Lesson A3–2

Using Hand Tools

Unit A. Mechanical Systems and Technology

Problem Area 3. Construction Systems

Lesson 2. Using Hand Tools

New Mexico Content Standard:

Pathway Strand: Power, Structural and Technical Systems

Standard: VII: Develop skills required to use construction/fabrication equipment and tools.

Benchmark: VII-A: Use tools in the workplace to demonstrate safe and proper skills with construction/fabrication hand tools.

Performance Standard: 1. Demonstrate proper use of measurement and layout tools. 2. Apply proper use of measurement and layout tools in construction/fabrication of an actual project. 3. Demonstrate safe and proper techniques in using hand and power tools in construction/fabrication.

Student Learning Objectives. Instruction in this lesson should result in students achieving the following objectives:

1. Discuss how to select hand tools.
2. Identify and explain how to use layout tools.
3. Identify and explain how to use cutting, shaping, and boring tools.
4. Identify and explain how to use holding and turning tools.
5. Identify and explain how to use driving and wrecking tools.
List of Resources. The following resources may be useful in teaching this lesson:

**Recommended Resources.** One of the following resources should be selected to accompany the lesson:


**Other Resources.** The following resources will be useful to students and teachers:


List of Equipment, Tools, Supplies, and Facilities

- Writing surface
- Overhead projector
- Transparencies from attached masters
- Copies of student lab sheets
- Set of carpentry hand tools

Terms. The following terms are presented in this lesson (shown in bold italics):

- 100 foot wind up tape
- Adjustable jaw wrenches
- Auger bit
- Backsaw
- Bar clamp
- Blacksmith’s vise
- Block plane
Box-end wrenches
Brace
Carpenter's pencil
Cat's paw
C-clamp
Center punch
Chalk line
Combination open-end box-end wrench
Combination pliers
Combination square
Coping saw
Crosscut saw
Crow bars
Curved claw hammers
Diagonal side cutting pliers
Digital level
Fixed jaw wrenches
Flat bars
Framing square
Hand drill
Hand screw clamp
Hand tool
Jack plane
Keel or carpenter's crayon
Keyhole or compass saw
Layout tool
Line level
Locking tape measures
Locking pliers
Machinist's vise
Marking gauge
Miter clamp
Needle nose or long round nose pliers
Open-end wrenches
Phillips or cross point screwdrivers
Pipe vise
Pipe wrenches
Plane
Plumb bob
Power tool
Push drill
Rasplane
Ripsaw
Rubber mallets
Rulers
Scratch awl
Set screw or Allen wrenches
Sledge hammer
Sliding T-bevel square
Smoothing plane
Socket sets
Speed square or rafter square
Spirit levels
Spring clamps
Square
Standard English measurement
Standard or flat blade screwdrivers
Straight claw hammers
Strap clamp or pony clamp
Tack puller
Tool
Try square
Utility vise
Wood chisel
Wood rasp
Wooden folding rules
Wooden mallets

**Interest Approach.** Use an interest approach that will prepare the students for the lesson. Teachers often develop approaches for their unique class and student situations. A possible approach is included here.

Display a variety of hand tools, tour a hardware store to look at tools, or go to an internet web site to view tools (i.e. www.stanleyworks.com/ or www.toolsource.com/). All people in our society either use hand tools or pay others who use hand tools. Ask students if they know the names of the tools and how to use them. Compare cheap tools with quality tools. Talk about the importance of using the right tool for the job. Explain when a hand tool must be used instead of a power tool.
Summary of Content and Teaching Strategies

Objective 1: Discuss how to select hand tools.

Anticipated Problem: How can I know what tool to select and use?

I. Hand tools are the most effective and efficient way to do many jobs. A tool is any instrument used in doing work. A hand tool is any tool operated by hand to do work. It is used to do a task or job that could not be done with the bare hand or without the tool. This is contrasted with a power tool, which is operated by some source of power other than human power.

A. Use hand tools when electrical or engine power is not available. Hand tools are used to do the small jobs and to do the work where large machines cannot function. Knowing how to use a hand tool helps when using a power tool designed for the same type of job.

B. Begin by selecting a quality tool. Good tools cost a little more than inferior tools but are worth the added investment. Buying brand names recognized as high quality is usually best.

C. Select the right tool to do a job and use it properly. Using the wrong tool can be dangerous, can damage the tool, and results in inferior work. Using the right tool in the wrong way is also dangerous.

D. Evaluate the job to be done and study information available to know the type and size of tool needed to successfully complete the job. For example a 12 oz. hammer would be good for driving brads while a 16 or 20 oz. hammer would be better for driving large nails.

E. Consider the number of times you will use the tool and the cost of the tool to determine whether to buy or rent the tool.

Students should be assigned readings in the reference texts listed at the beginning of the lesson. Compare a cheap hammer to a brand name quality hammer to see the difference in how they feel and how they drive nails. Do a price comparison on cheap vs. professional quality hand tools. Show how much easier it is to do a quality job using the right tool (Ex. open a paint can with a screwdriver and a paint opener or cut a slot in wood with a screwdriver, pry bar, and wood chisel). Complete the LS: A3–2A that matches the right tool to the job.

Objective 2: Identify and explain how to use layout tools.

Anticipated Problem: What tools are needed to measure and mark materials in layout?

II. A layout tool is a tool used to measure or mark wood, metal, and other materials.

A. Measuring is normally done using rulers, wooden folding rules, measuring tapes, or 100 foot wind up tapes. Rulers can be one foot, yardsticks, and meter sticks. Wooden folding rules are generally 6 foot long and their rigidness makes them useful in making vertical measurements. Locking tape measures come in lengths ranging from 6 foot to 30 foot, a width of ½ to 1 inch, they lock open, and use a spring to retract the tape with the push
of a button. The **100 foot wind up tape** is useful in building layout work where distances over 30 feet must be measured. Most construction in this country is done using **standard English measurement** units of inches, feet, and yards. Metric measurements using millimeters, centimeters, and meters is used in many other countries.

B. A carpenter may need to mark wood, formica, drywall, concrete, tile, etc. Marking tools include pencils, knives, marking gauges, and chalk lines. In contrast to a typical round pencil a **carpenter’s pencil** is flat-sided, more durable, and is sharpened with a utility knife. Its durability and the fact that it won’t roll away when set down on a board makes it a good choice for a carpenter. A **keel** or **carpenter’s crayon** is similar to a grease pencil and may show up better in some types of layout work than a pencil. Blue and red show up well on rough lumber and concrete while white works best on new concrete. A **marking gauge** uses a ruler with a wooden clamping block and a marking pin to mark lines parallel to the edges of material. A **chalk line** is a 50 to 100 foot string wound inside a box filled with powdered chalk dust. When used to mark, it must be stretched tight and pulled straight up when snapped to mark the material. If metal is marked, a **scratch awl**, a pointed metal tool with a handle (resembles an ice pick), is used to mark lines and a **center punch**, a punch ground to a 60 degree angle point, is used to mark a metal location prior to drilling.

C. Some things a carpenter builds are either square or rectangular. A **square** is a tool used to mark square straight lines for cutting, laying out angles, marking rafters, etc. The question is which square should be used. The **framing square** has a blade which is 24 inches long and 2 inches wide and a tongue that is 16 inches long and 1½ inches wide. It is used for squaring wide boards and laying out rafters and stairs. The **try square** is a rigid square like the framing square only smaller, commonly 8 inches long. A **sliding T-bevel square** is adjustable so that it can be set at any angle from 0 to 180 degrees to transfer the angle to another board. A protractor is a tool used to measure the number of degrees in a given angle. A **speed square** or **rafter square** is a small triangular square that can be used to mark both square and angled cuts. It can be used to mark out various angles and rafters of different pitches or angles. A **combination square** can be used as a straightedge, a marking gauge, a depth gauge, a 90 degree square, a 45 degree angle marker, or level.

D. A level is used to determine whether a surface is flat (perfectly horizontal) or plumb (perfectly vertical). Common **spirit levels** include the 9 inch, 18 inch, 24 inch, and 48 inch. They have bubbles in slightly bent fluid-filled vials. When the bubble is centered between the lines it is level or plumb depending on its position. A **digital level** is a battery operated electronic level that beeps when it is perfectly level or plumb. A **line level** is a small level attached to a line (string) to guide work such as laying concrete blocks. A **plumb bob** is a pointed weight attached to a string used to determine a plumb or vertical line or to find a point directly beneath an overhead point.

Assign students to read the appropriate sections in the recommended resource texts. Use the TM: A3–2A and TM: A3–2B transparencies to learn the names of layout tools. Demonstrate the use of each tool or assign different students the responsibility of the demonstrations. Use LS: A3–2B to verify your knowledge of the layout tool names.
Objective 3: Identify and explain how to use cutting, shaping, and boring tools.

Anticipated Problem: What tools are needed to cut, shape, and bore?

III. Once materials are measured and marked, they need to be cut, shaped, and bored as needed to prepare for assembling.

A. Saws are classified by use and teeth per inch. An 8-point saw would have 8 teeth per inch. Handsaws include the crosscut, rip, compass, or keyhole, coping, and backsaw. The **crosscut saw** is used to cut across the grain of wood. Use the thumb to guide the starting of the cut while pulling the saw upwards slowly two or three times. Saw to the line using long steady strokes with the saw at a 45 degree angle to the board. The **ripsaw** is used for sawing with the grain. Hold the saw at a 60 degree angle with the wood and use a wedge between the cut surfaces if the board binds. The **keyhole or compass saw** is a 12 to 14 inch long narrow saw that starts at about ½ inch wide at the handle tapering to a point at the end of the blade. It is used for cutting curves and circles. A hole is generally drilled as a way of starting the cut in the interior of a piece of wood. The **coping saw** is a small saw with a very thin blade of fine teeth used for cutting intricate curves in thin material. The **backsaw** is a finish carpentry saw with fine teeth generally used in a miter box to cut molding and trim.

B. Shaping tools include planes, wood chisel, and rasps. A **plane** is a tool used to smooth surfaces and change the size or shape of wood materials. The **jack plane** is usually 14 inches long and used for smoothing long surfaces by shaving with the grain of the wood. The **smoothing plane** is usually 8 inches long, is used with the grain, and for finish shaping. The **block plane** is usually 6 to 6½ inches long and is used for smoothing the ends of boards by cutting across the grain. To avoid splitting corners, clamp a piece of wood on both edges of the board or plane from the edge toward the center. A **wood chisel** is a wedge-shaped cutting tool used to cut notches and shaving off excess wood. They come in a variety of widths and are generally hit with a wooden mallet. Keep the chisel sharp for safe and effective use. To mark a slot turn the bevel of the chisel inward and up to cut shallow, and down to cut deep. A **wood rasp** (also known as a wood file) is used for smoothing rough work and for removing small amounts of wood on curved and irregular-shaped objects. Be sure the rasp has a handle. Apply pressure on the forward stroke. Clean the rasp with a wire brush or file card. A **raspplane** is a wood rasp in the shape of a plane. Use it in the same way as a wood rasp.

C. Boring tools include the hand drill, the push drill, and brace and bit. A **hand drill** is a device with gears that drive its bit much faster than the handle turns. It is used for small holes when it is not convenient to use an electric drill. A **push drill** is also called an automatic drill. It has a spiral-shaped shaft that turns clockwise when pushed against an object. The push drill can be operated with one hand, allowing the operator to hold the material being drilled with the other. A **brace** is the device for holding and turning an auger bit. The **auger bit** has a square tang to fit into the brace. The cutting end has a feed screw, cutting lips, and cutting spurs. Drill until the feed screw begins to come
through the wood, then back out the bit, and turn the wood over to finish the hole from the other side. This technique prevents the wood from splintering out.

Refer students back to the chapters listed in the recommended resource texts. These publications contain good basic information on the content of this objective. Use TM: A3–2C and TM: A3–2D to learn the names of cutting, shaping, and boring tools. Demonstrate the use of the tools. Use LS: A3–2B to verify the students knowledge of tool uses.

Objective 4: Identify and explain how to use holding and turning tools.

Anticipated Problem: What hand tools are used for holding and turning?

IV. Holding or gripping tools help complete the job quicker, easier, and safer. Clamps and vises are used to hold or grip wood or metal while being cut, shaped, bored, and fastened. Pliers, wrenches, and screwdrivers are also used at times for holding, gripping, or turning.

A. A **C-clamp** is shaped like the letter C and comes in sizes ranging from 2 to 10 inches. A **bar clamp** is an adjustable clamp that can range from a few inches to six feet. A **hand screw clamp** requires two hands for tightening and can span up to 10 inches. A **miter clamp** is used for tightening corners such as in making a picture frame. **Spring clamps** are a new type of clamp tightened by squeezing the handle. They are often used when fastening cabinet units together. A band clamp, also called a **strap clamp** or **pony clamp**, has many uses, may be ratchet tightened, and comes in a variety of lengths.

B. Vises include the machinist’s vise, the blacksmith’s vise, the utility vise, and the pipe vise. The **machinist’s vise** is made for heavy duty work, with jaws that grip materials to keep them from slipping, and are often mounted to a shop table. The **blacksmith’s vise** is also made for heavy work and is mounted on the edge of a table. It is not as popular as it was in the days of the blacksmith. The **utility vise** has a small anvil on the back and has removable jaws. A **pipe vise** is specially made to hold pipe without denting or flattening it.

C. **Combination** (also called slip joint and adjustable) **pliers** have two sizes and are used to hold materials, turn bolts, and cut wire. **Needle nose** (or long round nose) **pliers** are used to retrieve items, place items in tight quarters, and twist wire. **Diagonal side cutting pliers** are used to cut wire. Channel lock pliers have several size adjustments and may be used to hold material such as pipe. **Locking pliers**, commonly called vise grips, are adjustable and can be locked on a nut, bolt, or pipe.

D. Wrenches used for gripping and tightening include adjustable jaw, fixed jaw, socket, set screw, and pipe wrenches. **Adjustable jaw wrenches**, sometimes called crescent wrenches, are sized by the length of the handle and can be adjusted to fix various sizes. When using the wrench, pull against the stronger, stationary jaw of the wrench. **Fixed jaw wrenches** are either box end, open end, or a combination of the two. **Box-end wrenches** come as either 6 or 12 point and are used when the nut is very tight on the bolt. **Open-end wrenches** are faster to use when loosening nuts and are generally offset to a 15 degree angle so that they can be flipped over to loosen nuts in tight quarters. A
Combination open-end box-end wrench gives the advantages of both designs in the same wrench. Socket sets can have 6 or 12 point sockets. They offer the option of a breaker bar to loosen tight nuts and the speed of a ratchet handle to loosen the nuts quickly. Set screw or Allen wrenches are hex shaped and used to turn set screws. Pipe wrenches are adjustable, come in several sizes, and are used with pipe and large nuts. Wrapping the pipe or nut may prevent leaving jaw marks when a pipe wrench is used.

E. Screwdrivers are standard or Phillips. Standard or flat blade screwdrivers are used with standard size slots. Select a screwdriver that fills the width and depth of the screw slot. Longer handles give the maximum leverage for tightening and loosening. Phillips or cross point screwdrivers are designed to be used with Phillips screw heads. Phillips screws are easier to tighten or loosen because the screwdriver is less likely to slip out of the screw slot. This is the main reason that Phillips screwdriver bits are often used with portable drills to tighten screws quickly.

Each of the recommended resource texts has good information on these topics. Students should be assigned readings from the suggested chapters to gain a complete understanding of the content of this objective. Use TM: A3–2E and TM: A3–2F to learn the names of holding and turning tools. Demonstrate the use of the tools. Use LS: A3–2B to verify the students knowledge of tool uses.

Objective 5: Identify and explain how to use driving and wrecking tools.

Anticipated Problem: What hand tools are used for driving and wrecking?

V. Hammers and staplers are used as driving tools to fasten building materials together. Crow bars, flat bars, cat’s paw, and tack removers are used as wrecking tools.

A. Curved claw hammers are the most commonly used hammers to drive and pull nails. Handles may be wood, metal, or fiberglass. A 12 oz. hammer would be good for brads, a 16 oz. hammer would be a good general purpose hammer, and a 20 oz. hammer would be good to drive 16 and 20 penny spikes. Whatever the nail size hold the nail, tap it until it will stand on its own, and then grip the handle near the end hitting the nail square with a long swinging stroke. Resist the temptation to hit the nail one too many times leaving your hammer print in the wood. Straight claw hammers can be used to rip boards. The straight claw hammer is just as good as the curved claw hammer for driving nails but is not as effective when trying to pull bent nails. Wooden mallets may be used with wood chisels made with a metal shank. Rubber mallets are useful when there is concern of damaging the material that is being driven. A sledge hammer is a large hammer (5 to 10 pound) with a long handle that is used for driving stakes, wrecking materials that need to be removed, etc. For maximum delivery of power with the sledge two hands need to be on the handle.

B. Crow bars have a straight end and a curved end with a nail pulling notch in both ends. They are used to pull nails and pry materials apart. Flat bars, also called wonder bars, are flat with one straight end and one right angle bend end. They work well for pulling nails that are already part way out. A cat’s paw is a small bar with a curved end and nail pull-
ing notch. It works well by digging out nails that are completely set in the wood. A tack puller is the size of a small screwdriver with a notch in the end for pulling tacks or small nails. It works well for pulling roofing nails.

Employ student readings of the recommended resource texts to provide the basic information that is helpful to understanding this objective’s content. Use TM: A3–2G to provide examples of driving tools. Demonstrate the use of the tools. Use LS: A3–2B to verify the students knowledge of tool uses. Use the test included to test the students knowledge of hand tools.

Review/Summary. Use the student learning objectives to summarize the lesson. Use Hand Tool Basics video. Have students discuss the factors important in selecting hand tools. Use the transparencies and actual tools to review the names of tools and review how each one is used. The review questions at the end of Chapters 3 and 4 in the Introduction to Agricultural Mechanics text or Unit 7 in the Agricultural Mechanics text would be helpful.

Application. Have students use the tools in the shop to demonstrate their knowledge of proper tool use and increase their skill level. Assign the accompanying lab sheets to help students in reinforcing the content.

Evaluation. Use the test with this lesson and evaluation student performance in the actual use of the hand tools in the shop.

Answers to Sample Test:

Part One: Matching

1 = T, 2 = B, 3 = C, 4 = L, 5 = H, 6 = L, 7 = H, 8 = S, 9 = D, 10 = C, 11 = L, 12 = L, 13 = T, 14 = S, 15 = T, 16 = W, 17 = T, 18 = T, 19 = B, 20 = H

Part Two: Completion

1. Ruler, wooden folding rule, tape measure, 100 foot windup tape
2. Pencil, keel or carpenter’s crayon, marking gauge, and chalk line (any three of these four)
3. Protractor
4. Sliding T-bevel square
5. Plumb bob
6. crosscut, rip
7. Block
8. rasplane
9. C-clamp, bar clamp, hand screw clamp, miter clamp, spring clamp, and strap or pony clamp (any three of these six)
10. ripping, curved claw
Part Three: Short Answer

1. The bigger the job the bigger the hammer. For example use a 12 oz. hammer to drive brads but a 16 or 20 oz. hammer to drive large nails.

2. Select a screwdriver that fills the depth, width, and length of the screw slot.

3. English measurement uses inches, feet, and yards while metric is based on tens using millimeters, centimeters, and meters.

4. Stretch the line tight, pull straight up on the line, and let go of the line.
Lesson A3–2: Using Hand Tools

Part One: Matching

Instructions. Match the tools with their proper classification using the letter B for boring tools, C for cutting tools, D for driving tools, H for holding tools, L for layout tools, S for shaping tools, T for turning tools, and W for wrecking tools.

_______ 1. Adjustable wrench
_______ 2. Bit brace
_______ 3. Coping saw
_______ 4. Wooden folding rule
_______ 5. Bar clamp
_______ 6. Chalk line
_______ 7. C-clamp
_______ 8. Rasplane
_______ 9. Curved claw hammer
_______ 10. Rip handsaw
_______ 11. Levels
_______ 12. Squares
_______ 13. Standard screwdriver
_______ 14. Wood chisel
_______ 15. Open-end wrench
_______ 16. Cat’s paw
_______ 17. Setscrew or Allen wrench
_______ 18. Socket set
_______ 19. Push drill
_______ 20. Machinist’s vise
Part Two: Completion

Instructions. Provide the word or words to complete the following statements.

1. Measure wood using a ________________________, ________________________, ________________________, or ________________________.
2. Mark wood with a _____________, _____________________, or _____________.
3. Measure angles with a ____________________.
4. Transfer angles with a ________________________________.
5. To determine the location of a spot exactly below a given point use a ____________ ________________.
6. To cut across the grain use a ____________ handsaw. Use a ________ handsaw to cut with the grain.
7. To plane end grain use a ___________________ plane.
8. A tool that is used like a wood rasp but is shaped like a plane is called a ________________________.
9. Name three types of clamps: ________________, _____________, ________________.
10. A _______________ hammer is better for ripping boards while a ____________________ hammer is better to get leverage to pull nails.

Part Three: Short Answer

Instructions. Provide information to answer the following questions.

1. What is used to determine the right size hammer to buy?

2. How is the correct size screwdriver selected?

3. Compare the units of measure used in the English and the metric measurement systems.

4. How is a chalk line used?
MEASURING AND MARKING LAYOUT TOOLS

Zigzag Folding Wood Rule

Self-Winding Steel Tape

Electronic Tape Measure

Electronic Steel Tape Measure

Divider

Marking Gauge

Chalk Line

(Courtesy, Interstate Publishers, Inc.)
LAYOUT TOOLS...
Squares, Levels, Plumbs

Try Square

Combination Square

Sliding T-Bevel Square

24” Spirit Level

Line Level

Plumb Bob

(Courtesy, Interstate Publishers, Inc.)
EXAMPLES OF CUTTING TOOLS...HAND SAWS

Handsaw

Coping Saw

(Courtesy, Interstate Publishers, Inc.)
SHAPING AND BORING TOOLS

- Smoothing Plane
- Jack Plane
- Block Plane
- Wood Rasp
- Wood Chisel
- Hand Drill
- Auger Bit
- Bit Brace

(Courtesy, Interstate Publishers, Inc.)
EXAMPLES OF HOLDING TOOLS

Hand Screw Clamp

"C" Clamp

Bar Clamp

Miter Clamp

Blacksmith's Vise

Machinist's Vise

(Courtesy, Interstate Publishers, Inc.)
EXAMPLES OF GRIPPING/TURNING TOOLS

Open End Wrench
Adjustable Wrench
Pipe Wrench
Pipe Wrench
Standard Screwdriver
Socket Wrench
Box End Wrench
Phillips Screwdriver
Set Screw or Allen Wrench
Combination Open-end Box-end Wrench
Needle Nose Pliers
Lineman’s Pliers
Locking Pliers (Vise Grips)

(Courtesy, Interstate Publishers, Inc.)
EXAMPLES OF DRIVING TOOLS

- Ripping Claw Hammer
- Curved Claw Hammer
- Sledge Hammer
- Rubber Mallet

(Courtesy, Interstate Publishers, Inc.)
Lab Sheet

Match the Type of Tool to the Job

Types of Tools

A. Boring tools  D. Holding tools  G. Turning tools
B. Cutting tools  E. Layout tools  H. Wrecking tools
C. Driving tools  F. Shaping tools

Uses

1. Tools used to move nails, staples, etc., into wood.
2. Tools used to tighten or loosen nuts, bolts, and screws.
3. Tools used to measure or mark materials.
4. Tools used to make holes.
5. Tools used to hold materials for the use of other tools.
6. Tools used to smooth or change the contour of wood.
7. Tools used to cut or remove material.
8. Tools used to take apart materials that have been fastened together.

IMPORTANCE OF TOOL SELECTION

9. Give three reasons for using hand tools instead of power tools.

10. How can you be assured that you are buying a quality tool?

11. Give three problems that could result from using the wrong tool for the job.
Lab Sheet Key

Match the Type of Tool to the Job

1. C
2. G
3. E
4. A
5. D
6. F
7. B
8. H
9. a. The job is small.
   b. The area is small, not allowing room for large power tools.
   c. No power is available.
10. Buy a name brand.
11. a. Could be dangerous, resulting in injury.
    b. Could damage the tool.
    c. Could result in inferior quality work.
Lab Sheet

Match the Tool to the Tool Type

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>Layout tool</td>
</tr>
<tr>
<td>B</td>
<td>Boring tool</td>
</tr>
<tr>
<td>T</td>
<td>Turning tool</td>
</tr>
<tr>
<td>C</td>
<td>Cutting tool</td>
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<tr>
<td>D</td>
<td>Driving tool</td>
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<tr>
<td>W</td>
<td>Wrecking tool</td>
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<tr>
<td>S</td>
<td>Shaping tool</td>
</tr>
<tr>
<td>H</td>
<td>Holding tool</td>
</tr>
</tbody>
</table>

1. 100 foot wind up tape
2. Adjustable jaw wrenches
3. Auger bit
4. Backsaw
5. Bar clamp
6. Blacksmith’s vise
7. Block plane
8. Box-end wrench
9. Brace
10. Carpenter’s pencil
11. Cat’s paw
12. C-clamp
13. Center punch
14. Chalk line
15. Combination open-end box-end wrench
16. Combination pliers
17. Combination square
18. Coping saw
19. Crosscut saw
20. Crow bar
21. Curved claw hammer
22. Diagonal side cutting pliers
23. Digital level
24. Flat bar
25. Framing square
26. Hand drill
27. Hand screw clamp
28. Jack plane
29. Keel or carpenter's crayon
30. Keyhole or compass saw
31. Line level
32. Locking 25-foot tape measure
33. Locking pliers
34. Machinist's vise
35. Marking gauge
36. Miter clamp
37. Needle nose pliers
38. Open-end wrench
39. Phillips or cross point screwdriver
40. Pipe vise
41. Pipe wrench
42. Plumb bob
43. Protractor
44. Push drill
45. Rasplane
46. Ripsaw
47. Rubber mallet
48. Ruler
49. Scratch awl
50. Set screw or Allen wrench
51. Sledge hammer
52. Sliding T-bevel square
53. Smoothing plane
54. Socket sets
55. Speed square or rafter square
56. Spirit level
57. Spring clamp
58. Standard or flat blade screwdriver
59. Straight claw hammer
60. Strap or pony clamp
61. Tack puller
62. Try square
63. Utility vise
64. Wood chisel
65. Wood rasp
66. Wooden folding rule
67. Wooden mallet
Lab Sheet Key

Match the Tool to the Tool Type

1. L  24. W  47. D
2. T  25. L  48. L
6. H  29. L  52. L
7. S  30. C  53. S
8. T  31. L  54. T
9. B  32. L  55. L
10. L  33. T  56. L
11. W  34. H  57. H
12. H  35. L  58. T
14. L  37. T  60. H
15. T  38. T  61. W
17. L  40. H  63. H
18. C  41. T  64. S
19. C  42. L  65. S
20. W  43. L  66. L
21. D  44. B  67. D
22. T  45. S
23. L  46. C