

## **Have a Ball! Turn a Sphere.**

Handout

### **Make a template.**

Refer to the illustration.

Use 1/4" plywood or similar material.

Holes are for hanging together on a peg.

Mount on the lathe with a supporting plate.

Use a point live center.

Use a parting tool to cut the inside template.

The parting tool gap will be the wall thickness.

Cut a full semicircle template from the outside part.

The inside template must include the line through the center.

The outside templates (half circle and quarter circle) must have the perpendicular centerlines.

Cut away the waste (shaded areas).



*Sphere Template*

**Reference lines are important for making exterior and interior spheres concentric !**

### **Start with a blank.**

1/2" longer than wide for tenons e.g. 3 1/4" x 3 3/4" for a 3" sphere.

**Option:** Cut in half on band saw (while rectangular) instead of parting on the lathe for better grain matching. Alignment dowels may be used in predrilled holes to improve figure alignment.

Consider grain orientation.

Glue joint strength.

Figure matching.

Laminations.

Ease of turning.

Desired final product.

### **Make cylinder** (or more cylindrical) between centers.

A live center with point & cup in tailstock makes remounting easier in final steps.

Mark center and left and right side limits. Include loss to parting kerf.

### **Make short (1/4") tenons** to reduce mass to be removed later.

### **Reduce to desired diameter plus a little. (1/8")**

**Reverse mount in chuck** so point & cup center marks both ends.

**Part** (if not cut with band saw).

**Hollow chucked half.**

**This is a good place to take your time!**

Refine face for glue joint.

Define approximate inside diameter limit.

Be aware of grain orientation.

**Turn the lathe off to measure the inside!**



**Tip.**

Rate of tool handle movement for hollowing a spherical profile is constant throughout the cut.

**Chuck 2<sup>nd</sup> half and hollow.**

Remember! Inside and outside spheres need to be concentric and balanced between the halves.

**Glue.**

Dry align figure with point centers and mark for ease of alignment with glue. White glue is ok in most cases. Use yellow wood glue (Titebond 1) if you're not sure.

Apply glue, align, & apply pressure with the tailstock.

Remove from lathe after 5 minutes but maintain pressure for curing.

Allow overnight to cure.

Finishing before the glue is cured results in a higher glue joint failure rate.

**Trap!**



Measure the inside with the template where the nub would be but with **NO NUB!**

**Tip.**

Think about entering a parking space in a crowded parking lot.

**Shape the middle of the outside of the sphere.**

**This is a another good place to take your time!**

Mark sphere limit near tenons to define target.

Be aware of grain orientation for proper tool use.

**Middle needs to be nearly perfect so it will self center in the next step.**

Use quarter circle template. (Semicircle won't fit.)

**Trap!**

The centerline of the outside template must register and align with the glue joint.

**Trap!**

Imperfections here will compound problems completing a perfect sphere.

**Remount between jamb chuck or fixtures.**

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Plain spindle or chuck jaws and cup live center with pads may be used.  
Padded cup fixtures are helpful.  
Glue joint in line with axis of rotation vertically and horizontally.  
Original axis spinning perpendicular.  
Verify center point marks spin in line.  
Mark the line of rotation to be able to see where to place the parting tool.

### **Cut the circular witness through original centers.**

Use a parting tool.  
Cut gently and check orientation of center points.  
Continue until the witness line approaches the glue joint.  
Check for even cutting on both sides.  
Uneven cutting suggests misalignment between centers.



### **Remount between centers and continue shaping to the baseline.**

### **Rotate and remount to remove the remaining nubs.**

### **Rotate and remount as needed to sand.**



### **References.**

Christian Delhon - Spherical Box – AW2004p44-49.pdf  
Frederick C Hill - Spherical Thinking – AW2504p29-32.pdf