

# Welcome to Silversmithing Level One!

## Materials

Attached is our class handout where it lists the materials needed for each project. Note: Each project does not have to be sterling silver, copper is a nice affordable option. Silver Gold and Copper are all worked with in the same way and with the same tools. Please come in early or during the week before each class to purchase your materials. Class starts on time.

## Toolbox

Tool boxes are available to rent for \$140. You can choose to return it at the end of the course within two weeks of the end date and get all but \$25 back. You can also choose to keep the tool box. If you have or want to purchase the tools you will need:

Saw Frame 2 1/4"  
220grit Sandpaper  
400grit Sandpaper  
Safety Glasses  
Plier Kit  
Rawhide Mallet #2 6oz  
3/0 Sawblades 1dz  
Graduated Ring Mandrel  
Wolf Sanding Mandrel  
Needle File Set  
Large Hand File



## Parking

Parking is available at the side of the building with the staff parking. The front door will be locked at night.

## What to do if you miss a class:

Class time can be made up at the teachers convenience. Saturday afternoons are always a good time but make sure to speak with the instructor.

## Studio Time:

Studio time is available anytime Bedrock is open.

Monday through Friday 10am-6:30pm

Saturdays 10am-5:30pm

\$10 per hour

10 hours for \$80

20 hours for \$140

# Silversmithing Level One



## Flux:

Flux is used when soldering on the join to keep the solder seam clean. Solder will not flow to anywhere dirty.

## Types of Flux:

**Borax:** A mineral; powdered and mixed with water to facilitate application, forms a glassy residue best removed by pickling.

**Dandix Flux:** A white borax base compound. Provides good oxide protection: leaves flux glass, clear and fluid at 100 F.

**Batterns:** A Fluoride base flux with the consistency of water; usually yellow or green. It is called self pickling, since it doesn't leave much flux glass.

**Prips Flux:** A home made flux that provides good oxide protection and is a fire scale inhibitor.



## Pickle:

Pickle is a chemical used to clean oxides off a metal surface without abrasion. Most are used simultaneously to dissolve flux glass. Pickles work at room temperature but are hastened with heat- use a crock pot to heat. To mix use one part sparex to ten parts water. Copper tongs, wood or plastic baskets are the only thing to be used in the pickle. Stainless steel tweezers cause a plating reaction - growing copper crystals onto your sterling silver that later have to be sanded and polished off. This can be used to your advantage if you are soldering copper with silver solder and want to plate your solder joints over.

## Flame Types:

**Neutral:** Sharp point, gentle hiss, medium blue color, all gas is being ignited. Hottest point is the bushy part of the flame. This is the most common flame we use.

**Reducing:** Bushy, pulsing flame, deep blue color, fuel rich. Helps absorb oxides; a clean flame. We rarely use this flame

**Oxidizing:** Thin cone, angry hissing, pale lavender, fuel starved. Has no advantages when soldering.



## Soldering:

Pieces being joined should make a tight fit. A neater and stronger joint will result from care on this point.

Joint and solder must be clean: no grease, finger oils, tape, pickle, buffing compound, graphite etc

Flux must be used to protect the metal from oxidation. Each reheating usually requires refluxing.

All pieces being soldered should reach soldering temperature simultaneously. Heat the areas adjacent to the joint to reduce the conduction away from the joint. Take into account tweezers, binding wire and steel mesh act like heat sinks stealing the heat away from the silver.

Solder flows toward heat. When possible use the torch location to draw solder through a joint.

Use just enough solder to fill the joint; don't settle for just what is handy. It takes considerably less time to cut the correct size piece of solder than to remove excess later.



## Solders:

Solder comes in sheet or wire form. Then there are three types of sterling solder. Easy medium and hard. All three come in sheet and wire forms. When soldering more than one joint on a piece it is important to pick the right solder. Each has different melting temperatures and varies in color. Hard has the highest melting point and is the closest color match to sterling. Easy has the lowest melting temperature is a little more brown or yellow than sterling silver.

Hard 773 C 1425 F

Medium 747 C 1390 F

Easy 711 C 1325 F



## Project One: Soldering a Band Ring

### Supplies:

Sterling silver wire: half round, rectangle, square, round or patterned.

**Step One:** Wrap a piece of paper around your finger tape it closed and cut it off. This will give you the length of silver you will need to make a ring for the finger you measured. Make sure the paper ring can make it over your knuckle.

**Step Two:** Soften your silver by annealing it with the torch. You want to heat the silver flat against the brick until it becomes a cherry color or the metal begins to glow. Quench in water and place in the pickle pot until the silver turns back to white.

**Step Three:** File each end of the silver so that they are perfectly straight.

**Step Four:** Bend the silver until the two ends meet up. Make sure there are no gaps between the ends. The ring does not have to be a perfect circle. You will hammer it at the end to shape it. It should look more oval or a D shape to make sure the ends meet properly.

**Step Five:** Solder the ring closed. Set the ring upon the soldering block. I usually put the place where I want to solder facing me unless the band is patterned and then I set it up to be soldered from the inside. Flux the solder joint. Cut appropriate solder. Light the torch and begin heating the opposite side of the band. Currently because of the shaping of the band there is tension in the ring. By heating the opposite side first it takes any tension off of the ring so your seam doesn't open up. Once the flux goes white and fluffy continue heating until it turns clear. Once clear you are ready to pick up your solder. Ball up the solder with your torch and pick up the solder ball with your soldering pick. The solder ball will only attach itself to your pick if the flame is on it. Now place on the solder on the joint while applying heat. Once the solder is applied, evenly heat the ring until the solder flows.

**Step Six:** Pickle to remove the flux and oxides until the silver turns white, then brass brush.

**Step Seven:** Shape the ring by hammering it with a rawhide hammer and a ring mandrel. Make sure to flip the ring occasionally as the mandrel is tapered.

**Step Eight:** File File File. File any dent marks created from bending the ring. File the solder joint until you can no longer tell it was there. Then begin using sandpaper on the outside and inside with an inside ring sander to eliminate any coarse file marks.

**Step Nine:** Tripoli inside and outside of ring on polisher. Make sure to wear safety glasses and always use the bottom of the buff. Tripoli removes the scratches. Remove excess polishing compound with a toothbrush, soap and hot water.



## Project Two: Cabochon Setting

### Supplies:

Cabochon, something round or oval. Preferably a hard stone.

No opal, ammolite, amber etc

Sheet silver to fit under your chosen gem 20-22ga

Fine Silver Bezel Wire

**Step One:** Anneal your fine silver bezel wire. Make sure to be careful when annealing, fine silver does not change color in the flame like sterling.

**Step Two:** Using fine silver bezel wire measure around your stone cutting it a little larger than you think you need.

**Step Three:** File the bezel until it perfectly fits your cabochon. There should be no gaps between the stone and bezel. The stone should be able to fit right through the bezel easily. If your bezel isn't the right size it is better to start again rather than fix it.

**Step Four:** Solder the bezel shut just like you would a band ring. Make sure to be careful because it is very easy to melt your bezel. With reducing flame.

**Step Five:** Shape your bezel around your stone making sure it is a perfect fit.

**Step Six:** Using a tripod, set up your bezel and sheet silver. Flux and heat until the flux is no longer white. Place solder chips all around the inside of the bezel. There is less clean up required if the solder is placed on the inside rather than the outside. Heat from underneath the mesh screen until solder melts. It is best to heat from underneath because the sheet silver requires more heat than the bezel due to its size. You will need a larger oxidizing flame because the tripod mesh will act as a heat sink and steal some of your heat.

**Step Seven:** Pickle and brass brush.

**Step Eight:** Cut out your desired shape around your bezel and solder on your bail, ring etc (depending upon what you have chosen to make)

**Step Nine:** Place your gem inside the bezel. Use a burnisher to push the bezel towards the stone starting at 12 then 6 then 3 then 9 working your way across the bezel until it begins to close.

**Step Ten:** Polish. Dont worry about getting polishing compound on your stone, it can handle it. Stones like Amber, Ammolite, Pearl will not be as forgiving.



## Project Three: Reticulation and Tube Setting

Reticulation is a process by which metal is made to draw itself into ridges and valleys, creating a unique rich texture. The buckling occurs as the result of different cooling rates of the layers. The fine silver settles on the surface and the copper settles in the middle of the silver. The top then starts to melt and buckle creating a beautiful texture.

### Supplies:

- 20-22ga Sterling Silver sheet or coin silver
- 3.5mm Sterling Silver Tubing for settings and bail
- 3mm faceted synthetic gemstones

**Step One:** Anneal your silver sheet approximately 4-8 times. Begin heating the surface until it begins to melt pulling your torch up as it does. Repeat this again and again until silver begins to ripple and reticulate.

**Step Two:** Pickle, and brass brush.

**Step Three:** Cut your tubing to desired length. Make sure not to cut shorter than the height of the gemstone.

**Step Four:** File the top and bottom of the setting tubing until it sits straight on your reticulated metal. Cut a piece of tubing for the top of your piece as a bail.

**Step Five:** Place tubing on surface where desired. Flux and heat placing solder where the tubing meets the sheet. Direct your flame to just in front of the tubing but not actually hitting the tubing directly. Heat until the solder melts. Place your tubing bail and solder.

**Step Six:** Pickle and Brass Brush

**Step Seven:** Using a setting bur the same size as your gemstone cut a seat into your tubing so that the gem sits flush with the top of the tubing. Place gem inside and begin bending the tubing just like the cabochon setting working from opposite sides until the gem is set.

**Step Eight:** Polish

\*This is an extra project if time permits

## Project Four: Piercing



### Supplies:

A design of what you would like to cut out

Sheet silver to fit the desired design. Pendants 20-22ga Rings 18-16ga Earrings 22-26ga

### Loading the Sawframe:

1. The teeth on the sawblade must point down and out towards the metal.
2. Put the blade tightly into the bottom clamp.
3. Adjust the neck so the blade comes up halfway up the bolt on the top clamp.
4. Press the neck of the sawframe into the bench pin so that the blade moves all the way to the top of the clamp. Clamp tightly
5. Make sure blade is tight.

Note: If you cannot see the sawblade use your fingers to feel the teeth.

**Step One:** Using a glue stick glue the image onto one of the silver sheets.

**Step Two:** Drill small holes into the areas to be cut out.

**Step Three:** Cut all the inside areas first. Feed the sawblade through one of the holes, tighten into the sawframe.

**Step Four:** Cut out all the inside pieces first. Using needle files file any inside cut outs that need

refining. To get into smaller areas use the sawframe and rub the blade along the edge to refine.

**Step Five:** Cut the entire outside.

**Step Six:** File all inside and outside areas.

**Step Seven:** Scrub off the design with a brass brush, soap and water.

**Step Eight:** Attach findings if needed, polish.

### Things to remember about Piercing:

- Always keep the saw moving up and down the entire length of the blade.
- The sawblade must move straight up and down, any change in angle will break blades.
- The sawblade must be tight in the sawframe
- Move the metal around as you are cutting not the sawframe, the sawframe always moves up and down in the same position
- Treat it like you would treat a bread knife. Do not push the blade forward, if the saw frame is moving up and down straight, the blade will cut.
- Oil or Bur Lubricant can be used to help the sawblade move in and out of the metal. Rub it onto the back of the blade once in awhile to lubricate.
- If the blade freezes and cannot be moved forward, release the upper thumbscrew and remove the blade. Begin sawing again from a different direction.



## Project Five: Chain Making

### Supplies:

will depend upon project chosen  
Copper, Brass or Sterling Silver

This is an open chain project. Students can either choose chain maille or soldered chains. This project will be discussed at the end of the fourth class.