UNIT 1:
TOOLS AND SAFETY

KEY CONCEPTS

1. Commonly used tools in construction and home maintenance
2. Important tools to have in tool belt/tool box
3. Reading a tape measure
4. Basic applications of most common tools
5. Tool safety and care
6. Proper use of ladders
7. Job hazards and injury prevention

INSTRUCTIONAL ACTIVITIES

2. Identify basic tools that should be in your nail apron
3. Students use each tool
4. Measure and record lengths of various items
5. Identify common hazards at the work site and at home
6. Identify and demonstrate proper use of different types of ladders
7. Discuss safety practices with tools, at the work site, and at home
8. Summarize key learning points

ASSESS LEARNING OF KEY CONCEPTS

As a group, students will correctly answer questions during class discussion. Students individually will learn to use tools properly and safely during lab time.
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NECESSARY TOOLS

**Partner Family:** These tools should be with you each time you come to class and when you go on the job site to work.
- Nail apron or tool belt
- Hammer (16 oz)
- Retractable Utility knife
- 25’ measuring tape
- Speed or Combination Square
- Pencils - at least 2
- Safety glasses
- Work gloves

**Home Maintenance**
Tools you might want to purchase in the future to help maintain your home.
- Straight (flat) blade screwdriver
- Phillip’s head screwdriver
- Adjustable crescent wrench
- Channel lock adjustable pliers
- Vice grip pliers
- Regular pliers
- Putty knife
- Electric drill
- Torpedo level

**Habitat for Humanity**
Tools that will be at the job site that you need to know how to use:
- Sledge hammer
- Coping saw, Hack saw, and Keyhole saw
- Jigsaw
- Circular saw
- Reciprocating saw
- Miter saw
- Drywall Router
- Drywall rasp
- Electric drill and screw gun
- 2’, 4’, and torpedo levels
- Chalk line
- Framing Square
- T-square
- Cat’s paw
- Crow bar
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STRIKING TOOLS AND HAMMERS

A. **Claw Hammer** – a 16-oz. hammer with a nail puller on one end and a nail driver on the other. This is the primary hammer used to drive and remove nails.
B. **Sledge Hammer** – a 2 lb. to 20 lb. large and heavy hammer used to demolish framing and for driving stakes.

DEMOLITION TOOLS

A. **Flat Bar** – use this bar when prying two boards apart. Wear safety glasses when striking the bar with a hammer.
B. **Crow Bar** – used to pry apart lumber that has been nailed together
C. **Cats Paw** – use this bar when removing nails. Wear safety glasses when striking the bar with a hammer.
D. **End Cutter** – a simple tool for removing nails.
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CUTTING TOOLS

A. **Crosscut Saw** – A basic saw with coarse teeth for rough cutting lumber
B. **Backsaw** – A crosscut saw that has a reinforced spine (top edge), designed to cut a straight line across the face of a piece of wood. (NOT PICTURED)
C. **Hacksaw** – used to cut metal and some plastics
D. **Coping Saw** – is designed to make intricate and delicate cuts in wood, plastics and metals
E. **Keyhole Saw** – a narrow and pointed saw, used to cut curves and irregular shapes, usually in drywall
F. **Utility Knife** – a retractable knife used for cutting a wide variety of materials
G. **Bolt Cutters** – used to cut bolts, locks, and heavy metal

POWER SAWS

A. **Jig Saw** – a power tool that can make curved or irregular cuts
B. **Circular Saw** – a high-speed, hand held, electric saw used for ripping and cross-cutting wood
C. **Reciprocating Saw** – a heavy duty, hand held saw used for cutting through a variety of materials
D. **Miter Saw** – a power saw that can create straight or angled cuts on lumber and trim
E. **Drywall Router** – a small router used primarily to cut around door and window openings, and electrical boxes in drywall
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SHAPING TOOLS

A. **File** – metal files are used to shape wood, plastic, and metal
B. **Chisels** – used to whittle, cut, smooth, and trim wood
C. **Drywall Rasps** – used to smooth the rough edge of a panel after it is cut
D. **Electric Drill** – used for drilling holes in wood. This drill uses an electrical cord for power
E. **Cordless Drill** – same as “electric drill” only this drill runs on a battery, so it is more portable
F. **Hammer Drill** – a special drill used to drill holes in masonry.

HOLDING TOOLS

A. **Channel-Lock Pliers** – used for gripping and turning pipes
B. **Standard Pliers** – slip joint or needle nosed pliers are variations with special uses
C. **Clamps** – clamps are used to secure glued pieces together until the glue hardens. They can also be substituted for “holding devices” on many other jobs.
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TURNING TOOLS

A. Crescent Wrench – adjustable wrench to fit all sizes of nuts and bolts
B. Open-End Wrenches – each wrench is a specific size
C. Hex/Allen Wrench – for turning “hidden” set screws on handles, etc.
D. Pipe Wrench – much like a crescent wrench only heavier for bigger jobs such as plumbing.
E. Socket Wrench with Sockets – For turning nuts and bolts with a ratcheting action

SCREWDRIVERS

A. Flat Head Screwdriver – single flat blade
B. Phillips Head Screwdriver – cross blade
C. Square Head Screwdriver – square blade
D. Screwgun – “automatic” screwdriver, used to drive in the screw by using household electricity.
E. “Cordless” Screwdriver – “automatic” screwdriver, used to drive in the screw by using a portable battery.
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PLUMB AND LEVEL TOOLS

A. Four foot level – the bubble inside the glass vial indicates vertical and horizontal levels.
B. Plumb Line – a string with a weight on one end. The weight hangs straight down creating a perfect vertical line.

MEASURING TOOLS

A. Tape Measure (16 or 25 foot) – a metal housing containing a thin metal strip marked out in increments of $\frac{1}{16}$, $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, and 1 inch. The metal strip is pulled out to make the measurement and then is retracted back inside the housing.
B. Yard Stick – this is usually a straight wooden or metal ruler measuring 36 inches. It is marked in increments of $\frac{1}{16}$, $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, and 1 inch
C. 12 Inch Ruler – just like the wooden or metal one-foot ruler you have at home. It is marked in the same increments as the yard stick and the tape measures
D. Chalk Line – a string covered in blue or red chalk that is stretched and snapped to transfer a long, perfectly straight line.
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SQUARING TOOLS

Squaring tools are used to mark square lines exactly and make square cuts precisely.

A. **Speed Square** – a triangle with a lip that catches the edge of a board easily and can transfer a variety of degrees
B. **Framing Square** – a big “L”, used for large lumber or stairs
C. **Combination Square** – good for 90° and 45° angles and for using as a scribing gauge
D. **T-square** – 4’ square, mainly used for cutting drywall, but also for any sheathing material
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THE IMPORTANCE OF SAFETY
Safety is everyone’s responsibility! Safety and health of our volunteers and employees is the first consideration and is given preference over operating productivity for Habitat for Humanity of the Mid-Willamette Valley. Please report any unsafe, dangerous, or hazardous conditions to the supervisor, or to the Habitat office. A little common sense and caution can prevent most accidents from occurring. Accident prevention is of primary importance in all phases of operation of Habitat. Report all injuries, no matter how small, to the supervisor. Horseplay, scuffling, and other acts which tend to have an adverse influence on safety or the well being of volunteers or employees is strictly prohibited. Knowing what is going on around you is the most important thing you can do to remain safe.

PERSONAL SAFETY
- First aid kits will be located on the site or in the storage trailer. If there is a fire or medical emergency, notify the Construction Manager and Site Coordinator immediately.
- When cutting treated lumber, a mask should be worn and be sure to wash hands after working with treated lumber.
- When lifting heavy materials, always lift with your legs, not your back.
- Wear gloves while working with wood and insulations to protect hands from splinters.
- Wear safety glasses while using power tools, sanding, cutting, and hammering.
- Clothing should not be loose fitting and no strings should hang down. Shoes must have thick soles and toes covered. Absolutely no sandals or flip flops will be allowed on the work site. Jewelry that can get caught in tools should NOT be worn.
- While carrying long lumber, always use 2 people, one at each end, to avoid bumping someone.

HAND TOOL SAFETY
- Be sure to watch out for the person next to you as you nail.
- Always cut away from yourself and be aware of where your fingers are in relation to the blade.

POWER TOOL SAFETY
- If you are not sure how to use a power tool, always ask a Site Leader for instruction before using.
- Check all tools for damage and proper safety guard before use.
- Check all power cords for damage before plugging them in.
- Make sure that the blade is sharp.
MAINTENANCE SAFETY
- A clean site is essential to work site safety. Please keep trash in the dumpster and scrap lumber where it belongs.
- Return all tools back to the storage area. Do not leave tools lying around.
- Keep track of all the tools. If you see something where it does not belong, please pick it up and return it to the storage area.
- Use extension cords wisely. Do not drape the cord over obstacles. Try to keep them flat on the ground
- Store the tools with the sharp edges/sharp sides down or with guards on or in place.

THERE IS NO WAY THIS SHORT SUMMARY CAN COVER ALL THE SAFETY ISSUES. THE SITE MANAGER AND TASK ASSISTANTS WILL GIVE FURTHER CONSTRUCTION SAFETY TIPS AS THEY APPLY TO A PARTICULAR TASK. REVIEW THESE NOTES FROM TIME TO TIME BEFORE COMING TO THE SITE. IF YOU ARE UNSURE ABOUT ANYTHING—ASK!!

REMEMBER—ALWAYS EXERCISE CAUTION AND COMMON SENSE!

PLEASE KEEP SAFETY IN MIND AND WE WILL ALL HAVE FUN AND ENJOY THE PRODUCT TOGETHER—A BRAND NEW HABITAT HOUSE FOR A PARTNER FAMILY!
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FOLLOW ALONG WORKSHEET

Please use the area below to take notes about the major subject headings listed.

NEW TOOLS:

_________________________________________________________________________________________________________________________
_________________________________________________________________________________________________________________________
_________________________________________________________________________________________________________________________
_________________________________________________________________________________________________________________________
_________________________________________________________________________________________________________________________

READING A TAPE MEASURE:
In the warehouse portion of the class there will be several blocks of wood cut for you to measure. Write your measurements here:
_________________________________________________________________________________________________________________________
_________________________________________________________________________________________________________________________
_________________________________________________________________________________________________________________________
_________________________________________________________________________________________________________________________
_________________________________________________________________________________________________________________________

MOST IMPORTANT SAFETY ISSUES:
_________________________________________________________________________________________________________________________
_________________________________________________________________________________________________________________________
_________________________________________________________________________________________________________________________
_________________________________________________________________________________________________________________________
_________________________________________________________________________________________________________________________

ADDITIONAL NOTES:
_________________________________________________________________________________________________________________________
_________________________________________________________________________________________________________________________
_________________________________________________________________________________________________________________________
_________________________________________________________________________________________________________________________
_________________________________________________________________________________________________________________________
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FOLLOW UP WORKSHEET:

Fill in the Blank:
*Please fill in the blank of each question with the corresponding answer from the key below.*

1. The ____________ is used for pounding and most commonly associated with driving nails.
2. Devices used to create holes or drive screws that may or may not be corded are called ____________.
3. The ____________ has a sharp, retractable blade and may be used to cut a variety of materials.
4. Devices that may be hand-held or fixed, and are used to cross-cut or rip lumber are called ____________.
5. A ____________ is utilized to make sure that a measured object is perfectly vertical or horizontal.
6. A right angle can be obtained by aligning material with a ____________.

Matching:
*Please match the appropriate measurement from the key with the correct picture above.*

1.__________
2.__________
3.__________
4.__________

What is the proper ratio for a safe ladder angle? Describe an easy way to determine if your ladder is at the proper angle.

Choose one safety precaution particular to this unit that you can implement either on the job site or in your home. In the area below describe why this precaution is necessary to ensure safety.
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Tool Inventory

Striking Tools page 3
- Hammer (16 oz)
- Sledge Hammer
- Air Nailer (Pneumatic)
- Powder Actuated Nailer

Cutting Tools page 4
- Handsaws
  - crosscut, backsaw, rip saw, hacksaw, coping saw, keyhole saw
- Jigsaw (saber saw)
- Circular saw
- Reciprocating saw (sawzall)
- Miter saw (chop saw)
- Drywall Router
- Router
- Utility Knife (retractable)
- Bolt cutters

Shaping Tools page 5
- File
- Plane
- Chisel
- Drywall Rasp
- Drill
- Cordless Drill
- Hammer Drill

Holding Tools page 5
- Channel lock adjustable pliers
- Vise grip pliers
- Standard pliers
- Bar Clamp
- C-clamp
- Spring Clamp
- Quick Clamp

Turning Tools page 6
- Crescent adjustable wrench
- Open-end wrench
- Hex (allen) wrench
- Pipe wrench

Screwdrivers page 6
- Standard (flat)
- Square
- Phillips
- Cordless Screw gun
- Screw gun

Plumb and Level Tools page 7
- 2’ and 4’ Level
- Plumb line
- Torpedo level

Squaring Tools page 8
- Tri square
- Combination square
- Speed square
- Framing square
- T-square
- Bevel square

Undo Tools page 3
- Flat bar
- End cutter
- Cat’s paw
- Crow bar

Measuring Tools page 7
- 100’ tape measure
- 25’ tape measure
- Chalk line

Other Tools (not pictured)
- Nail apron or Tool belt
- Pencil
- Nail set
- Putty knife

Safety Equipment (not pictured)
- Safety glasses
- Ear plugs
- Gloves (leather or heavy canvas)
- Hard soled shoes
- Particle mask