

# First Activity - Getting acquainted with the lathe

## Goals and objectives:

- Set up for spindle turning
- Practice basic tool cuts
  - Roughing out
  - Smoothing
  - Beads & Coves
  - Parting & sizing

## Process:

### Mount the Blank

- With a short piece of practice stock mark the center on both ends
- Mount on the lathe “between centers,” that is with a spur drive installed into the lathe headstock and a live center mounted in the tailstock
- Secure the work piece by securing the tailstock, advancing its quill until the spur drive on the other end is firmly imbedded.
- Lock the tail stock quill by tightening its small locking lever
- Set a lathe speed of approximately 1800 RPM (see instructor for details)

### Turn the blank round (Roughing out)

- Advance the tool rest to about ¼ inch from the face of the wood
- Set the tool rest so that the cutting edge of the tool is at about centerline of the lathe
- Using the spindle roughing gouge practice making the spindle round, straight and without undulations
- Due the activity with left and right hands working toward both ends of the work piece

### Plane the blank smooth

- Using the skew chisel plane the blank so it is as smooth and straight as possible
- Raise the tool rest so that the cutting edge of the tool is about 11:00 o’clock ion the face of the wood – keep the tool rest close to the wood
- Work both left and right

### Turning Beads (Two ways)

### Turning coves (Shallow fluted gouge)

### Parting cuts

# Activity Two - Turning American Slim Pens

## Pen turning requires three separate groups of activities:

- Preparing the blank for turning
- Turning the pens
- Assembling the kit
- 

## Supplies required are:

- Pen blank  $\frac{3}{4}$  x  $\frac{3}{4}$  x 5 inches, straight grain hardwood
- 7mm American Slim pen kit & instruction sheet
- 7 mm brad or bullet point drill bit and drill
- 7 mm pen mill
- Pen mandrel and bushing for 7mm Am. Slim kit
- Medium thickness Cyanoacrylate glue (& accelerator)
- Fixture for hold blank vertical while drilling
- Pen to mark blank alignment
- Sanding supplies
  - 80-100 grit for roughing brass tubes
  - 120-600 for sanding finished pen
  - 0000 steel wool
- Finish
  - Friction polish
- Turning tools
  - Spindle Roughing Gouge
  - ( $\frac{3}{8}$  shallow fluted gouge)
  - (Skew chisel)
- Finishing supplies
  - Sand paper various grits to 600
  - Friction polish or other finish
  - Cloth to apply polish
  -

## Preparing the blank for turning

- Cut blanks to length
  - Measure brass tubes and mark on wood blank
    - Add  $\frac{1}{8}$  inch to each length
  - Cross cut blanks squarely
  - Mark mating ends for realignment later
- Insert brass tubes into blanks
  - Rough the surface of each tube with 80-100 grit sand paper
  - Coat each tubes with medium thickness Cyanoacrylate glue
  - Twist the tubes into the wood blanks from the mating (marked) ends
    - Press the tubes slightly below the wood surface
  - Allow to dry or add accelerator
- Square blank ends for turning
  - Using a 7mm pen mill square each end of each blank
    - Assure the blanks are firmly clamped
    - Assure that the brass is exposed and shiny at each end when completed
    - (Do not over cut the ends as the pen length will be affected)

## Turning the pen

- Assemble the blank on the mandrel
  - Place one 7mm bushing on the mandrel followed by one blank
    - The reference mark should be facing the tail stock
  - Insert a second 7mm bushing and add the second blank
    - The reference mark to face the head stock (and the other reference mark)
  - Add the third 7mm bushing and secure in place with the brass end screw.
  - Tighten completely
- Insert mandrel into lathe headstock
  - Clean the lathe's taper and the matching Morris taper on the mandrel
  - Insert into the lathe and bring up the tail stock
  - Tighten the tailstock only enough to engage the live center point into the dimple on the mandrel's end
    - *Over tightening will damage the mandrel and cause the pen to be turned oval*
- Rough turn using the spindle roughing gouge
- Finish turn the pen
  - Reduce dimensions until approaching the diameter of the bushings
  - Leave a small amount of wood proud of the bushing to allow for sanding
  - Sand skipping no grits
    - Keep sand paper moving at all time to minimize circular scratches
    - After each grit, turn lath off and re-sand with the grain
    - Complete sanding with 0000 steel wool
- Apply appropriate finish
  - Friction polishes
    - Use small square of shop cloth or cotton
    - Apply a thin coat allow to dry
    - Increase lathe speeds and burnish until finger get warm
    - Reapply if desired

## Assemble the Pen

- Remove the two blanks from the lathe keeping them in exact order
- Assemble the writing tip
  - Insert the pen tip into the far left blank end
  - Press into place squarely with pen press or wood-faced vice
  - Insert the twist mechanism into the other end of the same blank
    - Brass end first
    - Press into the blank until the marking band is slightly proud of the blank
    - Test the position by insert the pen refill and twisting to full extension
    - Adjust the fit by repressing the mechanism
    - *(Do not over press as removal is very difficult)*
- Assemble the top section
  - Insert the clip into the cap and press into the far right blank end
- Complete pen assembly
  - Place decorative center bank over the twist mechanism
  - Press the top portion of the pen into place

# Activity Three – Bud vase

## Goals & Objectives

- Learn to turn a basic “bead & cove” shape
- Practice transferring dimensions
- Complete and part off a project

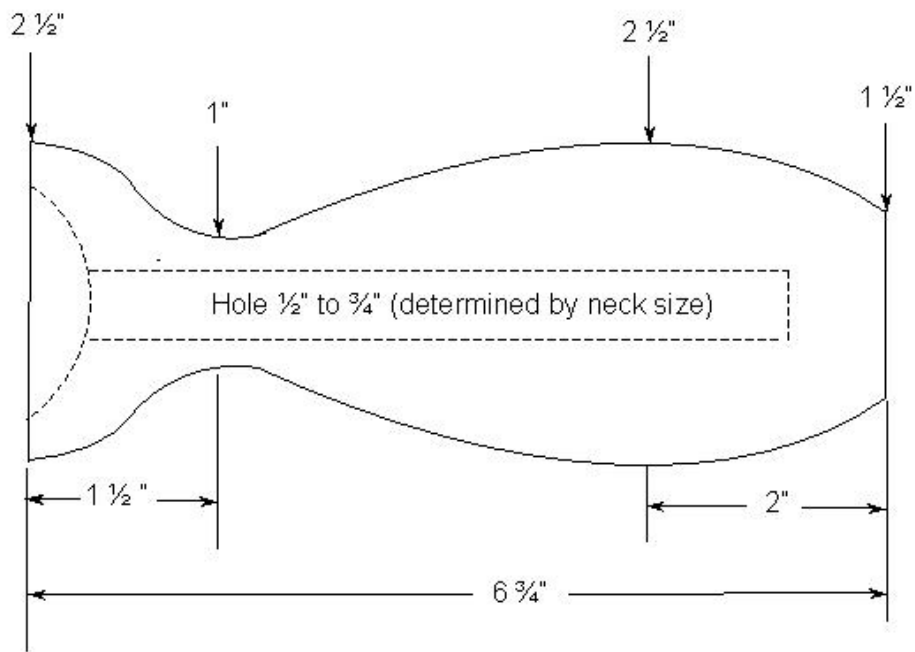
## Materials & Supplies

- Wood blank 3x3x8
- Four-jaw chuck
- Spindle Roughing Gouge (SRG)
- Shallow fluted gouge
- Drill bits and Jacobs chuck
- Parting tool & calipers
- Sand paper & finish

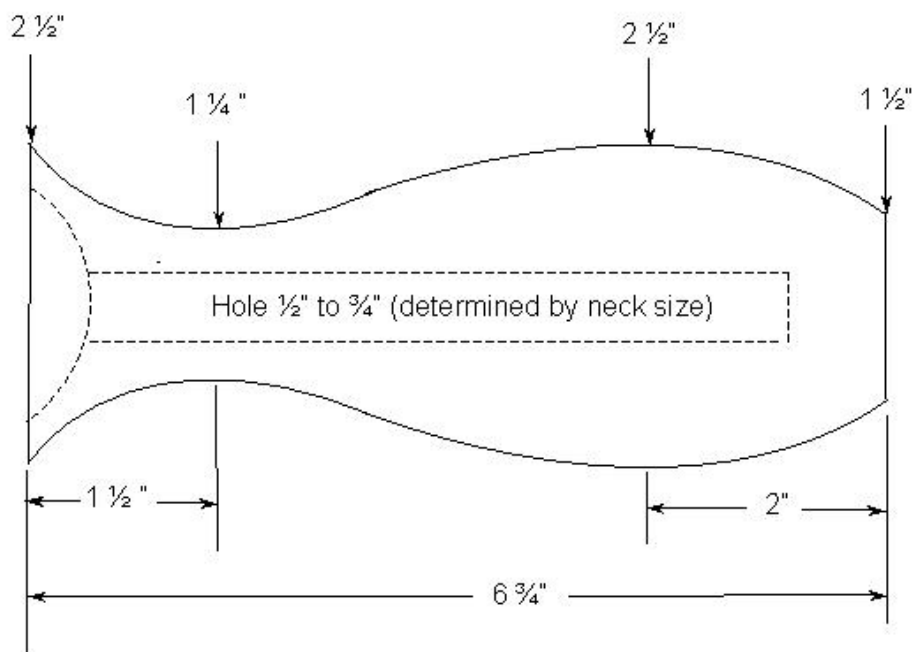
## Process

- Center & mount wood blank between centers
- With the SRG rough turn wood blank round
- Mount the blank in a four-jaw chuck
  - Transfer the tendon diameter of the selected chuck to the tail stock end of the wood
  - Transfer the tendon length the same end of the blank
  - Cut a tendon for the chuck as marked
  - Transfer the blank to the chuck
  - Bring up the tail stock for support
  - Re-true the blank
- With the parting tool and calipers, transfer major dimensions to the blank from drawing
  - Abut the drawing dimensions to the tailstock end of the blank
- Turn only the top 2/3 of the shape beginning at tailstock end of the lathe
- Drill depth hole from tailstock end with the Jacobs chuck and drill
- Complete shape reducing base diameter to final dimension
- Sand and finish
- Part off

## Bud Vase 1



## Bud Vase 2



# Activity Four – Rough turning a green bowl

## Introduction

Harvesting wood and turning bowls from domestic sources is one of the pleasures of wood turning. The process is completed in two separate steps:

- Roughing out a green wood bowl blank and drying
- Complete a bowl from a dried blank

### 1. Basic requirements

- i. Lathe
  - a. Spur drive/live center
  - b. Faceplate and square drive screws

### 2. Required tools

- i. Bowl gouge, 1/2" finger nail profile
- ii. Parting tool (for preparation of tenon)
- iii. Large bowl scraper (for competing the interior)
- iv. Cut off saw (for shortening the tenon stub)

### 3. Other items needed

- i. Bowl calipers (for measuring wall thickness)
- ii. Calipers (for determining tenon diameter)
- iii. Grease pencil, ruler
- iv. Personal safety gear
  - a. Face shield
  - b. Dust mask

### 4. Preparing the turning blank

- i. Log – preparing for storage
  - a. Select diameter suitable for lathe swing
  - b. Band saw/chainsaw log through its center for best grain alignment
    1. Remove the pith completely
    2. Goal is to select the best potential bowl shape
  - c. Saw half log to length (diameter plus 20 %)
  - d. Seal end grain with wax to prevent checking
- ii. Bowl blank – preparing for turning
  - a. Re-cut the log blank to proper width and length for your lathe
  - b. Cut off corners
  - c. Mark center on both sides removing bark on outside

### 5. Roughing out finished edge bowl

- i. Mount blank between centers with bark face toward tail stock
  - a. Drive spur into center with mallet before mounting on your lathe
  - b. Mount securely with a tightly positioned tailstock
  - c. Check for adequate clearance between the lathe bed and tool rest
  - d. Set speed low as bowl blank will be out of balance for some time
- ii. Shape exterior of bowl
  - a. Use larger bowl gouge to shape the exterior
  - b. Start at tail stock end and work toward head stock end

- c. Work off protruding comers first then extend cut further toward head stock rough shaping the bowl exterior
  - d. Increase lathe speed as work balance improves
  - iii. Complete a tenon
    - a. As bark end is shaped, mark with grease pencil the length of the tenon and its exact diameter
      - 1. The diameter will be the exact diameter of the faceplate selected for the next step
    - b. Use a parting tool to complete tenon
      - 1. Use calipers to test the diameter
      - 2. Assure that the face of the tenon is flat and square
  - iv. Finish exterior surface
    - a. Shear scrape with bowl gouge to remove major imperfections
- 6. Turning bowl interior**
- i. Prepare for reverse turning
    - a. Mount blank on faceplate
      - 1. Align tenon with diameter of faceplate
      - 2. screw into place with square drive screws
    - b. Reduce speed setting
    - c. Screw faceplate onto the lathe
    - d. With tailstock still in place retrue exterior
    - e. Square up the bowl face
    - f. Remove tail stock
  - ii. Turning interior
    - a. Turn the bowl interior to approximately 1" wall thickness (or 10% of bowl diameter)
      - 1. Work from lip of bowl toward bowl center
      - 2. Work in small increments increasing diameter of cut slowly
      - 3. Work in increments of 1" depth
        - a. Blend to next increment
        - b. *Don't go back after an upper section is completed*
    - b. Increase lathe speed as appropriate
    - c. Complete smoothing interior
      - 1. Using a bowl scraper working from bottom center to top edge
  - iii. Preparing for storage
    - a. Remove the screws from the faceplate
    - b. Paint the end grain area with a wax emulsion interior and exterior
    - c. *Store in brown paper bag tightly close in cool dry location*
      - 1. *Check for dryness*
        - a. *Mark date and weight on bag*
        - b. *Periodically reweigh*
    - d. *When weight becomes stable, bowl may be remounted and completed*

# Activity Five – Completing a dry wood bowl

## Introduction

After a drying period the bowl blank will be dry enough to complete. While drying, however, the blank will have deformed due to cellular shrinkage and will have to be re-trued prior to completion.

Since we are using faceplates for all steps, the face of the tenon must be re-flattened before remounting to get a firm hold and good mount.

1. Remount, re-true rough turned bowl tenon
  - a) Remount blank between centers using a jam chuck to drive the bowl
  - b) True up the tenon
  - c) Remount bowl into face plate
  - d) Re-true the exterior of the bowl
2. Complete exterior
  - a) Finish turn the exterior
  - b) Shear scrape and sand to final condition
3. Complete the interior of the bowl
  - a) Using the deep fluted gouge reduce the interior wall thickness to final dimension
    - i) Complete the reduction of the top one inch portion only
    - ii) Complete the rim
    - iii) Reduce the next one inch portion and blend in to the first section
    - iv) Continue this process until completed not returning to the earlier sections
  - b) When the curvature of the bottom cannot be addressed with the gouge the bowl scraper may be employed
    - i) Check with the instructor for specific instructions
4. Turning the foot
  - a) Remove the completed bowl from the faceplate
    - i) Determine interior bowl depth
    - ii) Measure depth and transfer information to a piece of blue painter's tape affixed to bowl exterior
  - b) Create a jam chuck
    - i) On the face plate true up a piece of scrap wood approximately  $1/2$  to  $1/3$  the diameter of the bowl interior
  - c) Mount bowl between centers using the jam chuck and a non-slip pad
    - i) Position the bowl carefully to center
    - ii) Use tailstock to re-center
  - d) Shape foot
    - i) Using a spindle gouge reduce tenon
    - ii) Assure sufficient support for bowl by maintaining a minimum of  $1/2$ " diameter tenon stub
    - iii) Shape foot with a concave (undercut) bottom
    - iv) Refer to tape mark to assure that the bottom thickness is adequate
5. Remove tenon stub
  - a) Remove bowl from lathe
  - b) Cut off tenon stub
  - c) Carve/sand away any remnants of tenon stub
  - d) Sand and finish the foot

# Activity Six - Goblet

## Goals & Objectives

- Learn end grain hollowing techniques
- Using the skew chisel for thin stems

## Materials & Supplies

- Wood blank 4x4x8
- Face plate and screws
- Spindle Roughing Gouge (SRG)
- Shallow fluted gouge
- (Skew chisel)
- Drill bits and Jacobs chuck
- Parting tool & calipers
- Sand paper & finish

## Process

- Center & mount wood blank to face plate with screws
  - (hardwood blanks will need to be pre-drilled to prevent splitting)
- Screw faceplate onto lathe and bring up the tailstock for additional support
- With the SRG rough turn wood blank round
- With shallow fluted gouge shape the goblet bowl on the tail stock end of the billet
- (Drill depth hole from tailstock end with the Jacobs chuck and drill to approximately 80 of the bowl depth)
- With the shallow fluted gouge, open the interior of the bowl
  - Center out to rim
  - Check wall thickness and depth frequently
  - Sand to final
  - Fill goblet bowl with paper towel and reinsert the tailstock live center for support
- Reduce the stem carefully from the tailstock end toward the drive center with the shallow fluted gouge
  - (Final shape and smooth the stem with the skew chisel)
- Shape the base
- Sand exterior
- Part off



# Resource List

## Wood Turning major specialty suppliers

Craft Supplies, USA  
1287 East 1120 South  
Provo, UT 94606  
1-800-551-8876  
[www.woodturnerscatalog.com](http://www.woodturnerscatalog.com)

Packard Woodworks  
PO Box 718  
Tryon, NC 28782  
1-800-683-8876  
[www.Packardwoodworks.com](http://www.Packardwoodworks.com)

The Cutting Edge  
7123 SouthWest Freeway  
Houston, TX 77074  
7-800-790-7980  
[www.cuttingedgetools.com](http://www.cuttingedgetools.com)

## Inexpensive turning tools and pen kits

Penn State Industries  
9900 Global Road  
Philadelphia, PA 19115  
1-800-377-7297  
[www.pennstateind.com](http://www.pennstateind.com)

WoodTurningz, Inc  
17408 Tiller Court  
# 300  
Westfield, IN 46074  
1-888-736-5487  
[www.woodturningz.com](http://www.woodturningz.com)

Arizona Silhouettes  
660 East 18<sup>th</sup> Place  
Suite B  
Yuma, AZ 85365  
1-928-329-9466  
[www.arizonasilhouette.com](http://www.arizonasilhouette.com)

## General woodworking dealers (local)

Rockler Woodworking  
541 Contra Costa Blvd  
Pleasant Hill, CA 94523  
1-925-521-1800  
(10% discount on supplies if you mention you are an MDAE student)

Woodcraft of Dublin  
6044 Dougherty Road  
Dublin, CA  
925-875-9988  
(15% discount with student discount card)

## Inexpensive grinding wheels, drills, etc

KBC Tools  
1751 Sabre  
Hayward, CA 94545  
1-510-732-5500  
[www.kbctools.com](http://www.kbctools.com)

Enco  
400 Nevada Pacific Highway  
Fernley, NV 89408  
1-800-873-3626  
[www.use-enco.com](http://www.use-enco.com)