2009 4-H WOOD SCIENCE JUDGING

The 2009 4-H Wood Science judging Contest will include two divisions. The beginner division is designed for 8-10 year old 4-H members with limited experience in this project. The senior contest is open to any 4-H member, regardless of age or experience. Questions for the beginner contest will be taken from Measuring Up, Level 1**.** The senior contest will draw on materials contained in Levels 1-4.

The 2009 Wood Science Contest will include all or part of the following:

A. Beginner

1. Identify 5 of the 15 tools listed on page 6 of Level 1, Measuring Up, the 4-H Wood Science Project Manual as well as the hammers, saws and screwdrivers listed in this guide.

2. Be able to identify at least one safety practice with 5 listed tools as well as with the hammers as listed in this guide.

3. Identify the parts of a power drill, hammer, handsaw or coping saw.

4. From a box or can containing a mixture of screws and nails, be able to select 5 of the nails and screws listed on page 20 of Level 1 or be able to identify these fasteners if they are pre-selected for you.

5. Demonstrate one or more of the following skills:

    a. Use a square to draw a line across a board (page 15)

    b. Drill a hole in a board using a power drill (page 16)

    c. Saw a board using a handsaw. (Page 17)

    d. Connect two pieces of wood using nails or screws. (Pages 21 and 26)

    e. Remove a nail from a piece of wood. (Page 26)

6. Be familiar with the terms in the glossaries of Level 1.

7. Rank a class of 4 finished or unfinished items considering workmanship, appearance, and suitability and quality of the finish.

B. Senior

Senior members will be responsible for understanding all items from the beginner event as well as:

1. Listing at least one safety rule with any tool listed in Levels 1-4.
2. Identify 10 tools from Levels 1-4 including those attached to this guide.
3. From a box or can containing a mixture of screws and nails, be able to select 10 items as directed.
4. Demonstrate one or more of the following skills:
    a. Mark and measure wood as directed.
    b. Draw a plan to scale (page 17, Level 2)
    c. Make an angled cut. (Page 19).
    d. Correctly demonstrate the use of a wood chisel. (Page 20)
    e. Select the correct type and grade of sandpaper and demonstrate how to correctly sand the given object.
    f. From a set of plans, identify the tools and supplies needed to construct the item shown.
    g. Use a protractor and T-bevel to draw 15, 45 and 70-degree angles. (Level 3, p.10)
    h. Enlarge scale drawn plans. (Level 3, p11)
    i. Demonstrate any other common procedure using the correct tool.
5. Be familiar with the terms in the glossary of Levels 1-4.
6. Rank one or more classes of 4 finished or unfinished items considering workmanship, appearance, and suitability and quality of the finish.
7. Be able to determine the correct pieces of wood to select to construct an article from a plan. A sample plan is attached. Other sample plans are available on the Minwax web page at: http://www.minwax.com/
8. **All** material printed in this guide.

Wood Training Box – each county has a wood science-training box with samples of woods, joints, fasteners and more.

Other Training Tips – field trip to local hardware and building supply stores. Trip to furniture stores to view finished and unfinished items. Visit web sites listed in the back of the project manuals and read woodworking magazines.

Don't Forget! – Each participant should bring a pencil, clipboard and paper to the contest.

Some Interesting Stuff About Hammers

THE HAMMER IN HISTORY

If you want to go back far enough you'll find that man's first hammer was a stone he held in his hand. However, it took centuries of this painful finger bashing before the first caveman do-it-yourselfer finally decided to put a handle on the stone - and voila, the first hammer was born. This was about the 4th century BC and of course the handle was wood, which became the handle of choice through the ages up to the present day. At first handles were tied to the hammer head with vines or strips of hide. It was much later before a hole or "eye" was bored into the head for a secure fit to the handle. Meanwhile, through the centuries the hammer head proceeded to change in keeping with the millennium it was in, evolving through the Stone Age, the Bronze Age, and the Iron Age, to the modern Industrial Age with its steel and metal alloys.

First Hammer Manufacturers

When our country's forefathers went shopping for a hammer, instead of a local home center, they went to their village blacksmith. He was the guy who beat out hammer heads from red hot iron on his trusty anvil. In addition to being the worlds' first hammer producers, they were the first metallurgists facing some of the same challenges as today's hammer manufacturers of providing the right combination of temper, hardness and durability.

When steel was first introduced blacksmiths had to use a process for adding carbon to give it the proper hardness. The hammer head was put into a charcoal fire box until it reached the proper heat (or temper), and while red hot was immediately doused in oil or water.

Hammers With A Temper!

Later on, steel was introduced with carbon in it until today's modern manufacturing methods introduced computerized processing which carefully controls the carbon and alloy content to insure proper temper and hardness. One manufacturer has developed a triple-zone heat treating process which insures different degrees of hardness

in the important areas of the face, eye and claw of the hammer head. Quality hammers require a hot forging process with exacting tempering of the steel to produce a durable, high-performing product. Less expensive hammers produced of cast steel, are not as durable with likelihood of chipping and mushrooming.

Hammers As "Family"

In colonial times hammers were given special attention as our Do-It-Yourself forefathers made their own hammer handles out of their favorite wood, engraving them with their name and the date. Sometimes the family hammer was personalized and given names such as "Tom, John or Sam" which was also cut into the handle. Wooden headed hammers (mallets) were in the majority in pre-Revolutionary days when wooden nails were in wide use. Iron hammers soon replaced them when metals nails were later introduced.

A Family of Hammers

Because for our forefathers "do-it-yourself" meant doing everything, they had to have a hammer for every trade and task - coopers hammers for making barrels, veneer hammers for trimming lumber, wooden mallets for carpentry, farrier hammers for horse-shoes, blacksmith hammers, bricklaying hammers, ice hammer, and shoemaker's hammers, to name a few. Again, most of these were fashioned by the village smithy. Today's consumer has even more types and sizes at his disposal. As an example one major U.S. hammer manufacturer produces more than 250 types and sizes for every conceivable trade and task.

Hammer History Still Being Made

In the beginning all hammer handles were of wood, but today they also come in steel and fiberglass. Many wood working professionals still prefer the wooden handle over other handle types as its more shock absorbent, is lighter in weight and provides good balance. Steel hammers, a favorite with construction workers for their strength and durability also have a drawback in causing handle "sting." However, new technology has improved on this, with a wood and rubber implant in the hammer head reducing vibration and making the feel of these steel hammers "almost as kind as wood." Other innovations include: increasing the curve of the hammer claw to permit easy cradling of 2 x 4's, milled faces to reduce nail slippage, straight claw design for ripping hammers and finely polished hammer heads for quality inspection and customer pride of ownership.

With all the improvements the hammer still remains as one of man's most personal tools. As a longtime carpenter puts it, "A hammer is more than just a hammer. It's a personal tool that you get used to and you form a loyalty with. It becomes an extension of yourself."

SELECTING THE CORRECT HAMMER

If you're not an expert or professional craftsman, how do you know which hammer is right for which job? Did you know there are actually many different types of hammers, each with a special purpose? Choosing the right hammer will pay off in the long run by doing a better job, faster, and safer.

1. **Common Nail Hammer with Curved Claw** - used for general carpentry work and, of course, nail pulling.

2. **Rip Hammer with Straight Claw** - used for general and heavy carpentry work, framing, ripping.

3. **Finishing Hammer** - used for cabinet making, finishing, and general carpentry.

4. **Ball Pein Hammer** - used for riveting, center punching, and bending or shaping soft metal.

5. **Hand Drilling Hammer** - used for powerful work such as striking masonry, nails, steel chisels and masonry drills.

6. **Soft-face Hammer** - for assembling furniture and wood projects, setting dowels, and any task, which requires non-marring blows.

7. **Tack Hammer** - used to drive small nails, furniture upholstering and more.

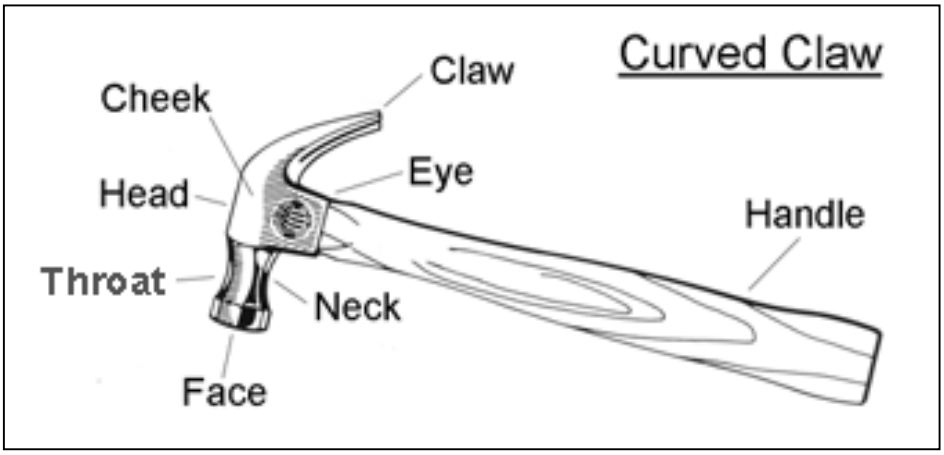
8. **Brick Hammer** - designed for cutting and setting bricks of blocks or chipping mortar.

9. **Drywall (Wallboard) Hammer** - used for drywall work, marking wallboard, making cutouts, sets nails with dimple for easier finishing, corner nailing (in some versions).

10. **Carpenter's Mallet** - for use in furniture assembly, shaping soft sheet metals or any project that requires non-marring blows.

For line drawings of these hammers visit: http://www.hammernet.com/select.htm

Anatomy of a Hammer



HAMMER SAFETY

Although hammers appear to be the basic of tools, they can be very dangerous if not used properly and with care. A quality hammer is a safe hammer, but all hammers should be treated with care and respect. Practice makes perfect certainly applies to hammering.

Along with remembering to wear safety glasses for all hammering jobs, there are some other general rules to follow when maintaining a high safety level for hammering:

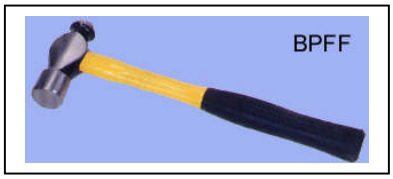
1. Make sure the handle of the hammer fits tightly on the head.
2. Do not strike a hard steel surface with a steel hammer. This may cause small pieces of steel to fly and injure someone.
3. Do not use the hammer handle for striking, and never use it as a pry bar. This may cause the handle to split which could result in a cut or pinch to the user.
4. Always strike the surface squarely - avoid glancing blows.
5. Always wear safety goggles.
6. Never strike any hammer with or against another hammer.
7. Discard a hammer with a chipped or mushroomed face.
8. Do not use steel hammers on concrete, stone, or hard metal objects.
9. Replace loose or cracked handles
10. Discard hammers with cracked claws or eye sections.

Much of the information about hammers came from a web page. You can find it at

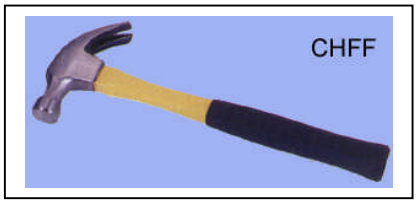
http://www.hammernet.com/hammers.htm

It has a lot of neat stuff about hammers. It is sponsored by Vaughan & Bushnell one of the oldest, major companies in the U.S. still operating under its original, founding family (since 1869).

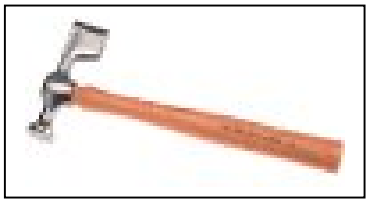
Hammers



Ball Pein Hammer



Claw Hammer



Drywall Hammer

Masonry

Rubber Mallet

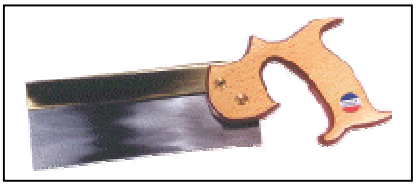
Sledge Hammer

Framing Hammer

Tack Hammer

Brick Hammer

Saws You Should Know



Back Saw

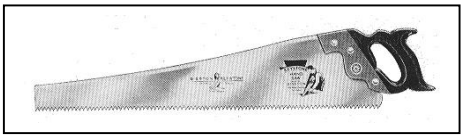
Bow Saw

Compass Saw

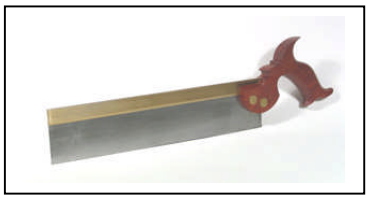
Coping Saw

Dovetail Saw

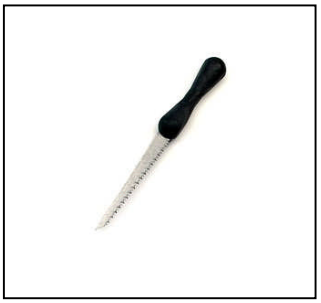
Hacksaw



Handsaw



Tenon Saw



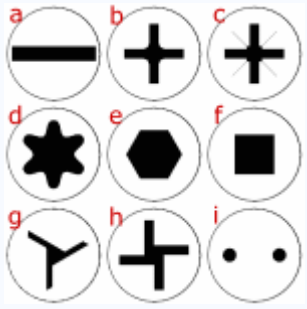
Utility Saw

Screwdrivers

The following information is from Wikipedia, the free internet encyclopedia. It was found at : http://en.wikipedia.org/wiki/Screwdriver

A **screwdriver**, invented by Leonardo da Vinci, is a device specifically designed to insert and tighten, or to loosen and remove, screws. The screwdriver comprises a head or tip which engages with a screw, a mechanism to apply torque by rotating the tip, and some way to position and support the screwdriver. In physics, torque (or often called a moment) can informally be thought of as "rotational force" or "angular force" which causes a change in rotational motion. A typical hand screwdriver comprises an approximately cylindrical handle of a size and shape to be held by a human hand, and an axial shaft fixed to the handle, the tip of which is shaped to fit a particular type of screw. The handle and shaft allow the screwdriver to be positioned and supported and, when rotated, to apply torque. Screwdrivers are made in a variety of shapes, and the tip can be rotated manually or by an electric or other motor.

A screw has a head with a contour such that an appropriate screwdriver tip can be engaged in it in such a way that the application of sufficient torque to the screwdriver will cause the screw to rotate.



Screw types:
(a) Slotted, (b) Phillips, (c) Pozidriv, (d) Torx, (e) Hex key, (f) Robertson, (g) Tri-Wing, (h) Torq-Set, (i) Spanner

There are many types of screw heads, of which the most common are the slotted, Phillips, PoziDriv/SupaDriv (crosspoint), Robertson, , TORX, and Allen (hex).

Jewelers Screwdriver Set

Screwdrivers come in a large variety of sizes to match those of screws, from tiny jeweler's screwdrivers up. It is important to use a screwdriver that is the right size and type for the screw used, or it is likely that the screw will be damaged in the process of tightening it. This is less important for PoziDriv and SupaDriv, which are designed specifically to be more tolerant of size mismatch. When tightening a screw with force, it is important to press the head hard into the screw, again to avoid damaging the screw.

Some manual screwdrivers have a ratchet action whereby the screwdriver blade is locked to the handle for clockwise rotation, but uncoupled for counterclockwise rotation when set for tightening screws; and vice versa for loosening.

Many screwdriver designs have a handle with detachable head (the part of the screwdriver which engages with the screw), called bits, allowing a set of one handle and several heads to be used for a variety of screw sizes and types. This kind of design has allowed the development of electrically powered screwdrivers, which, as the name suggests, use an electric motor to rotate the bit. Some drills can also be fitted with screwdriver heads.

A rechargeable battery-powered electric screwdriver

An electric screwgun, used mainly to set drywall screws

While screwdrivers are designed for the above functions, they are commonly also used as improvised substitutes for pry bars, levers, and hole punches, as well as other tools.

Screwdriver Safety

An often abused tool by the do-it-yourselfer and the professional craftsman is the screwdriver. There are very few who can say they haven't used a screwdriver to pry open lids, pry apart parts of equipment, punch pour holes in metal, as a wood chisel, and much more.

If you include yourself among those who misuse the screwdriver, you are flirting with possible serous injury, according to the Hand Tool (HTI), an association of American hand tool manufactures.

HTI points out those screwdrivers are manufactured only for the purpose of driving or removing screws. Accordingly, the strength and types of materials that go into the manufacture of screwdrivers are limited.

Misuse of the screwdriver, such as striking it with another tool or using is as a prying tool, could cause the screwdriver to break and cause serious personal injury, as well as possible damage to other involved equipment.

Some other don'ts:

Don't use a screwdriver with rounded edges or tips – it may slip and damage the work.

Don't use a screwdriver to check a storage battery or other electrical current.

Don't use pliers on handle or shank of screwdriver to get extra turning power. A wrench should be used only on a square shank that is especially designed for the purpose.

Don't expose a screwdriver blade to excessive heat. It may reduce hardness of the blade.

Don't use a screwdriver with a split or broken handle.

HTI points out **always wear safety goggles** when using hand tools to avoid serious injury.

In addition to using the screwdriver safely, no home or workplace should be without an assortment of screwdrivers – a minimum of three types – such as the stubby, to work in close quarters, the commonly used standard blade type and the Phillips. Having the correct screwdriver on hand will insure that you don't misuse them.

Screwdrivers You Should Know

Cordless

Demolition

Phillips

Offset

Square Tip

Scratch Awl

Standard