✓	✓		✓	✓					✓				✓			✓								✓	✓		✓			✓	✓
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Lather (Wallboard Carp.)							✓			✓								✓																				
Tile Applicator							✓			✓								✓			✓	✓																
Cabinet Installer								✓	✓	✓						✓	✓						✓									✓				✓	✓	✓	✓
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Floor Layer				✓			✓	✓						✓		✓		✓					✓														✓	✓
Millman	✓	✓	✓	✓	✓		✓	✓			✓			✓									✓														✓	
Sash and Door Carpenter	✓	✓	✓	✓	✓	✓	✓				✓						✓	✓														✓						
Furniture Maker	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		✓	✓	✓	✓		✓	✓			✓									✓	✓	✓	✓	✓	✓	✓	✓
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Wood Turner					✓		✓	✓		✓	✓			✓	✓	✓		✓		✓			✓										✓		✓		✓	
Layout Man					✓		✓	✓		✓				✓	✓		✓	✓					✓										✓					✓
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Assembly Man	✓			✓	✓		✓	✓		✓				✓		✓			✓				✓									✓	✓	✓					
Boat Builder	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓								✓	✓	✓	✓	✓	✓	✓	✓
Model Maker			✓	✓	✓		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓
Mockup Man			✓		✓		✓	✓		✓		✓		✓			✓	✓	✓	✓			✓									✓	✓	✓	✓	✓			✓
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Metal Patternmaker							✓	✓		✓	✓	✓	✓					✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓	✓	✓				✓

BASIC WOODWORKING

Task 1. Reads blueprints.

C.O. 1 Given a blueprint, the student interprets the meanings of various lines and symbols, identifies dimensions, and extracts the pertinent facts such as scales, materials required, etc.

T.O. 1 Given a blueprint, the student identifies dimensions, interprets the meaning of various lines and symbols.

T.O. 2 Given a blueprint, the student identifies the dimensions, tolerances, and scales.

T.O. 3 Given a blueprint, the student identifies all views given and the relationship between the views.

T.O. 4 Given a blueprint, the student discriminates between isometric and orthographic projection and their applications.

T.O. 5 Given a blueprint, the student extracts information from the title block (such as materials used, quantity, scale, etc.).

Task 2. Makes measurements with the 1, 3, and 6-foot rule.

C.O. 1 Given a blueprint, stock or area to be measured, the student measures the required dimensions to $\pm$ 1/32 inch.

T.O. 1 Given a blueprint, prepared stock, and 1-foot, 3-foot, or 6-foot rule, the student measures the dimensions stated in the blueprint to $\pm$ 1/32 inch.

Task 3. Computes dimensions.

C.O. 1 Given a blueprint, the student computes the dimensions not indicated on the blueprint.

T.O. 1 Given a blueprint and pencil and paper, the student computes any required dimensions not indicated on the blueprint by subtracting or adding segments.

Task 4. Uses square to check flatness and squareness.

C.O. 1 Given a piece of planed stock and a square, the student positions the square on the stock and checks the flatness and squareness of the stock. (The blade of the square and the stock must be flush.)

T.O. 1 Given a framing square and combination square, the student identifies each by its function and appearance.

T.O. 2 Given a piece of planed stock and a square, the student checks the stock for flatness by placing the square on the surface (along the length, width, and from corner to corner), checking that the blade of the square is flush with <u>all</u> points.

T.O. 3 Given a piece of prepared stock and a square, the student checks the squareness of the edges and ends by positioning the inside edges of the square head and square blade on the edges and ends of stock. (The stock must be flush with the edges of the head and the blade.)

T.O. 4 Given two pieces of stock fastened together to form a square angle and a square, the student checks the squareness of the joint by positioning the outside edges of the blade and head on the inside of the joint and the inside edges of the blade and head on the outside of the joint. (All surfaces must be flush.)

Task 5. Makes stock lists.

C.O. 1 Given a blueprint or drawing of a job and pencil and paper, the student makes up a stock list by computing board feet of lumber and listing all materials and hardware required.

T.O. 1 Given a blueprint or a diagram of a job, pencil and a paper, the student makes a stock list by computing the board feet of lumber (to nearest board feet) and all materials and hardware required.

Task 6. Saws lumber.

C.O. 1 Given a piece of marked stock and various handsaws, the student selects the saw required to make the cut and cuts the stock along the marked lines.

T.O. 1 Given various handsaws, the student identifies each by its appearance and function.

T.O. 2 Given a piece of marked stock and a crosscut saw, the student saws the lumber to desired length along the markline (compensates for kerf).

T.O. 3 Given a piece of marked stock and a rip saw, the student saws the lumber to desired width along the markline (compensates for kerf).

T.O. 4 Given a piece of prepared and marked lumber, the student saws the lumber to desired shape along the cutting line, square to the surface.

Task 7. Uses hammer.

C.O. 1 Given a variety of hammers, nails, and stock to be nailed, the student selects a proper hammer and nails, and drives in the nails without damaging the stock or bending the nails.

T.O. 1 Given a variety of hammers, the student identifies each by its function, weight, and appearance.

T.O. 2 Given a claw hammer, nails and stock, the student drives in the nails into the stock without bending the nails or damaging the stock.

T.O. 3 Given a claw hammer, brads, and stock, the student drives the brads into the stock by toe-nailing (without bending brad or damaging the stock).

C.O. 2 Given a bent nail (driven in wood) and a claw hammer, the student removes the nail without damaging the stock.

T.O. 1 Given a bent nail (driven in wood) and a claw hammer, the student removes the nail from the wood without damaging the surface or hammer. (This can be accomplished by placing a piece of flat material between the head of the hammer and the surface of the stock.)

Task 8. Uses the bit brace.

C.O. 1 Given a bit brace and various bits, the student identifies the bits and installs them into the brace.

T.O. 1 Given a bit brace and various bits, the student associates the bits with their uses and installs bits into braces so that they are straight.

C.O. 2 Given a bit brace with an installed bit, the student bores or countersinks holes or tightens screws without damaging the stock, bit, or screw heads.

T.O. 1 Given a bit brace and an installed auger bit and a piece of marked stock, the student bores a hole in the stock and prevents the splintering by backing the stock with scrap material or reversing the boring as soon as the spur penetrates the stock.

T.O. 2 Given a bit brace, an installed countersink, and stock with bored holes, the student countersinks the holes to form a 1/8 inch countersink or chamfer.

T.O. 3 Given a bit brace, an installed screwdriver bit, and partially installed screws, the student tightens the screws without damaging the screw heads, the stock, or the bit.

Task 9. Identifies lumber.

C.O. 1 Given various samples of lumber, the student identifies each by its characteristics, grades, and uses.

T.O. 1 Given several pieces of stock, the student will identify each piece by its color and grain structure.

T.O. 2 Given several pieces of stock, the student states the grade by its labels and imperfections.

T.O. 3 Given various pieces of identified stock, the student states the common application or uses of each.

Task 10. Planes lumber.

C.O. 1 Given a variety of planes, the student identifies each plane and dissembles and assembles each.

T.O. 1 Given various planes, the student will identify each by its characteristics and functions.

T.O. 2 Given various planes, the student disassembles and assembles each and adjusts the blade to various depths.

C.O. 2 Given a plane, grinder, India stone, and strop, the student sharpens the plane blade.

T.O. 1 Given a plane blade, a grinder, #2 fine India bench stone, and a strop, the student sharpens the plane blade to a razor-sharp edge.

C.O. 3 Given a piece of marked stock to be planed and a variety of planes, the student selects the proper plane and planes the stock to desired dimensions.

T.O. 1 Given a piece of stock to be planed and various planes, the student associates the type of plane with the planing required.

T.O. 2 Given a selected plane and a piece of marked stock, the student planes the stock flat and smooth.

TABLE OF CONTENTS - 10TH GRADE

GENERAL WOODWORKING (BASIC)

1. Observe general safety rules in the woodworking shop.
2. To tell or state what various lines and symbols on a blueprint mean.
3. To tell the difference between isometric and orthographic projection.
4. To recognize all views and the relationship between them.
5. Locate all dimensions on the drawing and be able to state the dimensions between all important points.
6. To extract and use information from a title block.
7. Identify various parts of a tree and how it is cut into lumber.
8. Describe how lumber is seasoned.
9. Recognize defects in lumber and how lumber is graded.
10. Recognize and state the standard measurements to which lumber is sawed.
11. Identify the common woods used in the woodworking industry.
12. Recognize the differences between plywoods.
13. Identify various types of hardboards and their uses.
14. Using the one-, three-, and six-foot rule.
15. Identify various types of planes by how they look and what they are used for.
16. Disassemble (take apart), assemble (put together), and adjust the plane blade to various depths.
17. Sharpen the plane blade by using the grinder, benchstone and strop.
18. Identify various saws and what they are used for.
19. Selecting proper saws for given sawing assignments.

20. To saw stock to size with a crosscut saw and a ripsaw.

21. To identify various squares by what they look like and what they are used for.

22. Planing stock flat and smooth.

23. To test edges of lumber for squareness and straightness.

24. To identify various layout tools by their appearance and functions.

25. To disassemble, assemble, and adjust the block plane.

26. To square an end, using hand tools, straight and square to a working face and edge.

27. To cut and plane a piece of stock to length.

28. To dress a piece of stock to thickness so that the surface is parallel to the working surface and is flat and smooth.

29. To cut and plane a piece of stock to width, straight and square to the working surfaces, using hand tools.

30. To produce a beveled edge on a piece of stock, using hand tools.

31. To plane a 45-degree chamfer to blueprint specifications.

32. To identify various types and grades of abrasive papers by their appearance and functions.

33. Selecting the appropriate abrasive paper and sand a job to desired smoothness.

34. Identifying glues by their characteristics and functions.

35. Preparing wood for gluing and selects the most appropriate glue to be used.

36. Identifying various types of clamps by their appearance and function.

37. Gluing and clamping stock to desired width.

38. Identifying the glue scraper by its appearance and function.

39. Using the glue scraper.

40. Bisecting a line, an angle, and an arc.

41. Drawing a line perpendicular to a line, a perpendicular from a point to a line, and a perpendicular at the end of a line.

42. To lay out outside and inside corners.

43. To lay out a simple job from blueprint specifications using selected layout tools.

44. Using the coping saw.

45. To identify various gouges by their appearance and function.

46. Using the appropriate gouge and paring inside radii to size.

47. Identifying chisels by their appearance and function.

48. Using the appropriate chisel to pare stock to shape.

49. Identifying different types of templates by their appearance and function.

50. Making a simple template.

51. Identifying various boring tools by their appearance and function.

52. To identify hole drilling cutters by their appearance and function.

53. Boring holes with a bit and brace.

54. Counter sinking a hole in wood using a countersink bit and brace.

55. To identify files by their appearance and function.

56. Selecting the appropriate wood file for smoothing edges and corners.

57. Sandpapering curved edges and corners.

58. Sharpening an auger bit.

59. To identify hammers and mallets by their appearance, weight, and function.

60. Identifying nails and brads by their size, appearance, and function.

61. To drive nails properly without bending the nail or splitting the stock.

62. Using the claw hammer to draw out nails without damaging the work.

63. Identifying screws by their size and appearance.

64. Fastening stock with screws.

65. Making up a stock list.

66. Joinery.

67. Machine woodworking.

68. Wood finishing.

Name _____

Unit 15

Date Started _____

Date Completed _____

PLANING LUMBER

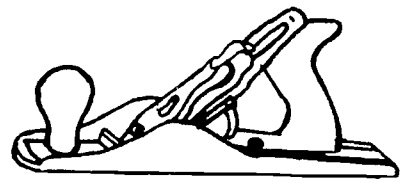
OBJECTIVE B: Disassemble (take apart), assemble (put together) the plane, and adjust the plane blade to various depths.

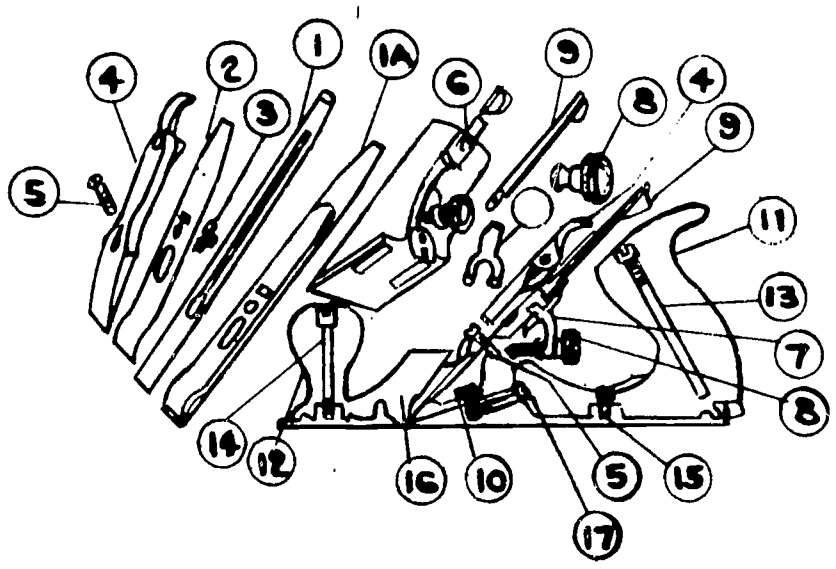
EQUIPMENT AND MATERIALS REQUIRED: Smoothing, jack, or jointer plane; scrap stock.

OVERVIEW: In order to use a plane efficiently, you should be able to disassemble, assemble, and adjust the cutting blade to a proper depth. When you finish this unit, you will be able to do this with jack, smoothing, and jointer planes.

LEARNING ACTIVITIES:

a. Look at the picture on the following page and study it very carefully. Each part of the plane is labeled. You will have to know each part in order to disassemble and assemble the plane. Check off the name of each part after you think you have memorized it.





PARTS OF A HAND PLANE

1A	DOUBLE PLANE IRON
1	SINGLE PLANE IRON
2	PLANE IRON CAP
3	CAP SCREW
4	LEVER CAP
5	LEVER CAP SCREW
6	FROG COMPLETE
7	"Y" ADJUSTING LEVER
8	ADJUSTING NUT
9	LATERAL ADJUSTING LEVER
10	FROG SCREW
11	PLANE HANDLE
12	PLANE KNOB
13	HANDLE BOLT & NUT
14	KNOB BOLT & NUT
15	PLANE HANDLE SCREW
16	PLANE BOTTOM
17	FROG ADJUSTING SCREW

b. Take out the plane which is in your tool kit. What kind of a plane is it?

_____

Look at the plane very carefully and match its parts with the pictures on the previous page. MAKE SURE YOU KNOW EACH PART BEFORE YOU DISASSEMBLE THE PLANE.

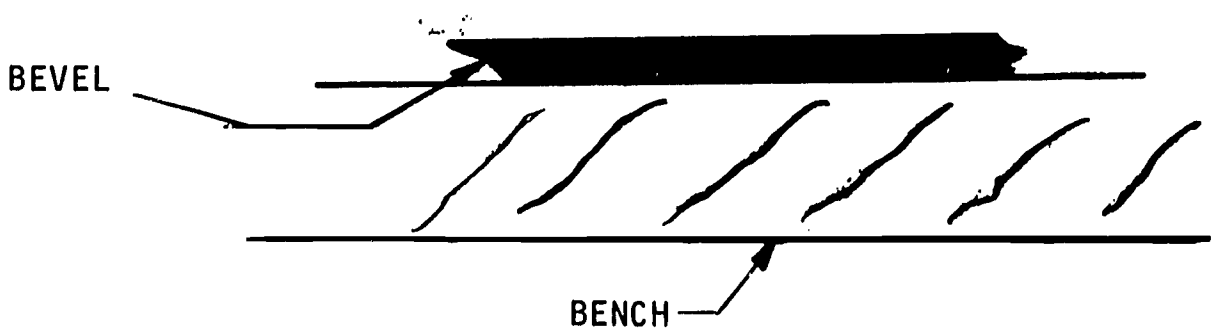
c. Go over to your instructor and point out the parts of the plane to him. The instructor will tell you if you are ready to disassemble the plane.

S _____ U _____ Instructor's Initials _____

d. Now you should be ready to take your plane apart. The steps are listed below.

1. Lift the cam lever on the lever cap (4 on the picture of the plane) and lift the lever cap from the plane. This will permit you to remove the double-plane iron (1 and 2).

2. Lift off the double-plane iron (1 and 2). Using the narrow edge of the lever cap (4) as a screwdriver, loosen the cap screw (3) about two turns to the left. Slide the plane-iron cap back, away from the cutting edge. Turn the plane iron cap (2) to the left or right. THE PLANE-IRON CAP MUST NOT TOUCH THE CUTTING EDGE. Now slide the plane-iron cap down on the plane-iron slot and lift off the plane-iron cap. Lay the parts down on the bench. THE BEVEL OF THE PLANE IRON MUST FACE DOWN. (See picture below.)



You have now disassembled your plane. This is as much as you need to do. DO NOT TRY TO TAKE ANY OTHER PARTS APART. The other parts are adjusted permanently at the factory. If you have any trouble with your plane, check with your instructor.

e. Now you should be ready to assemble the plane. The steps are listed below.

1. Lay the plane-iron cap on the flat side of the plane iron, as shown in Figure 1, with the screw in the slot.

2. Move the plane-iron cap back.

3. Turn the plane-iron cap so that it is straight with the plane iron. MAKE SURE THAT THE PLANE-IRON CAP DOES NOT TOUCH THE CUTTING EDGE. The plane-iron cap must be placed so that the bevel faces down.

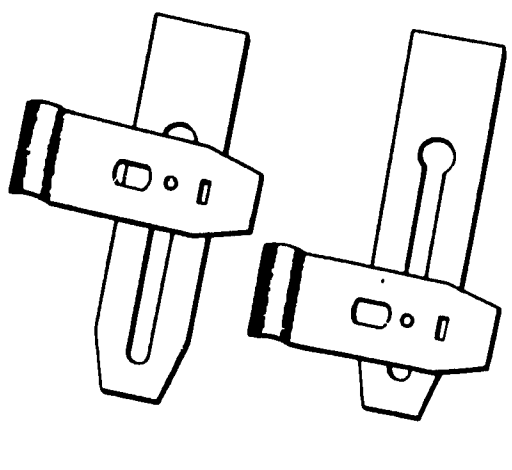


Figure 1

4. Now move the plane-iron cap up until it is about 1/32" away from the cutting edge. See Figures 2 and 3 on the following page. DO NOT DRAG THE PLANE-IRON CAP ACROSS THE CUTTING EDGE.

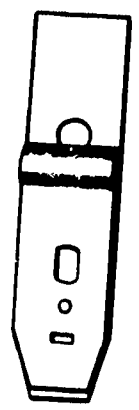


Figure 2

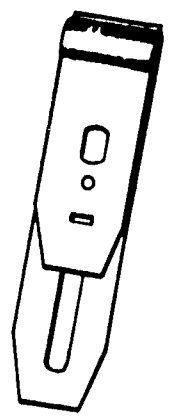
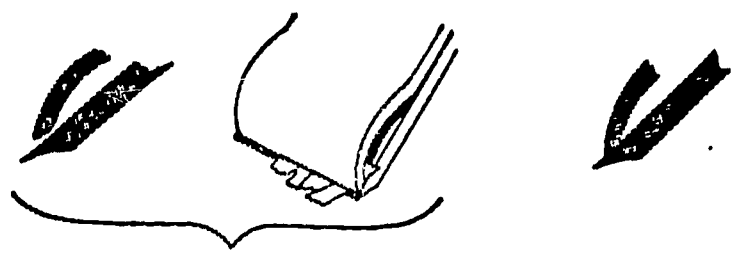


Figure 3

5. Now pick up your lever cap and tighten the plane-iron cap screw.

6. Check to see if the plane-iron cap is properly installed. The picture below (Figure 4) shows poorly fitted and properly fitted plane-iron caps. A properly fitted plane-iron cap will prevent shaving from wedging under it, piling up, and choking the plane.



POORLY FITTED PROPERLY FITTED

Figure 4

7. Check with your instructor to see if everything is okay up to this point.

S _____ U _____ Instructor's Initials ____

The next series of steps will take you through the final assembly of the plane.

1. Refer back to the picture of the plane at the beginning of this unit. It will help you to assemble the plane properly.

2. Pick up the plane with your left hand. Then pick up the double-plane iron (1 and 2) and lay it on the frog with the plane-iron cap facing UP. (The roller on the lateral adjusting lever (9) must fit into the slot of the plane iron and the Y adjusting lever (7) must fit into the slot of the plane-iron cap.) (See Figure 5 below.)

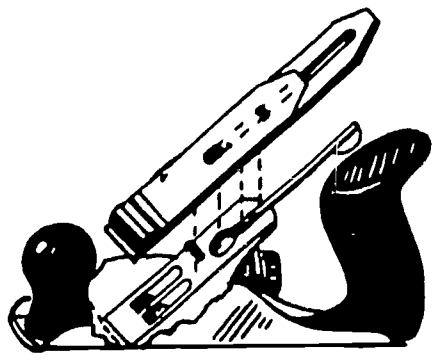


Figure 5

3. Slip the lever cap under the lever-cap screw (5) and press down the cam. (See Figure 6.) If the plane iron is in the correct position, the cam will easily snap in place. If the cam will not snap in place easily, <u>loosen</u> the lever-cap screw slightly. If the plane iron is not firmly held when the cam is in place, <u>tighten</u> the lever-cap screw.

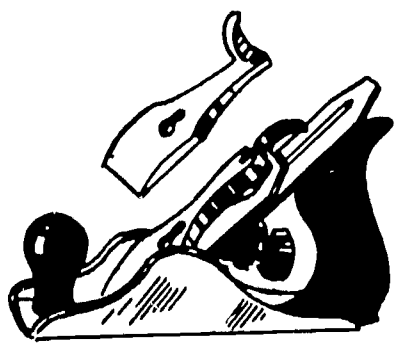


Figure 6

4. The lateral adjusting lever (9) must move easily. The pressure of the lever cap should be just tight enough to allow the depth and lateral movements of the plane iron to be made easily. It should also be tight enough to hold these adjustments in place.

5. Now have your instructor check you out at this point.

   S _____ U _____ Instructor's Initials _____

Now you should be able to adjust your plane to cutting depth. Follow the steps which are listed below.

1. Hold the plane in your left hand by its knob. Hold the plane against a light background and sight along the bottom of the plane.

2. Turn the adjusting nut (8) until the cutting edge sticks out about 1/32". The plane iron is pushed <u>out</u> when the adjusting nut <u>moves out toward the handle.</u>
   The plane iron is drawn <u>in</u> when the adjusting nut <u>moves in toward</u> the frog.

3. When the blade projects (sticks out) about 1/32", you may see that the blade may be higher on one side. You can fix this by moving the lateral adjusting lever either to the left or right until the blade shows evenly on both sides. (See Figure 7 below.)

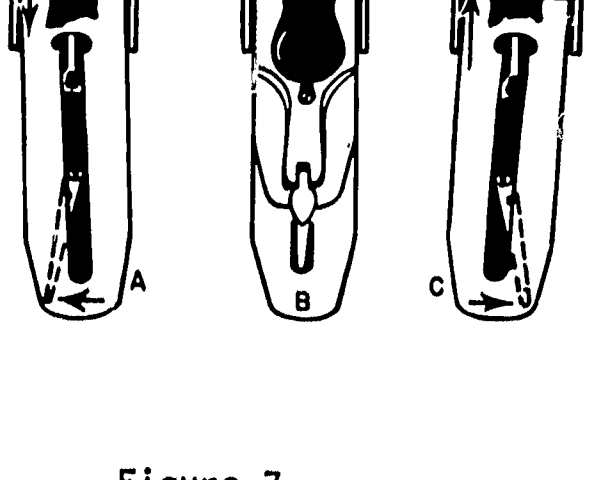


Figure 7
(Knob, lever cap and plane-iron cap removed to show how the lateral adjusting lever works.)

4. A final check can be made by planing the surface of a piece of stock. The blade should be adjusted so that you will get a smooth, thin shaving when planing a surface or an edge.

5. Have your instructor check your work up to this point.

   S _____ U _____ Instructor's Initials _____

Comments _____

_____

OPTIONAL READING: If you are not sure of yourself when working with planes, read pages 113 to 120 and 132 to 137 in Hand Woodworking Tools by Delmar.

SUMMARY:

In this unit you have learned how to disassemble, assemble, and adjust your plane. This knowledge will be useful to you when you are required to sharpen and work with your plane.

Name _____

Date _____

STUDENT EVALUATION

Unit 15

1. List the steps (in order) in disassembling a plane.

   1. _____
   2. _____
   3. _____
   4. _____
   5. _____
   6. _____
   7. _____
   8. _____
   9. _____
   10. _____

2. List the steps (in order) in assembling a plane.

   1. _____
   2. _____
   3. _____
   4. _____
   5. _____
   6. _____
   7. _____

8. _____

9. _____

10. _____

3. Disassemble your plane for the instructor.

Procedure	S _____	U _____
Safety Precautions Observed	S _____	U _____

4. Assemble your plane for the instructor.

Procedure	S _____	U _____
Safety Precautions Observed	S _____	U _____

5. Adjust your plane for the instructor.

Proper Depth	S _____	U _____
Blade Even Across Width	S _____	U _____

Student must get every item correct.

Instructor's Initials _____

Comments _____

_____

Quincy Vocational-Technical School
Project ABLE

General Woodworking
Basic Woodworking

Name _____

Date Started _____

Date Completed _____

Unit 21

PLANING LUMBER

OBJECTIVE D: Planing stock flat and smooth.

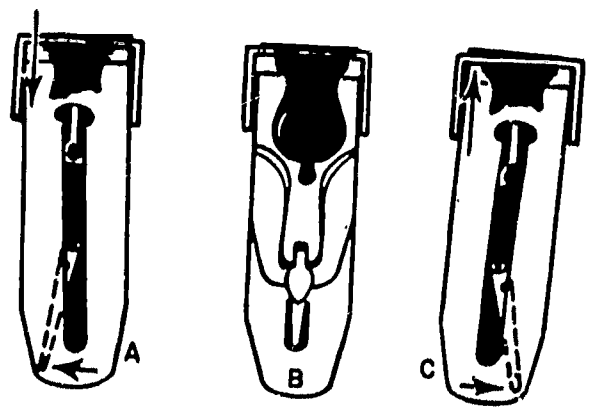
EQUIPMENT AND MATERIALS REQUIRED: Various hand planes, try square, stock for sanding block.

OVERVIEW: In one of the previous units, you have cut out a piece of stock for the sanding block. The next step is to plane one surface of the stock smooth and flat. This unit will take you through the steps to do this.

LEARNING ACTIVITIES:

In previous units, you have learned what different planes are used for, how to disassemble and assemble them, how to sharpen plane blades, and how to adjust the plane.

A properly adjusted plane will take off a long, thin, tissue-like shaving. The plane blade must be adjusted so that it is even across the width or sole of the plane. (See the picture on the following page.)



Position B shows correct adjustment.

Another thing to remember is that you must keep the plane flat on the stock when you are planing it. You must also maintain an even pressure on the stock when you use the plane.

As you use a plane, you may find that quite a bit of friction develops between the stock and the sole of the plane. You can reduce the friction by rubbing a piece of paraffin on the sole.

a. Get the piece of stock which you have cut out in a previous unit--(Unit 19). This is the stock which will eventually become the sanding block.

   The first thing that you must do now is to plane one surface flat and smooth. To accomplish this, you will have to select a proper plane, secure the stock, and plane the surface. The surface will have to be checked with a square for straightness.

b. Now you must select the plane which you will use to smooth the surface. What plane would you pick?

   _____

   Why? _____

c. Adjust your plane to the proper depth.

d. Pick up the piece of stock and look it over carefully. Ask yourself the following questions.

1. Does it have any defects? _____

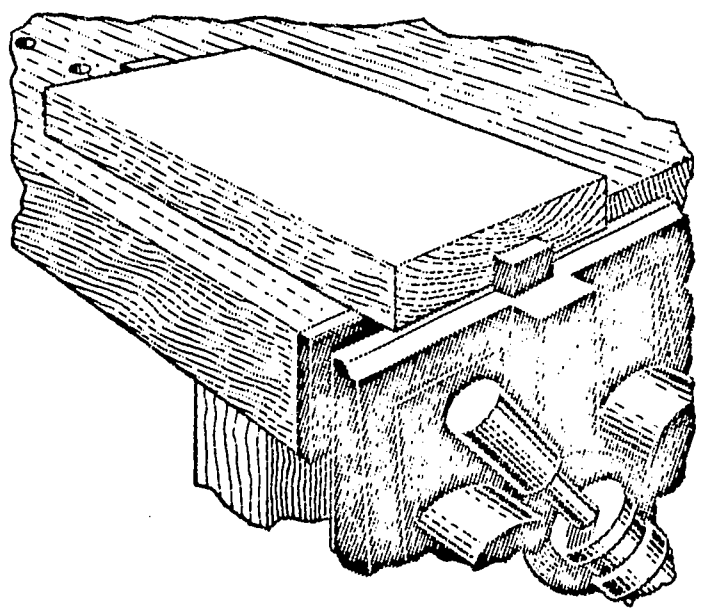
2. What kind of stock is it? _____

3. Which way does the grain run? _____

Mark the direction of the grain with a pencil.

Sometimes it is pretty hard to tell the direction in which the grain runs. One of the ways to tell is to take a couple of strokes with the plane on the stock. If the plane lifts the grain as you are planing, you are going against the grain. In this case, you will have to reverse the piece. This will also indicate to you if you have adjusted the plane properly.

Be sure to place your bench stop in position to hold the piece and prevent it from slipping. You may be able to hold it with the vise only, if the piece fits. (See the picture below.)



e. When you have selected your plane and have it properly adjusted, position your piece of stock on the bench or in the vise. Ask your instructor to check your work up to this point.

S _____ U _____ Instructor's Initials _____

Comments _____

_____

f. Look at the chart, "How to Use the Stanley Plane." You will see the starting position, direction of the grain, the beginning of the stroke, and its ending. Notice how pressure is kept evenly on the wood.

REMEMBER--YOU MUST PLANE <u>WITH</u> THE GRAIN.

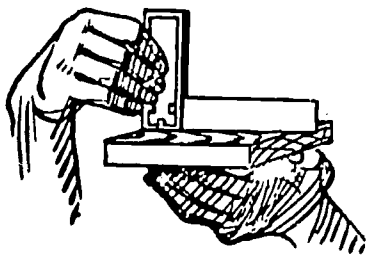
g. Take your first stroke with the plane. If the fibers of the wood seem to lift leaving a pitted surface, it is an indication that you are planing against the grain and the position of the stock should be reversed.

h. Continue planing the surface of the board with slow, steady strokes until you can see smooth lumber on the entire surface area. When you reach this point, it is time to check for levelness. There are two ways to do this. These are described below.

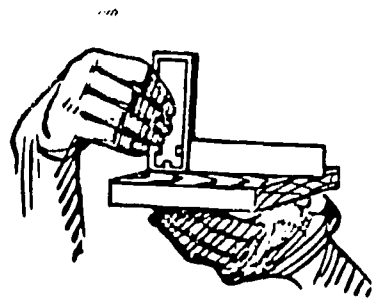
<u>Method 1</u>.

A. Get your square blade.

B. Position the blade on its edge as shown below.



TESTING FACE FOR STRAIGHTNESS ACROSS LENGTH

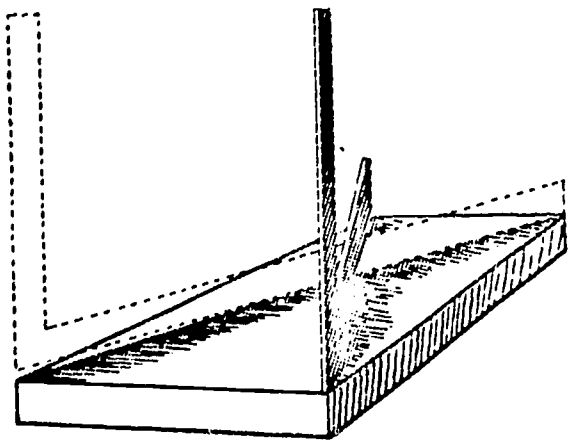


TESTING FACE FOR STRAIGHTNESS ACROSS WIDTH

C. Hold the square and the board towards the light. The light will show through the low spots.

D. With your pencil, mark all the high spots which will have to be planed off.

E. The surface can be checked completely by placing the blade edge on the planed surface and then sliding the blade across the full length, width, and diagonally across the corners as shown below.



If you have a piece of graphite crayon, you can rub it on the edge of the square blade. This will help you locate the high spots much easier.

F. If the surface does not test true and the high spots are marked, continue to plane until the surface is true and no light appears under the square blade when you drag it across the surface.

Method 2.

The second method for testing a flat surface is by using the surface plate, which you can find on your bench.

A. Rub white chalk on the surface of the plate. (The plate is flat and very smooth.)

B. When the surface plate is chalked, lay the planed side of your stock on the plate and rub the stock against the plate with circular motions.

C. Lift the stock up and you will see where the chalk dust shows all the high spots on the planed surface.

D. Using short strokes (if necessary), plane off the high spots until the surface of your stock shows a thin layer of chalk dust over the entire planed surface when you rub it against the plate.

E. You can check the surface with a square blade to be sure that the surface is flat.

i. When the stock is smooth and flat, lightly mark the surface "WF" with your pencil. This surface will be a reference point for determining other dimensions of the sanding block.

j. In the model rack, you will find a demonstration model of the Sanding Block (No. 2) which has been completed to this point. How does your surface compare with the surface of the model? It should look as good or better.

k. Take your work to your instructor so that he can check it.

S _____ U _____ Instructor's Initials _____

Comments _____

_____

The surface must meet the approval of the instructor before you can take the evaluation.

OPTIONAL READING: You can find more about planing faces of stock in the following books:

Hand Woodworking Tools by Delmar, pages 120 to 122.

Technical Woodworking by Groneman and Glazener, pages 122 to 123.

SUMMARY:

You have just completed the first step in dressing a piece of stock (milling) with hand tools. You have also planed one surface smooth, flat, or true, which will be your reference point or working face (WF).

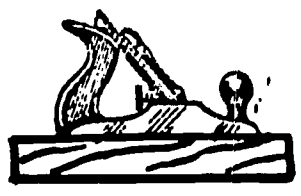
Name _____

Date _____

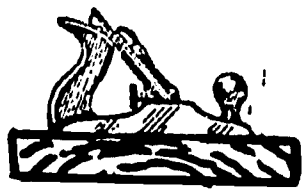
STUDENT EVALUATION

Unit 21

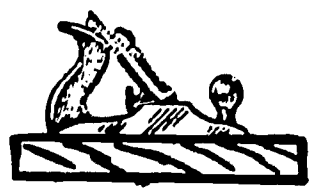
1. Which sketch below shows the proper direction of the plane when you are planing a surface?



A



B



C

2. List the steps used to test a flat surface for straightness (for both methods).

Method 1.

_____

_____

_____

Method 2.

3. Explain how pressure is to be applied to a plane when you are planing a surface.

4. State the two ways that stock may be held in place when you are planing it.

1. _____

_____

_____

_____

2. _____

_____

_____

_____

5. Demonstrate to your instructor how the square blade is used for testing a true surface.

S _____ U _____

Instructor's
Initials _____

Student must get all questions correct.

Instructor's
Initials _____

Comments _____

_____

Date _____

QUINCY VOCATIONAL-TECHNICAL SCHOOL
QUINCY, MASSACHUSETTS

Project ABLE
Unit 27
Activity--Preparing Stock

Vocational Family--General Woodworking
Course--Basic Woodworking
Date Started _____
Date Completed _____

Name _____

OBJECTIVE:

To dress a piece of stock to thickness so that the surface is parallel to the working surface and is flat and smooth.

EQUIPMENT AND MATERIALS REQUIRED:

1. Blueprint S-1, "The Sanding Block"
2. Scratch Gage (Marking Gage)
3. Pencil with a chisel point
4. Try Square
5. Hand Plane
6. Measuring Rule
7. Chalk and Surface Plate (optional)
8. Sanding Block (stock with a W.F., W.E., working end--cut to length)

OVERVIEW:

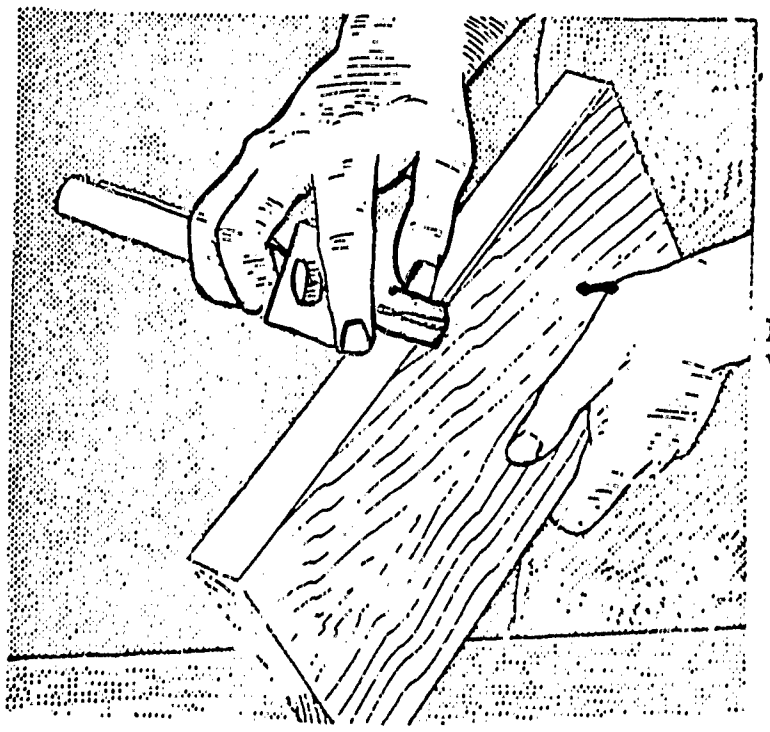
In doing any woodworking job, it is necessary to cut and shape the piece or pieces to size. The size may be the whole job or part of a number of pieces used to complete the job. First, the piece or pieces are cut to a rough size. You should allow at least 1/8 to 1/2 inch to the length and width. Generally, the rough thickness is determined by the thickness of stock available. This may be 1/4- to 1/2-inch thicker than the actual size of the part or job. This allowance will enable you to trim any deformities in the stock. Then you can obtain the true, smooth, surface required in woodworking. The operation of taking off excess stock to obtain a desired size is called dressing stock to size or dressing the stock. Another term often used is milling the stock to size.

From your Units 21 and 22, you obtained a working face (W.F.) and a working edge (W.E.) on your sanding block. Your next task is to dress your piece to the required thickness, parallel to the working surface.

LEARNING ACTIVITIES:

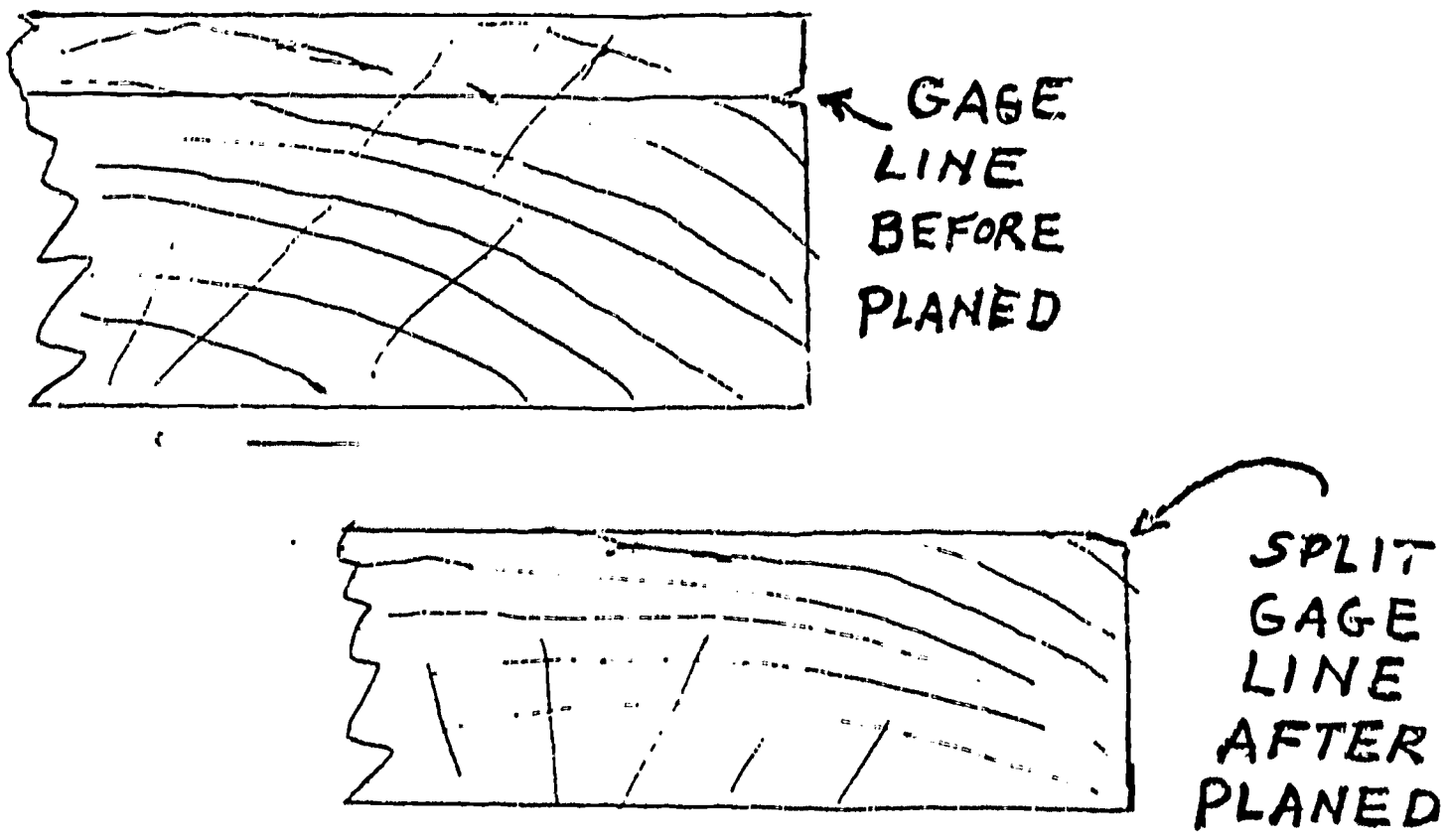
a. Set your Marking Gage to the required thickness by placing the head of the gage against the end of your rule. Then slide the beam until the spur fits the desired dimension line.

b. With the head of the Marking Gage held firmly against the working face (W.F.), mark the stock to thickness. Mark all around the edges as shown below. Then mark the line with a chisel point Pencil.

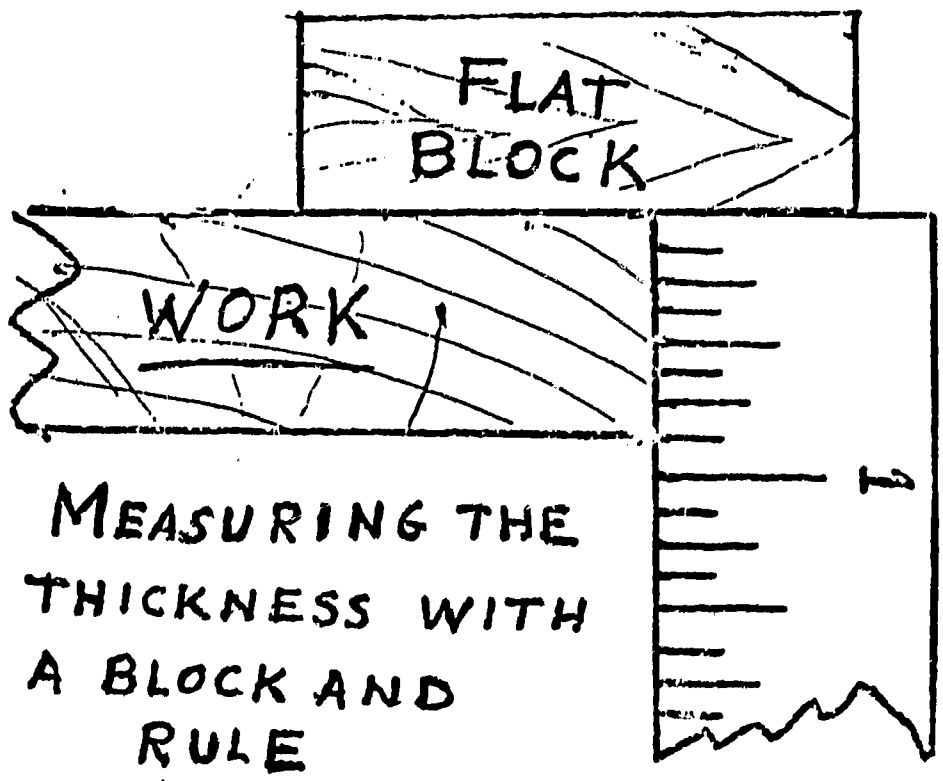


Marking stock to thickness with marking gauge

c. Using your bench stop or vise, position the stock in the proper planing position. Plane the surface down until you have split the thickness line (see picture below). Test often for levelness and for wind. Use your square or surface plate as you did for acquiring the working face (W.F.).



d. Check the stock for proper thickness. Do this by measuring, carefully, at several points on both edges and ends. (See sketch below.)



MEASURING THE THICKNESS WITH A BLOCK AND RULE

e. Set the plane for a very light cut. Check the surface with a square or surface plate. Plane carefully any high spots that still remain.

f. When you think your block is done accurately, compare it with the learning aid sample in the learning aid cabinet (marked sanding block). The quality and accuracy must be as good or better. If it is, call your instructor over to your bench and have him check it out.

SUGGESTION:

Before you call your instructor, you can accurately find out how close you are to having the stock parallel and accurate. Set a pair of outside calipers to the required dimension. Slide the calipers across the thickness at several places from the edges and ends. The jaws or legs of the calipers must slide along the thickness, just barely touching the surfaces. If the calipers slide too loosely or bind, get another piece and try again (or plane down the high spots until the calipers fit properly). If the thickness is within 1/32 inch of the dimension on the print, call your instructor to check your work.

S _____ U _____ Instructor's Initials _____

Comments: _____

_____

OPTIONAL READING OR VIEWING:

Film strip #002/09. Title: Squaring a Board to a Specified Size.

Hand Woodworking Tools by Delmar, pages 120-127.

SUMMARY:

In accomplishing the objective required by this unit you have learned how to dress a piece of stock, using hand tools, to thickness. This is the fifth step in Dressing Stock to size. You have also learned the most accurate method for measuring the thickness of a board. This is done with a rule and a pair of outside calipers.

QUINCY VOCATIONAL-TECHNICAL SCHOOL
QUINCY, MASSACHUSETTS

Project ABLE
Unit 27
STUDENT EVALUATION

Vocational Family--General Woodworking
Course--Basic Woodworking

Name _____

Use Trainer-Tester Response Card TT No. 2-11. Use blocks 21-25 on card marked #25.

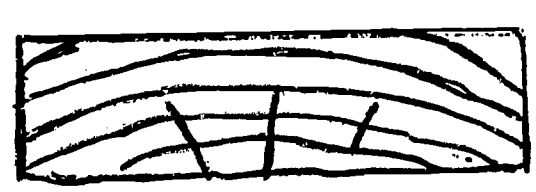
1. Lines locating the thickness of a board are applied by:

   a. a chisel-point pencil and ruler.
   b. planing stock until you meet a pencil line and often checking the thickness with outside calipers.
   c. using a scriber and a metal straight edge, usually a square blade.
   d. using a marking gage held firmly against the working face.

2. The two most accurate methods for measuring the thickness of stock is by:

   a. splitting the line and checking it with a square blade.
   b. using a pair of calipers and a scratch gage set to dimension.
   c. having a flat piece of stock against the W.F. and butt the end of a rule up against it; and using a pair of outside calipers.
   d. checking the surface with a square blade and using a pair of outside calipers.

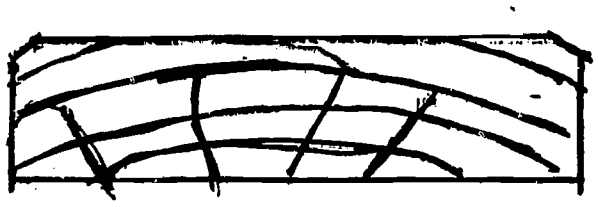
3. Which of the cross-sectional sketches below best show splitting a line when planing to a thickness.



A

B

C



D

4. To use a marking gage properly, it is:

   a. pushed in the direction away from you while keeping the head firmly against a working face.
   b. pushed away from you while keeping the head firmly against a working end.
   c. pulled toward you while keeping the head firmly against a working face.
   d. pulled toward you while keeping the head firmly against a working end.

5. Which of the steps below have you just completed in dressing a piece of stock?

   a. Planed a working surface flat and smooth.
   b. Planed an edge straight, square, and smooth to the W.F.
   c. Planed two surfaces to thickness flat and true.
   d. Planed a surface flat and smooth to thickness.

Student must answer all five questions correctly.

Instructor's Initials _____

Comments: _____

	S	U
Effort		
Conduct		
Attitude		
Neatness		
Application of Previous Material		
Cooperation		
Accuracy		

Refer to criteria sheet for woodworking.