Lesson #2: Building a Hexagon Serving Tray (10 Days)

Objectives

Students will be able to...

- Apply math skills to building a hexagon serving tray.
- Produce a hexagon serving tray product.

Common Core Standards

LS 11-12.6
RSIT 11-12.2
RLST 11-12.2
Writing 9-10.5
Problem Solving/Critical Thinking 5.4
Health and Safety 6.2, 6.3, 6.6, 6.12
Responsibility and Leadership 7.4, 9.3
Residential and Commercial Construction Pathway D2.1, D3.1, D3.7
CCSS.MATH.PRACTICE.MP6
CCSS.MATH.PRACTICE.MP2
CCSS.MATH.PRACTICE.MP1

Materials

Hexagon Serving Tray Order of Materials
Materials List on The Order of Materials Handout
Bill of Materials
Self-Evaluation

Lesson Sequence

- Pass out and review the ***Hexagon Serving Tray Order of Materials***. Answer any questions.
- Have students fill out their ***Bill of Materials.*** After they have been checked, allow students to begin working on their projects. Monitor progress along the way.
- At the end of the project have students set out their finished products and walk around the room to look at one another's final project. Have students fill out their ***Self-Evaluation*** for project.

Assessment

Informal assessment through questioning and student observations throughout the project time frame.

Use rubric to grade student's product.

Accommodations/Modifications

One on One Support
Check for Understanding
Peer Support as Needed
Extra Time If Needed

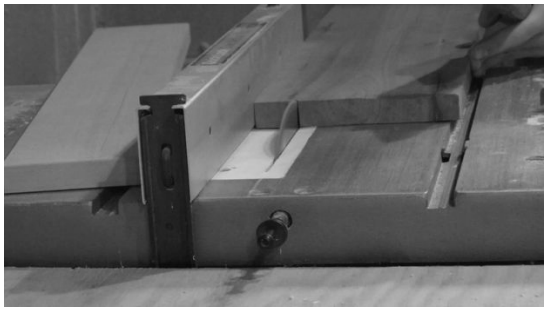
Hexagon Serving Tray Order of Materials

The serving tray is made up of over 50 small trapezoids of different species of wood, which are all laminated into hexagons, and then glued together into a big single piece. This video will show you the process of making the hexagons. You will be using them to make the bottom for a serving tray, so some measurements have been changed.

Making a Serving tray run time 6:01 (the individual is making a cutting board, but we will be using the board as the bottom of our serving tray. https://www.youtube.com/watch?v=iPeSxhdP6Dw

Materials:

- 3 different grained hardwood, 2 or 3 strips off each board - dimensions are: length 13.4in x 1 1/2in width x 1 in. high.
- 1″ x 3″ of the same wood to create a mitered frame around the tray bottom.
- 3/8 x 3/8 x 3′ Square Dowel to make cleats
- 60 grit sandpaper stapled onto a piece of plywood
- grit 80, grit 120, and 240 grit
- Brush to apply glue – Titebond 3, Gorilla wood glue, or similar water-resistant glue
- Elastic bands
- Damp rag
- Polyurethane



Order of Construction:

Step 1: Rip 2 or 3 strips off each board.

Step 2: Measuring and Cutting Angles
The small topside of the trapezoid needs to be the same length as the slanted sides. Mark out a few pieces with a bevel guide, and then set the angle of the blade to a little over 30 degrees. The actual angle is 60 degrees measuring from the table to the left side of the saw blade when using a table saw.

The angle of the blade could best be measured with a bevel box. You attach it on the blade, and it measures the angle of the saw blade digitally very accurate.

Step 3: Sanding

- Sand off the tear out from the saw blade with some 60-grit sandpaper stapled to a board.

Step 4: **Gluing Part 1**

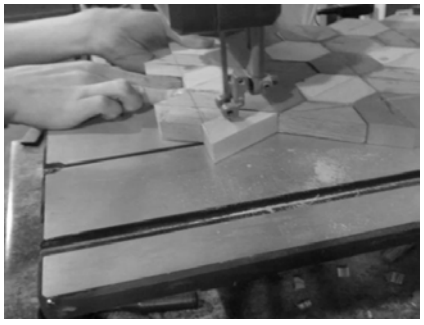
- Lay out all the pieces before starting and glue all the pieces in steps.
- Take two pieces of the same kind of wood and glue them with the longest sides butted up against each other.
- To clamp them, use thick rubber bands and wipe off excessive glue with a damp cloth. Glue all the pieces and wait for the glue to dry.

Step 5: **Gluing Part 2**

- Next step of gluing is to put the hexagons into groups of four. Again, use rubber bands, to clamp together.
- Wipe off excessive glue with a damp cloth. Try to keep all the pieces level and flat as they are drying.
- If there are slight gaps showing up between the pieces, which come from slight imperfections when cutting the pieces, fill the gaps with little wedges of wood glued in or sawdust mixed with wood glue.

Step 6: **Gluing Part 3**

- Take the groups of 4 hexagon pieces and arrange the blocks as tightly as possible in a rectangular fashion.
- Glue and clamp.

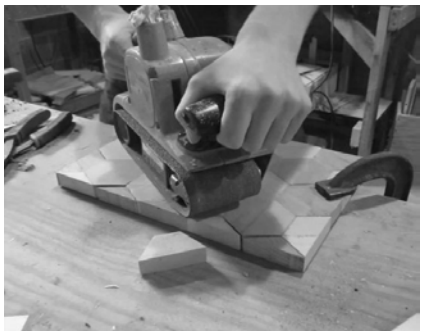


Step 7: **Cutting Square**

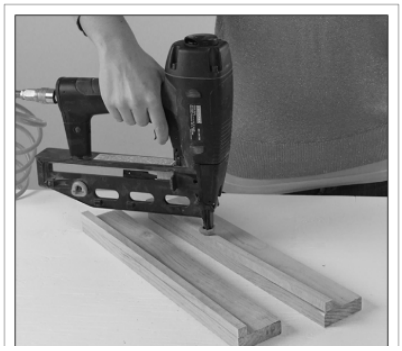
- Drawing lines with a straight edge, square off your board to your size.
- Follow your lines and cut with a band saw.
- Use a belt sander to smooth the edges.

Step 8: **Flattening**

- Block plane the top to make the uneven pieces as level as possible before sanding.
- Sand first with grit 80, then grit 120, and finish with 240 grit
- To flatten the bottom, use the thickness planner. Make sure the top is level as possible before doing this.
- You may use a portable belt sander, which will take much longer.



Step 9: **Framing**

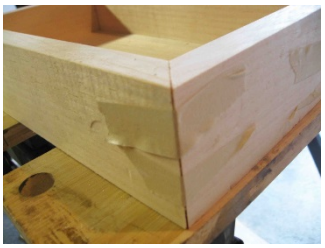


- 3/8 x 3/8 Cleats or square dowels – 2 - (1½" less than width of 1x3 sides)
- 3/8 x 3/8 Cleats – 2 - (1¼" less than length of 1×3 sides)
- 1x3 sidepieces to frame the hexagonal bottom

How to Cut a Board to Length w/ Angles - A Beginner Tutorial
https://www.youtube.com/watch?v=yMPF40sExcM

- Using a miter saw and the cut list above cut the 1×3 pieces and square dowels to size. Miter one of the edges of the 1×3" at a 45-degree angle and then hold it up to the bottom piece of wood and mark where the edge is.
- Then use that mark on the miter saw to measure where to start the 45-degree angle cut out.
- Sand the sidepieces.

Step 10: Dry Fit the Sides



- Attach the first set of cleats. Position the cleats on the 1×3 pieces flush with their bottom edges and ends. Apply a bead of wood glue to the cleat, reposition it, and then nail it in place using a pneumatic nail gun and ¾-inch finish nails.
- Then glue the corners together and use some masking tape or clamps to hold them together, you may also nail them.

Step 11: **Finishing**

- Once the glue has dried use polyurethane on the tray. Or any other finish to bring out the differences in the woods.

Hexagon Serving Tray Self-Evaluation

1. What I had learned from this project ...

2. Parts of the project I am most proud of ...

3. Safety practices I have been observing...

4. What I have learned that I should be doing, from this point on, to ensure any other projects have an excellent outcome.

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Project #2: Hexagon Serving Tray

Bill of Materials

Part #	Description	Material Type	Dimensions (calculate footage)		Footage (bd/ft, lin/ft, sq/ft)	Quantity Of Parts	Unit Cost	Total Cost
				=				$-
				=				-
				=				-
				=				-
				=				-
				=				-
				=				-
				=				-
				=				-

To calculate board feet with all measurements in inches: $\frac{T \times W \times L}{144}$

Total Cost: $-