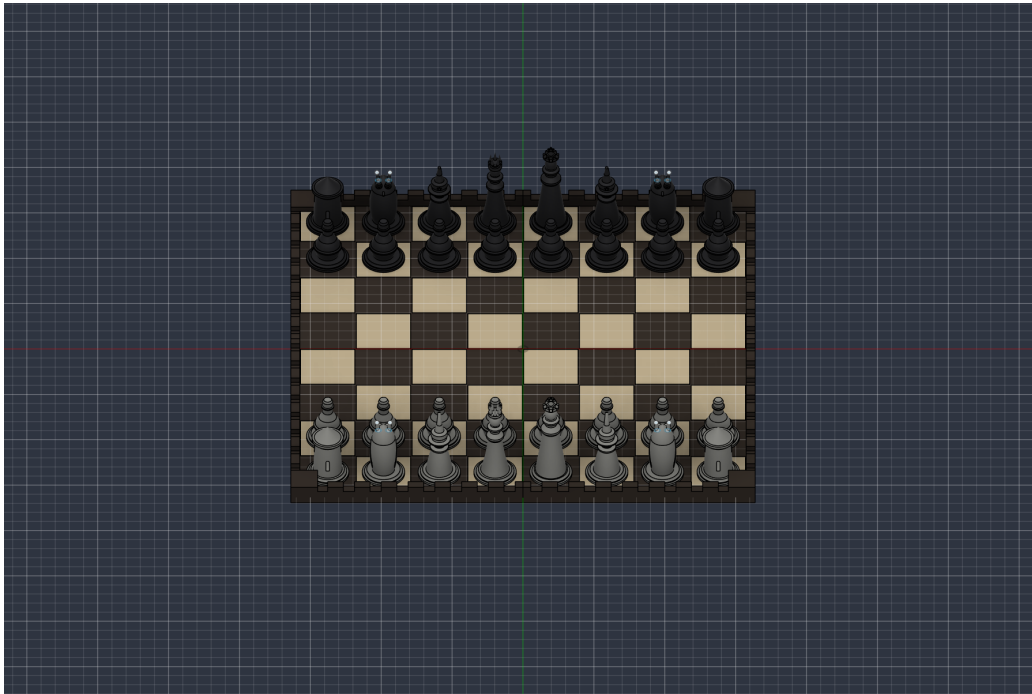


Wizard's Chess Set

Assembly manual, version 0.1.0 (project WC)



Difficulty	Intermediate
Build time (after printing)	about 2 h 40 min plus glue wait time (about 1 h)
Steps	15
Printed parts	74 (4 quadrants, 32 inserts, 8 joiners, 32 pieces)
For	Adults and teens. Adult supervision under 14.
Status	DESIGNED. Not yet printed or tested. All fits are provisional.

A gothic wizard-school chess set: potion-flask pawns, castle-turret rooks, wizard-hat bishops, owl knights, a moon-sorceress queen and a headmaster-tower king, on a four-piece board with a castle-wall border. All designs are original. The board comes in four 208 mm quadrants so each fits a 256 mm print bed.

Safety and age

- Small parts. The light inserts, joiners and the owl ear tufts are small. Not a toy for children under 14; keep away from anyone who puts things in their mouth.
- Sharp points. The queen spires, the king finial and the bishop tip are pointed, and the castle wall edges are square. Handle with care.
- Glue. Use cyanoacrylate or epoxy in a ventilated room. Wear eye protection. Keep glue away from skin and from the board top surface.
- Cutting tools. Cut away from your body and onto a mat when removing brims.
- Magnets (optional). Keep neodymium magnets away from pacemakers, phones and cards, and away from small children.
- Test status: Designed only. The set has not been printed or tested yet. Fit values (0.2 mm clearances) are PROVISIONAL until a test print confirms them.

Before you start

Work at a clear table at least 60 x 60 cm with bright light. Read all steps once. Every step ends with a check ("You should see...") and a common mistake. Steps marked **Safe to stop** are good places to pause; steps marked **Do not stop** must be finished before you walk away because glue is setting.

The board and the pieces are described from the white side: the player with the stone-gray pieces sits at the bottom, and the white rook on the left is on square a1.

Tools and materials

ID	Item	Needed
T-01	Fine flush cutters	required
T-02	Hobby knife with spare blades	required
T-03	Sandpaper, 220 grit	required
T-04	Cyanoacrylate (super glue) gel or 5-minute epoxy	required
T-05	Steel ruler or straight edge, at least 450 mm	required
T-06	Digital calipers	optional
T-07	Painter's tape	optional
T-08	Self-adhesive felt, 28 mm discs, 32 pcs	optional
T-09	Neodymium magnets 10 x 3 mm, 32 pcs	optional

Print guide

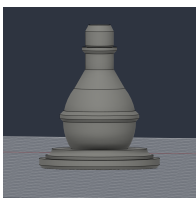
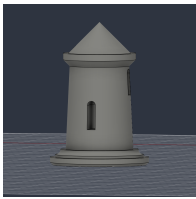
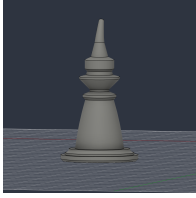
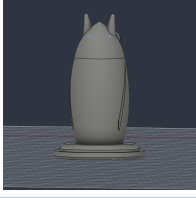
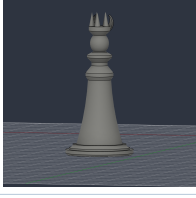
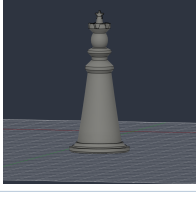
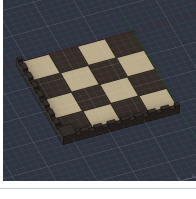
Printer: any FDM printer with at least 220 x 220 mm bed (the board quadrants are 208 x 208 mm). Nozzle 0.4 mm. Material PLA or PETG. Walls 3. No supports for any part. Print every piece upright. Pieces: stone gray 16, charcoal 16 (half of each piece type in each color). Board quadrants in a dark color, light inserts in a light color. Grams below are ESTIMATES from the model volume (3 walls, 15% infill about 60% of solid), not measured. Print times are not stated because they have not been sliced.

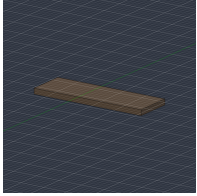
ID	Part	Qty	Size	Layer	Infill	g each (estimate)	Notes
WC-PAW-001	Pawn (potion flask)	16	45 mm tall	0.20	15%	10.2	Print upright. Neck and cork are narrow; slow the outer walls if the cork looks stringy.
WC-ROK-001	Rook (castle turret)	4	55 mm tall	0.20	15%	17.4	Print upright. The two arched slots bridge 3.2 mm; expect slight sag at the top of each arch.
WC-BIS-001	Bishop (wizard hat)	4	69.4 mm tall	0.16	15%	12.3	Print upright. The bent hat tip is a thin 1.2 to 4.8 mm cone: print slowly and add part cooling.
WC-KNI-001	Knight (owl)	4	60 mm tall	0.16	15%	17.6	Print upright. The beak faces +Y. Eye rims overhang slightly; fine at 0.16 mm.
WC-QUE-001	Queen (moon sorceress)	2	80 mm tall	0.16	15%	13.5	Print upright. The crescent bottom bridges about 2 mm.
WC-KIN-001	King (headmaster tower)	2	89.3 mm tall	0.16	15%	18.6	Print upright. The star finial has short flat undersides about 2.5 mm wide.
WC-BRD-001	Board quadrant (LL, LR, UL, UR)	4	208 x 208 x 18 mm	0.20	10%	198.6	Print top face UP. Four different parts, one of each. Brim optional against warping.
WC-BRD-001-I	Light square insert	32	48.6 x 48.6 x 1 mm	0.20	100%	3.0	Print flat. Print one test insert first; it must drop into a pocket without force.
WC-BRD-002	Seam joiner	8	60 x 20 x 3 mm	0.20	100%	4.5	Print flat.

Total printed mass is roughly 1343 g (estimate). Files: exports/stl/ (one STL per part; the board quadrant file is one per corner).

Parts list and identification

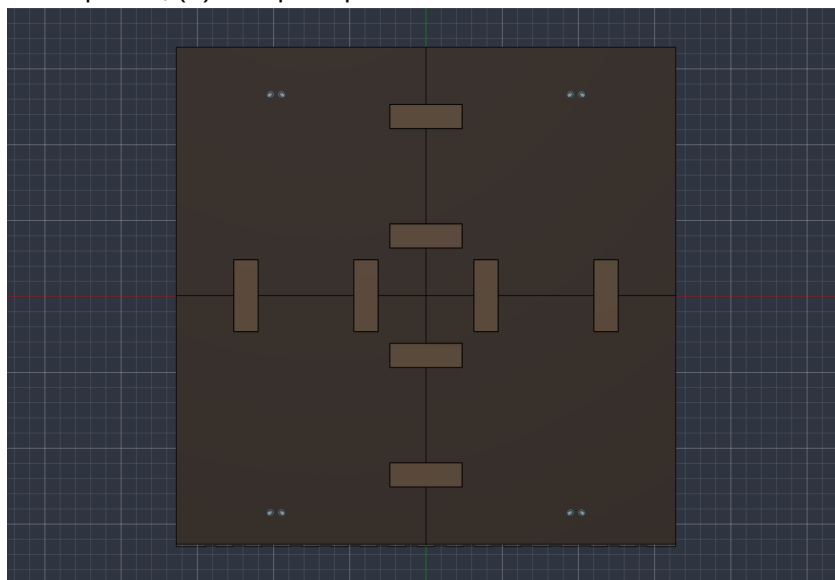
Quantities are per set. Spares are recommended for the small parts.

Picture	ID	Name	Qty	Spare	First step
	WC-PAW-001	Pawn (potion flask)	16	0	14
	WC-ROK-001	Rook (castle turret)	4	0	14
	WC-BIS-001	Bishop (wizard hat)	4	0	14
	WC-KNI-001	Knight (owl)	4	0	14
	WC-QUE-001	Queen (moon sorceress)	2	0	14
	WC-KIN-001	King (headmaster tower)	2	0	14
	WC-BRD-001	Board quadrant (LL, LR, UL, UR)	4	0	3
(plain 48.6 mm square tile, 1 mm thick)	WC-BRD-001-I	Light square insert	32	2	3

Picture	ID	Name	Qty	Spare	First step
	WC-BRD-002	Seam joiner	8	2	4
	WC-HW-001	Neodymium magnet 10 x 3 mm (optional)	32	2	13
	WC-HW-002	Self-adhesive felt disc 28 mm (optional)	32	2	12

Sub-assembly map

Order of work: (A) prepare parts, (B) glue the four quadrants into one board, (C) fill the light squares, (D) optional felt and magnets under the pieces, (E) set up the pieces.



Underside of the finished board. The eight tan rectangles are the seam joiners.

Part A: Prepare the parts

Step 1. Clear a flat table at least 60 x 60 cm.

- Use a table with good light. Lay down a mat or clean cloth.
- Put the four board quadrants, 8 joiners, 32 light inserts and all pieces in separate piles.

Check: Everything is within reach and the pieces are not touching the glue area.

Common mistake: Working on a newspaper that sticks to the glue.

Time: 5 min **Safe to stop**

Step 2. Clean every printed part.

- Cut off any brim with flush cutters.
- Scrape the first-layer edge ("elephant foot") with a hobby knife, cutting away from yourself.
- Lightly sand the bottom edge of every quadrant and the sides of every joiner and insert.

Check: The bottom face of each part sits flat on the table without rocking.

Common mistake: Sanding the top of a quadrant: this scratches the dark squares.

Time: 30 min **Take a break**

Step 3. Dry-fit one insert into a pocket.

Dry-fit one insert into a pocket.

Parts: 1 x WC-BRD-001, 1 x WC-BRD-001-I

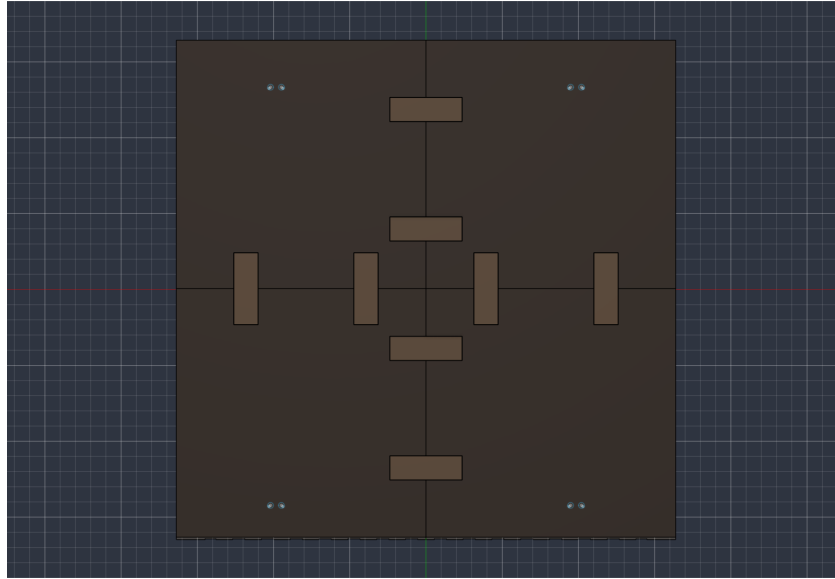
- Take one light insert and one quadrant. Do not use glue yet.
- Drop the insert into any light-square pocket, flat side up.

Check: The insert drops in without force and its top is flush with the dark surface (gap under 0.3 mm).

Common mistake: The insert is stuck or proud: sand its edges and try again. If the insert rattles loosely, glue it in later.

Time: 3 min **Safe to stop**

Step 4. Dry-fit one joiner into an underside pocket.



Dry-fit one joiner into an underside pocket.

Parts: 1 x WC-BRD-002

- Turn quadrant LL upside down (castle wall facing the table; the four rectangular pockets face you).
- Drop a joiner into any pocket.

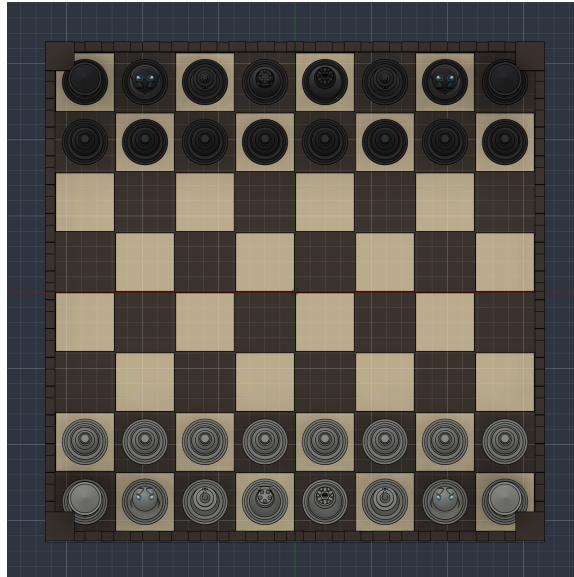
Check: The joiner sits flush with the bottom face (within 0.3 mm). It may be slightly loose, which is intended.

Common mistake: Joiner standing proud: sand its sides, not its faces.

Time: 3 min **Safe to stop**

Part B: Assemble the board

Step 5. Identify the four quadrants.



Identify the four quadrants.

Parts: 4 x WC-BRD-001

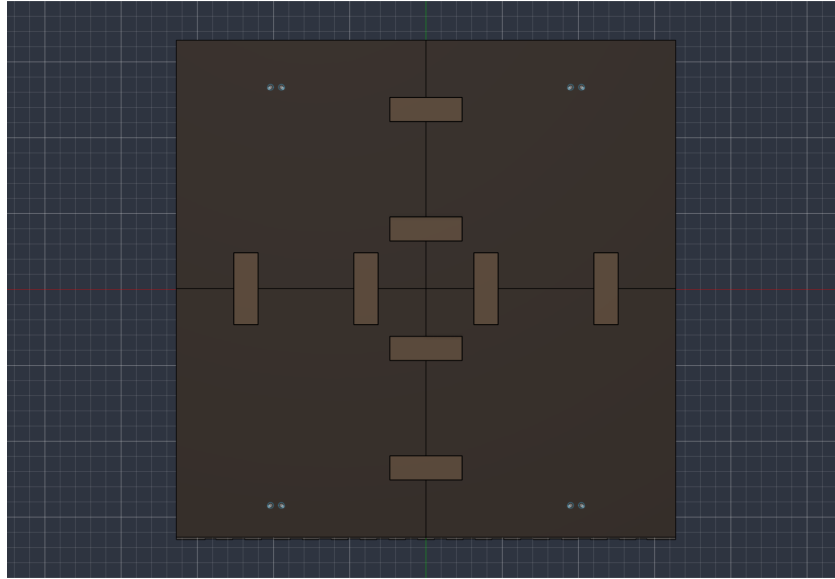
- Look at the board from the white side (the side with the stone-gray pieces).
- LL is the bottom-left corner (files a to d, ranks 1 to 4). LR is bottom-right (files e to h, ranks 1 to 4). UL is top-left (files a to d, ranks 5 to 8). UR is top-right (files e to h, ranks 5 to 8).
- Write the letters LL, LR, UL, UR on masking tape and put one tape strip on the underside of each quadrant.

Check: Each quadrant has a tape label. The castle wall is on the two outer edges of every quadrant.

Common mistake: Putting a quadrant in the wrong corner. The seam edges (no wall) must touch each other.

Time: 5 min **Safe to stop**

Step 6. Lay the quadrants face down in a 2 x 2 square.



Lay the quadrants face down in a 2 x 2 square.

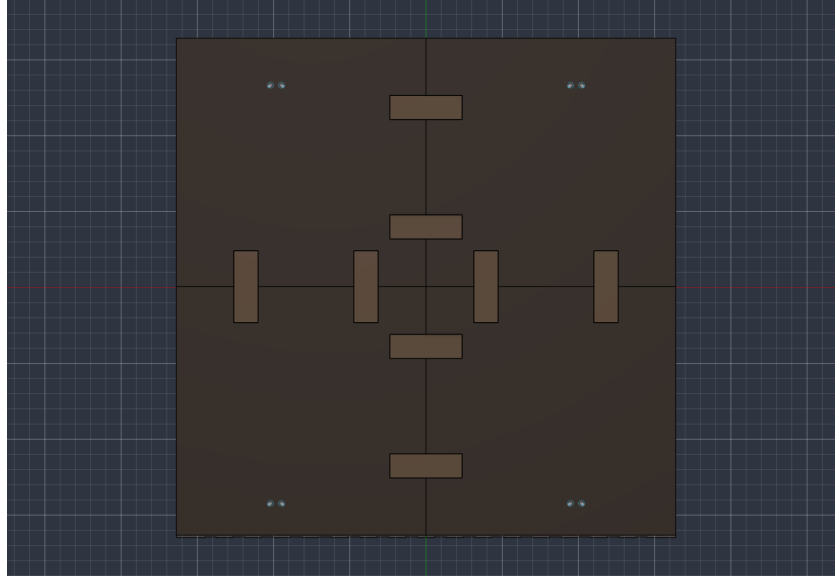
- Turn each quadrant upside down by flipping it left to right, like turning a page.
- Arrange them in two rows as you now see them from below: the near row is LR then LL (left to right); the far row is UR then UL. The seam edges (no castle wall) touch each other and the castle walls form the outer edge.
- Hold the straight edge across the seam and check the bottom faces are level.

Check: The four bottoms form one flat 416 x 416 mm square with tight seams.

Common mistake: Wall on a seam edge: that quadrant is in the wrong corner.

Time: 5 min **Safe to stop**

Step 7. Glue two joiners across the left-right seam of the bottom row.



Glue two joiners across the left-right seam of the bottom row.

Parts: 2 x WC-BRD-002

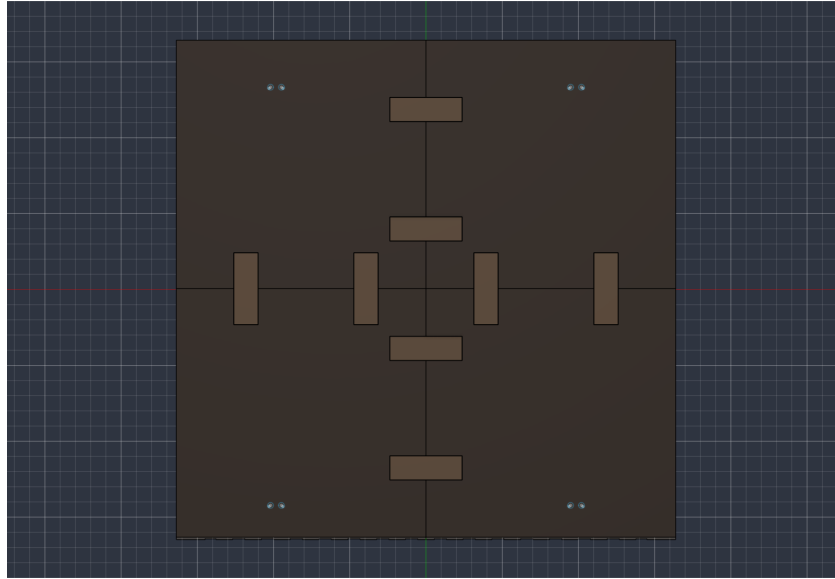
- Put a drop of gel glue in the two pockets of LL that touch the LR seam, and in the two matching pockets of LR.
- Press one joiner into each pair of pockets so that it bridges both quadrants.
- Wipe any glue that squeezes out with a paper towel.

Check: Two joiners bridge LL and LR, flush with the bottom. The top faces of LL and LR meet with no step.

Common mistake: Glue on the seam edge: the quadrants will bond crooked.

Time: 10 min + 15 min wait **Do not stop until the glue has set (15 min)**

Step 8. Repeat for the top row.



Repeat for the top row.

Parts: 2 x WC-BRD-002

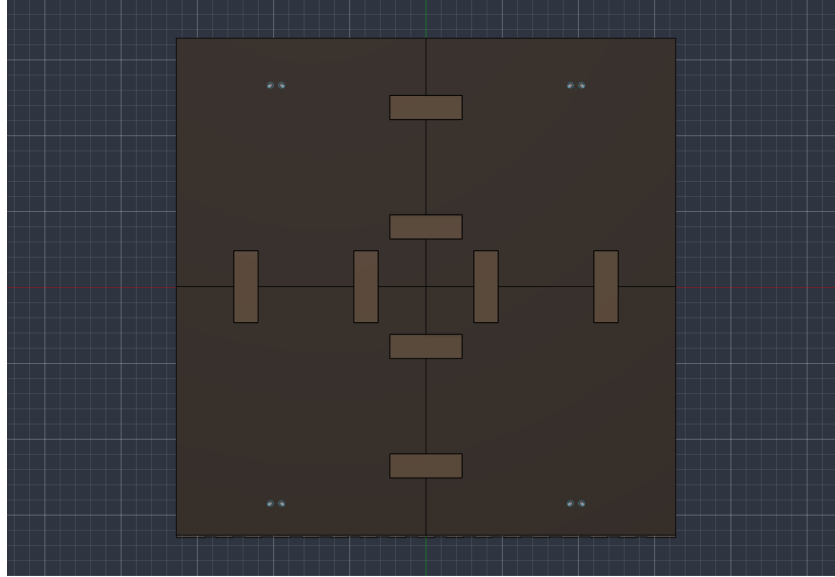
- Glue two joiners across the UL and UR seam in the same way.

Check: Two joiners bridge UL and UR, flush with the bottom.

Common mistake: Using the wrong pockets: the long side of the joiner runs across the seam.

Time: 10 min + 15 min wait **Safe to stop after cure**

Step 9. Glue the last four joiners across the middle seam.



Glue the last four joiners across the middle seam.

Parts: 4 x WC-BRD-002

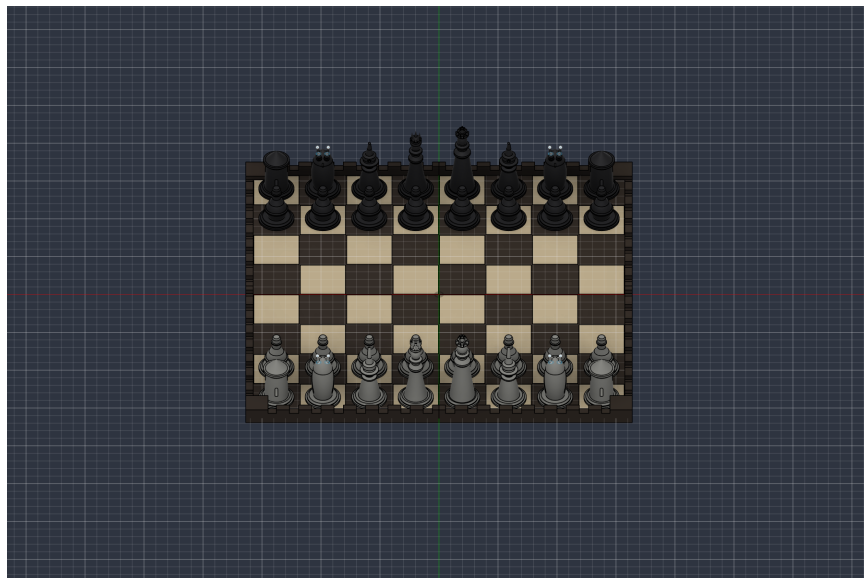
- Glue four joiners into the pockets along the seam between the bottom row and the top row.
- Lower the top row onto the bottom row, keeping the seam edges aligned.
- Press down along the seam for one minute.

Check: The four quadrants are one rigid board. Press the board gently: it does not flex at the seams.

Common mistake: A step at the seam: re-seat the joiner before the glue sets.

Time: 10 min + 30 min wait **Do not stop until the glue has set (30 min)**

Step 10. Turn the board over and check flatness.



Turn the board over and check flatness.

- Flip the board right side up.
- Lay the straight edge along the middle seam, then across the seam in the other direction.

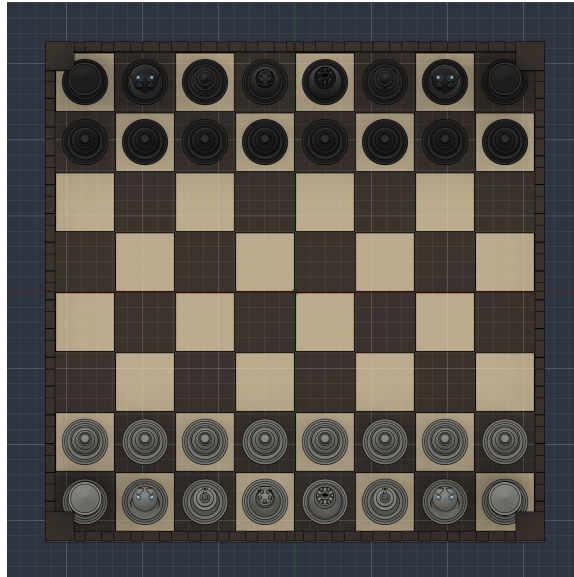
Check: No gap under the straight edge larger than 0.5 mm.

Common mistake: A bow in the board: add a drop of glue under the loose joiner.

Time: 3 min **Safe to stop**

Part C: Fill the light squares

Step 11. Drop the 32 light inserts into the light squares.



Drop the 32 light inserts into the light squares.

Parts: 32 x WC-BRD-001-I

- Work one quadrant at a time, 8 inserts each.
- Drop each insert into a pocket. The a1 square (bottom-left corner next to the white rook) is dark; the h1 square is light.
- Add a tiny dot of glue only if an insert rattles.

Check: Every light square is tan, every dark square is dark brown, and all insert tops are flush.

Common mistake: An insert in a dark-square pocket: there are no dark pockets, so this cannot happen.

Time: 20 min **Take a break**

Part D: Optional: felt and magnets

Step 12. (Optional) Press a felt pad into the recess under each piece.

- Turn a piece over. The shallow round recess is 28 mm wide.
- Peel the pad and press it in.

Check: The pad sits in the recess and does not stand proud.

Common mistake: A pad stuck on the outer rim: it will lift the piece.

Time: 10 min **Safe to stop**

Step 13. (Optional) Glue a 10 x 3 mm magnet into the center cavity under each piece.

- Use the same polarity facing down for all pieces of one color.
- Put one drop of glue in the center hole and push the magnet in.

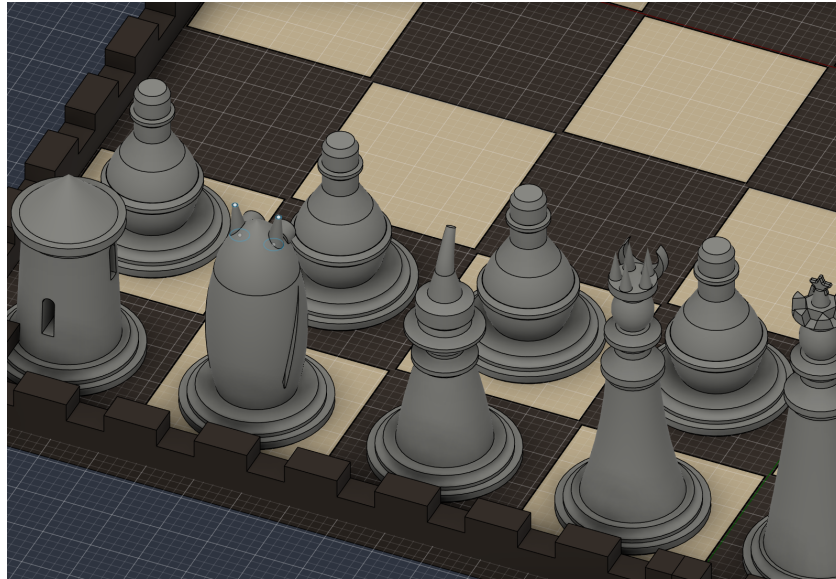
Check: The magnet is below the felt recess surface.

Common mistake: Magnets glued with opposite polarity: pieces repel each other.

Time: 20 min + 10 min wait **Do not stop until the glue has set (10 min)**

Part E: Set up the pieces

Step 14. Set up the white side (stone gray).



Set up the white side (stone gray).

Parts: 8 x WC-PAW-001, 2 x WC-ROK-001, 2 x WC-KNI-001, 2 x WC-BIS-001, 1 x WC-QUE-001, 1 x WC-KIN-001

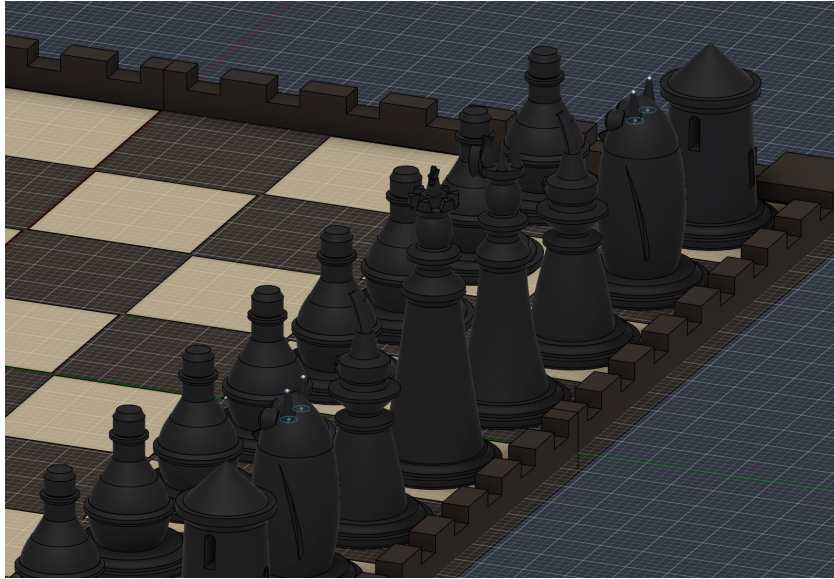
- Stand the board with the white side nearest you.
- Rank 2: place the 8 pawns on a2 to h2.
- Rank 1 from left to right: rook a1, knight (owl) b1, bishop (hat) c1, queen d1, king e1, bishop f1, knight g1, rook h1.
- Turn every owl so its beak points toward the black side.

Check: The queen stands on her own color: d1 is a light square for white. The king stands on the e file.

Common mistake: Queen and king swapped: the taller piece (king) goes on e1.

Time: 5 min **Safe to stop**

Step 15. Set up the black side (charcoal).



Set up the black side (charcoal).

Parts: 8 x WC-PAW-001, 2 x WC-ROK-001, 2 x WC-KNI-001, 2 x WC-BIS-001, 1 x WC-QUE-001, 1 x WC-KIN-001

- Rank 7: place the 8 pawns on a7 to h7.
- Rank 8 from left to right as seen from the white side: rook a8, knight b8, bishop c8, queen d8, king e8, bishop f8, knight g8, rook h8.
- Turn every owl so its beak points toward the white side.

Check: The black queen stands on a dark square (d8) and the kings face each other along the e file.

Common mistake: Black queen on e8: swap with the king.

Time: 5 min **Safe to stop**

Final inspection

Do this	Pass if
Place a straight edge across the middle seam of the board.	No gap larger than 0.5 mm.
Measure the overall board with a ruler.	416 mm by 416 mm (plus or minus 2 mm).
Place a piece on a square and wiggle it.	The base (38 mm) sits inside the square with at least 5 mm to each square edge.
Count the pieces.	16 stone gray and 16 charcoal; each side has 1 king, 1 queen, 2 rooks, 2 bishops, 2 knights, 8 pawns.
Run a finger along the castle wall.	No sharp print blobs or loose strands.

First use, care and storage

Play on a hard flat table. Lift pieces by the base, not the tip. Store pieces upright in a box with dividers. Wipe the board with a dry cloth. To disassemble the board, cut the joiners with a hobby knife along the seam; this cannot be undone, so replace the joiners.

Troubleshooting

Symptom	Likely cause	Fix
Insert will not drop in	Elephant foot or over-extrusion	Sand the insert sides; reprint with lower flow (95%).
Insert is loose	Under-extrusion or shrinkage	Add one dot of glue under it.
Seams show a step	Quadrant warped on the bed	Add a brim and re-print, or sand the high edge.
Joiner will not seat	Joiner slightly oversize	Sand the long sides; do not force it.
Owl or hat tip breaks	Thin features printed too fast	Reprint slowly with part cooling; glue the broken tip with a drop of CA.
Pieces slide on the board	No felt or magnet	Fit the optional felt pads or magnets.

Test record

Not yet tested. No test prints have been made. The two clearances that matter (0.2 mm for the joiners and 0.2 mm around each insert) are PROVISIONAL until a dated entry is added to the tests folder.

Specifications (designed values)

Piece	Height	Base	Volume
Pawn	45.0 mm	38 mm	13.7 cm ³
Rook	55.0 mm	38 mm	23.4 cm ³
Bishop	69.4 mm	38 mm	16.5 cm ³
Knight (owl)	60.0 mm	38 mm	23.7 cm ³
Queen	80.0 mm	38 mm	18.1 cm ³
King	89.3 mm	38 mm	25.0 cm ³
Board (assembled)	18 mm	416 x 416 mm	4 x 266.9 cm ³ + 32 x 2.4 cm ³

Changelog and licence

0.1.0 (2026-10-31): first version, designed in Fusion, not yet printed. Designed by John Stancell with Claude. All characters and shapes are original: no franchise characters, logos or lettering are used. Licence: personal use; share with credit.