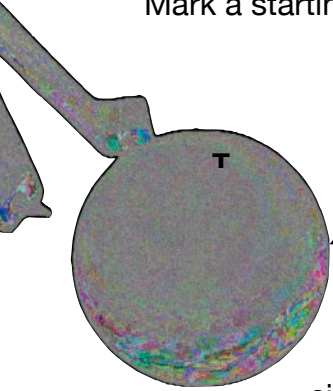


Singapore Ball Point Layout Sheet

1) Measure the diameter of the sphere in mm. Multiply the diameter x .526. Set the compass to that measurement using the digital caliper. Mark a starting spot on the sphere.



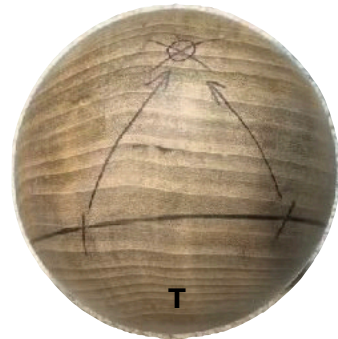
2) Place point of the compass on the starting spot. We'll call this the Top of the sphere. Make a little "T" near this spot for Top. Make a circle on the sphere with the compass.



3) Make a mark on the circle. Use this intersection to place the point of the compass and draw an arc on the circle. Continue this around the circle until you have divided the circle into 5 equal parts. If the 5 sections don't come out exactly, adjust your compass, erase the marks and try again. *It's important that these 5 points are close to perfect.*

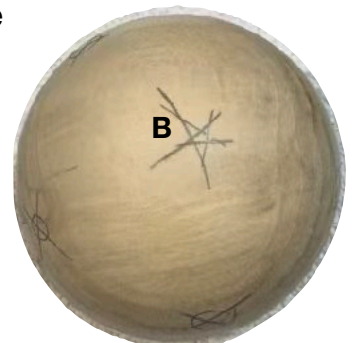
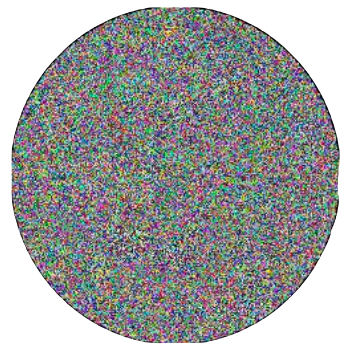


4) Keeping the same measure on the compass, use two of the points you just created on the circle to make an intersection on the side of the sphere that has no points yet. Repeat this 5 times until you get another 5 points similar to the ones on the circle. They will be located between the 5 points from the circle (just on the opposite side of the sphere).



We should now have our starting point (T), a ring with 5 points on the circle and 5 more points towards the bottom of the sphere.

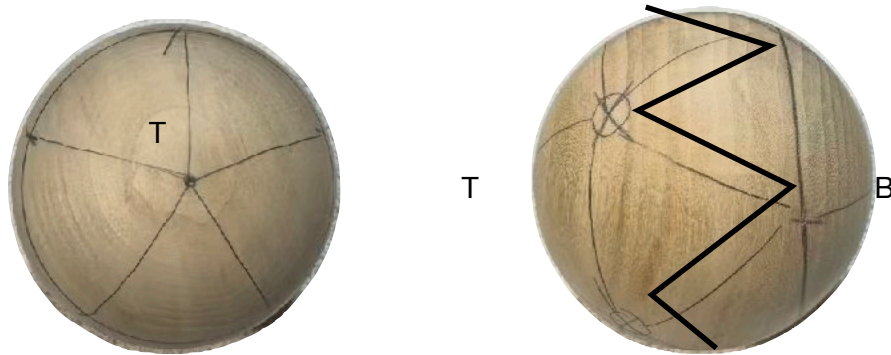
5) Using these 5 points on the bottom of the sphere, using the same measurement on the compass, draw an arc on the bottom of the sphere from each of the 5 points. These will intersect at the bottom of the sphere or create a small star with a pentagon (5 sided figure) in the middle. The bottom point is in the middle of this pentagon. Mark it with a "B" for **B**ottom. If you are happy with the placement of the 12 points you just made, use an awl to indent the 12 points. Draw a small circle around these 12 points.



The 12 points we just made, **Top**, **Bottom** and two rings of 5 points are called the **Primary** points.

Using the **Primary** points we will now identify 20 equal triangles that will give us the 20 **Secondary** points.

6) Using a pencil, draw lines to connect the Top with its surrounding 5 points. Then turn to the bottom and connect the Bottom to its 5 surrounding points. We now have 10 triangles. In the middle of the sphere, connect the points in a zig-zag fashion around the sphere to create the remaining 10 triangles. We should now have 20 equal triangles.



The center of each triangle will be the **Secondary** points.

7) To mark the center of each triangle, set the compass to slightly over half the distance between two of the primary points. Draw an arc from the three points of a triangle towards the center of the triangle. The spot where these three arcs intersect is a **Secondary** point. Mark that point and use an awl to indent the point, circle it. Repeat this process for each of the 20 triangles.



The 12 **Primary** points plus the 20 **Secondary** points represent the **32** points of the Singapore Ball. Leave the pencil marks on until after drilling and widening each hole.

After using the cage (donut chuck) to drill and widen each of the 32 holes, sand the ball with 320, apply finish to the exterior and into each hole. I use Mahoney's Oil to finish the sphere.

Singapore Ball Sheet

Part 1

Sphere selection and preparation

- Maple, Birch, Boxelder, Cherry - close grain, light color
- Choose item with minimal issues
- Sand to 320

Part 2

Layout of points - draw lines to place points on surface of sphere

- Determine diameter of sphere
- Use compass to place primary points on sphere (12)
- Use compass to determine secondary points (20)

Part 3

Use lathe to drill and widen holes in sphere

- Secure sphere in jig, drill first hole to depth
- Widen the bottom of the hole to become a teardrop shape
- Rotate sphere within jig to the next point
- Repeat process (32 holes)

Part 4

Create spikes for sphere

- Round square stock for spikes
- Determine diameter of spikes and add 0.25mm
- Turn spikes, *measure*, sand, *measure*, apply Mahoney's oil
- Insert spike into hole
- Repeat process (32 times)

Materials and tools needed:

Wooden Sphere - (~64mm about 2 1/2")
Digital Caliper
6B Pencil & Eraser
Metric drill bits
Platform tool rest
Bowl gouge - Small
240 and 320 grit sandpaper
Mahoney's Oil for spikes

Wood for spikes - (~mm about ")
Compass - see pattern
Awl
Sphere Cage
Hockey stick scraper
Spindle gouge - Small
Finish of choice for Sphere
Metal Drill Stop Collar

