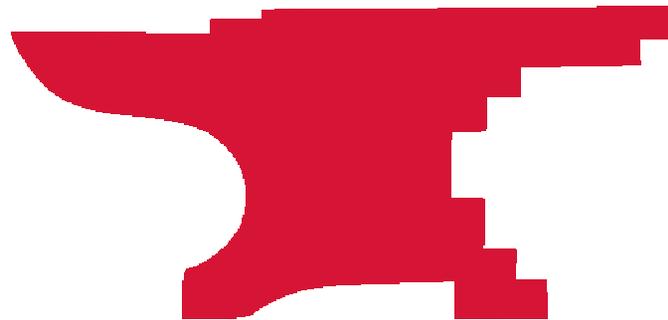


Blacksmithing Viking Pizza Axe Workshop



Outcomes

1. Taper metal
2. Bend metal
3. Grind metal

This project may require additional Grinding or Sanding to achieve its final shape and finish.

You may want to become familiar with the Linature (2x72 grinder) in the Metal Shop.

<https://www.youtube.com/watch?v=AV56w-p8QfY>

We will cover

- **Safety Equipment**
- **Tongs**
- **Hammers**
- **Drawing out**
- **Bending**
- **Twisting**

Notice

Protect your own safety.

You are responsible for verifying all information related to safety and protection measures.

You are responsible for damage to equipment and facilities.

(I believe that I am giving you accurate information but, *don't take my word for it. Independently verify for yourself.*)

Blacksmithing

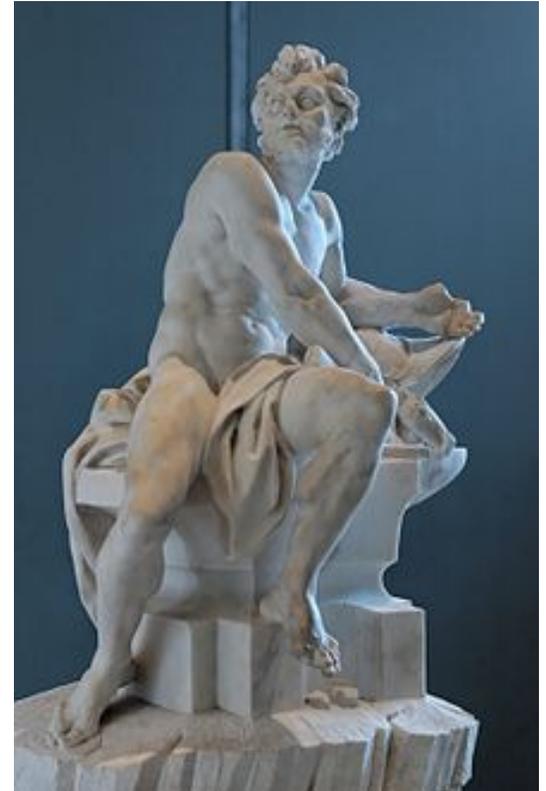
Forging objects from iron by hammering

Blacksmithing

Is a very old art form.
From Hephaestus the Greek god of
blacksmiths and metalworkers
to the Roman god Vulcan.

You will recognize same tools used
thousands of years ago.
Hammer, Anvil, and Tongs.

Oldest evidence dates to more
than 5,000 BC (7,000 years
ago)



Blacksmithing

Norse gods didn't have a "smith" god (like the Greek god Hephaestus or his Roman counterpart Vulcan). In spite of being polytheists they didn't divide every aspect of their lives in the way that other cultures (Greek, Roman) did. In Norse mythology most of the "cool crafts" were done by the Dwarfs (Dwarves). Dwarves had far greater cleverness in the arts and crafts of working with iron and gold and precious stones. These Dwarves, with Durin as their king, made rings and swords and priceless treasures, and mined gold out of the earth.

(Roger Lancelyn Green. Myths of the Norsemen)

Though there are "legendary" smith figures in the Norse mythology beside the Dwarves, like **Waylan the Smith**. Wayland (sometimes Weyland or Weiland) is, according to Völundarkviða (a poem in the Poetic Edda), one of the three sons of the king of the Finns. But, in spite of being a legendary master blacksmith, he didn't forge any remarkable artifacts nor any of the god's weapons. He is also a human figure (although maybe with skills that could rival with those of the Dwarves) not a god.

(Source: mythology.stackexchange.com)

Safety gear

Protection from heat

Safety Goggles or Face Shield – Eye Protection

Flying sparks, scale, flying tool shards

Gloves – protects hands (wrists, forearms) from heat, sparks, etc.

Apron – protects clothes from flying sparks and scale

Masks (face coverings) are Mandatory during the Covid pandemic.

And, Keep a Fire Extinguisher handy and know where additional extinguishers are located.

Blacksmith Space

Flamable objects (wood shavings, rags, fluids, leaves) in the Blacksmith Shop area are subject to having hot sparks/scale/metal set them on fire.

Galvanize/Platings

Don't Heat Galvanized or Zinc plated metal. The fumes are very dangerous (Zinc Flu).

Cadmium and other platings are dangerous as well

Pot Metal (is a Zinc alloy). Avoid.

Protecting Others

Forging metal (pounding it on an anvil) produces very hot flying sparks and scale.

Let people around you know what is going on.
i.e. "Hot metal – coming through !"

Forge

A furnace, usually gas or coal, for heating metal making it easier to work. Typical temperatures inside the forge are 1,500° F to 2,000° F plus.

Temperatures

Steel Heat/Colour Chart

Colour	C	F
Faint Red	600	1112
Dark Red	700	1292
Cherry Red	800	1472
Dull Orange	900	1652
Orange	950	1742
Lemon Yellow	1000	1832
Yellow	1050	1922
Bright Yellow	1100	2012
White	1200	2192
Glowing White	1300	2372

Bottom Line

Black Steel can be at
a temperature of
1,000 degrees !

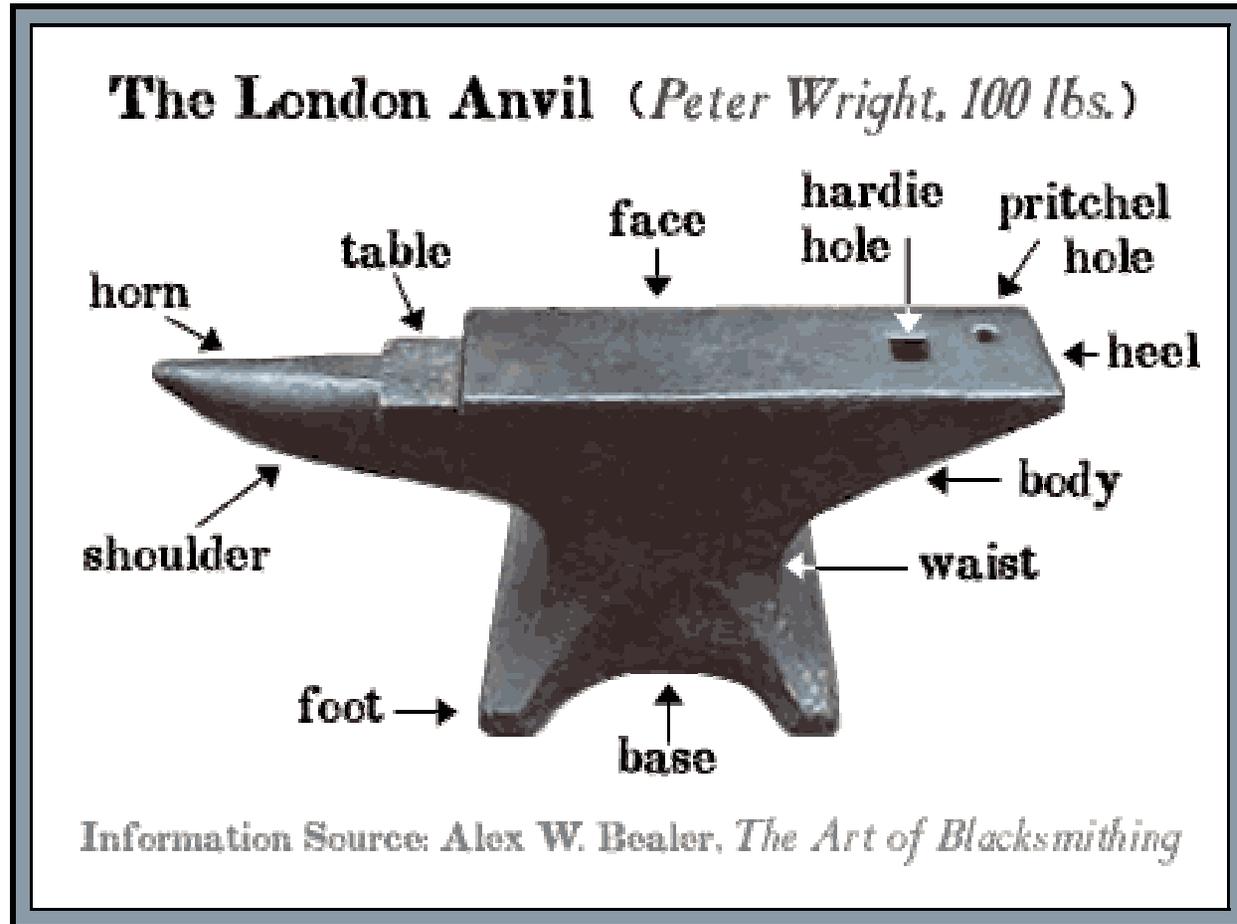
Anvil

An anvil is a metalworking tool consisting of a large block of metal (usually forged or cast steel), with a flattened tool steel top surface, upon which another object is struck (or "worked").

Anvils are as massive as is practical, because the higher their inertia, the more efficiently they cause the energy of striking tools to be transferred to the work piece. In most cases the anvil is used as a forging tool. Before the advent of modern welding technology, it was the primary tool of metal workers.

(Wikipedia)

Anvil



Leg Vise

Leg vises, which are attached to a bench but also supported from the ground so as to be stable under the very heavy use imposed by a blacksmith's work.



Hammers

Weight

Usually between 1 and 3 pounds (close to 2 most common)

Types (most common usage)

Ball Peen



Cross Peen



Straight Peen



Rounding



Hammers

Swinging a hammer

Stance

Chest Open (burning lots of energy, need oxygen)

Full arm movement

Hit it like you mean it,

but, let the hammer do the work – just get it going.

(gravity is your friend)

Aim – look at where you want the hammer to hit

Practice

Tongs

Used to hold hot metal and move it into or out of the Forge.

Flat Jaw



Wolf Jaw



Duck Bill



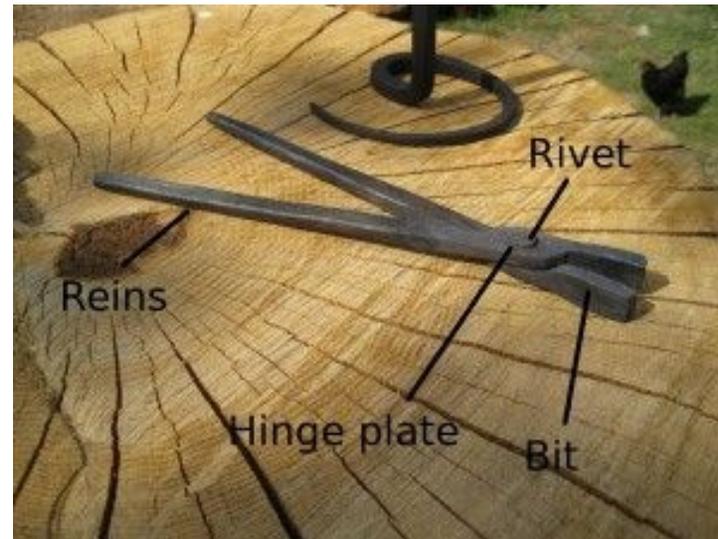
Bolt



Box



Many, many others



Twisting Wrench



Used to Twist Metal.

Center section adjustable

2 handles make it easier to twist a straight section of metal and keep it straight.

Stuff

A 'Heat' is placing your metal in the Forge and heating it, usually to a bright red/orange color before working it on the Anvil.

Slack Bucket/Tub – a bucket/tub of water for quenching (cooling) metal and tools

Annealing Bucket – a bucket of vermiculite or ash into which hot metal is placed so that it cools very slowly.

Oil Quench – container of special quenching oil used to harden high carbon steel. (May also use air, water, or brine – depending on the type of steel.)

Don't strike the Anvil directly with the hammer. Striking two hardened surfaces together may cause one to fracture.

Drawing out

Lengthening a section of metal

Hammer on the flat, one side then the other (rotate 90°)

Metal will elongate but remain square in cross section.

Can be done on the face of the Anvil

Can use flat or rounding hammer

Can use cross peen to draw out faster

Can also be done on the horn of the anvil

Viking Pizza Axe



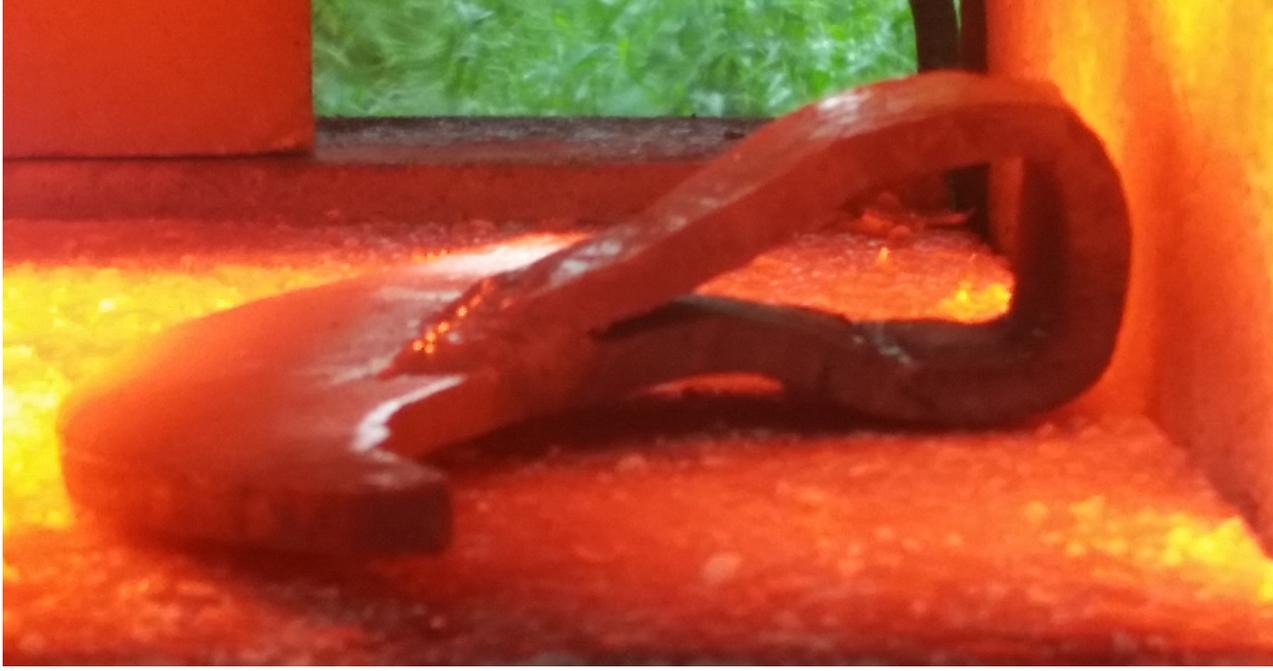
Viking Pizza Axe



Viking Pizza Axe



Viking Pizza Axe



Viking Pizza Axe

Start with a pre-welded Axe blank

Take a Heat

Offset the 'eye' (place where the handle will go).

Square up the back of the eye and form it to shape

Taper the cutting edge of the Axe

Heat and straighten/adjust as necessary

Quench

Use steel brush to clean up and remove scale

Stamp Runes if desired

Grind to shape

Warm and apply wax if desired

Please ask Questions

If you are not sure – Ask

Stewards are here to help you
(but not to do the work for you)

There are special techniques and materials for
special circumstances.

Biggest problems

Metal not hot enough

Metal too hot

Not hitting where you aim

Not working the full heat of the metal

Picking up *hot* parts

Be Safe

Be Safe.

Be Careful.